RESOURCE BASED INDUSTRIES

PETROCHEMICALS INDUSTRY

PHARMACEUTICAL INDUSTRY

WOOD-BASED INDUSTRY

RUBBER PRODUCTS INDUSTRY

OIL PALM-BASED INDUSTRY

FOOD PROCESSING INDUSTRY

Chapter 14

PETROCHEMICALS INDUSTRY

PETROCHEMICALS INDUSTRY

SECTION I OVERVIEW

14.01 The petroleum and petrochemicals industry is one of the leading industries in Malaysia. Presently, Malaysia is a major exporter of petrochemical products within the ASEAN region, exporting both commodity grade polymers, as well as petrochemical derivatives. Factors contributing to the development of the industry include:

- availability of resources in hydrocarbon feedstock from oil and gas;
- cumulative investments of RM55 billion in the industry, with Malaysian investments contributing RM34.8 billion, or 63.3 per cent, and foreign investments, RM20.2 billion (36.7 per cent); and
- presence of 40 petrochemical companies in operation, with a combined capacity of 12.8 million metric tonnes per annum. As at the end of 2005, investments by these companies totalled RM31.5 billion. PETRONAS is the major domestic investor in the industry. The United States of America (USA) is the largest source of foreign investments, contributing 40.3 per cent of the total foreign investments, followed by Germany (22.8 per cent) and Japan (14 per cent).

14.02 During the period of the Third Industrial Master Plan (IMP3), 2006-2020, the industry will be encouraged to further develop its potential. Areas of focus include expanding its current manufacturing activities, as well as developing new products and diversifying into manufacturing-related services and facilities. These developments will assist in achieving the full integration of the industry.

SECTION II PERFORMANCE DURING THE SECOND INDUSTRIAL MASTER PLAN

(a) Status of the Industry

14.03 The industry covers petroleum products, natural gas and petrochemicals. Petroleum products include lubricating oils and refinery products, such as gasoline, kerosene, fuel oils, gas oils, diesel, naphtha and bitumen. The range of petrochemical products includes:

- commodity grade plastic resins, such as polyethylene (PE) resins, polypropylene (PP) resins, polyvinyl chloride (PVC) resins and polystyrene (PS) resins;
- engineering grade plastic resins, such as acrylonitrile-butadiene (ABS) resins, polyoxymethylene (POM) resins and polyester co-polymer (PETG) resins;
- petrochemical derivatives, such as ethylene oxide (EO), butanols and acetic acid; and
- specialised and fine chemicals, such as food additives and raw materials for pharmaceuticals.

(i) Feedstocks from Natural Gas

14.04 The production of petrochemicals has been stimulated by the availability of natural gas as feedstock for the industry. Natural gas is mainly used for the production of liquefied natural gas (LNG) and power generation. Malaysia is presently the third largest producer of LNG in the world, after Algeria and Indonesia, with a production capacity of 24 million metric tonnes per annum, largely concentrated in the Bintulu complex in Sarawak. The entire LNG produced is exported, mainly to Japan, Republic of Korea and Taiwan. Presently, the Bintulu complex also produces 450,000 million metric tonnes per annum of liquefied petroleum gas (LPG), mostly for exports.

14.05 Methane (sales gas for power generation), ethane, propane, butane and condensates are obtained from natural gas, and used as feedstocks for the petrochemicals industry. These feedstocks are produced by six gas processing plants in Terengganu, with a combined capacity of 2,000 million standard cubic feet of gas per day. The gas processing plants are part of the Peninsular Gas Utilisation Project, which includes a trans-peninsular gas transmission pipeline system, connecting the gas processing plants to petrochemical zones of Kertih in Terengganu and Gebeng in Pahang, as well as industrial areas in Peninsular Malaysia. These petrochemical zones use the feedstocks from the gas processing plants as basic raw materials to produce downstream petrochemical products.

14.06 For the production of petrochemicals, ethane is cracked into ethylene. There are two ethane crackers in Terengganu. Ethylene is used for the production of polyethylene, acetic acid and ethylene derivatives. Propane is used as the raw material for the propane dehydrogenation plant in Gebeng, Pahang, to produce propylene. Propylene is used for the production of polypropylene, and together with butane, they are used for the production of methyl tertiary butyl ether (MTBE) and propylene derivatives, such as acrylics, oxo alcohols, butanediol, butylacrylates, plasticisers and tetrahydrofurane. Condensates are used as raw materials by the aromatics plant in Terengganu to produce paraxylene and

benzene. These products are, in turn, used for the production of polyethylene terephthalate and polystyrene.

(ii) Feedstocks from Petroleum

14.07 The production of petrochemicals also uses naphtha obtained from petroleum refining. Naphtha is available from the existing petroleum refineries in Peninsular Malaysia, and the gas-based middle distillates synthesis (MDS) plant in Bintulu, Sarawak. To complement domestic requirements, a large proportion of naphtha is also imported. The naphtha cracker in Pasir Gudang-Tanjung Langsat, Johor, provides ethylene, propylene and butadiene as feedstocks for the production of polypropylene, polyethylene and aromatics. It also provides feedstock for the production of ethylene vinyl acetate (EVA).

(b) Petrochemical Zones

14.08 During the period of Second Industrial Master Plan (IMP2), 1996-2005, three petrochemical zones were established in Kertih, Terengganu; Gebeng, Pahang and Pasir Gudang-Tanjung Langsat, Johor. Each zone is an integrated complex, supplied with crackers, syngas and aromatics facilities to produce basic feedstocks for the production of downstream petrochemical products. PETRONAS has contributed significantly to the development of support infrastructure, dedicated utilities and services to the petrochemical zones of Kertih, Terengganu and Gebeng, Pahang. This has created a conducive investment environment for the expansion of the petrochemical industry within the zones. Major products manufactured in the three petrochemical zones are:

Zone	*Core Products*	*Derivatives and Products*
Kertih, Terengganu	Ethylene, propylene, para-xylene, benzene and syngas	Ammonia, acetic acid, polyethylene (PE), ethanolamines, ethoxylates, glycol ethers, butanol, butyl acetate, ethylene oxide (EO), ethylene glycol (EG), vinyl chloride monomer and polyvinyl chloride (PVC)
Gebeng, Pahang	Propylene and syngas	Polypropylene (PP), acrylic acid and esters, butyl acetate, oxo-alcohols, pthalic anhydride and plasticisers, butanediol, tetrahydrofurane, gamma-butyrolactone, polyester copolymers (PETG), purified terephthalic acid, dispersion PVC (DPVC), methyl metacrylate copolymers, methyl tertiary butyl ether (MTBE) and polyacetals
Pasir Gudang -Tanjung Langsat, Johor	Ethylene, propylene, benzene, toluene, xylene and butadiene	Polyethylene (PE), polypropylene (PP), ethylbenzene (EB), styrene monomer (SM), polystyrene (PS), expandable polystyrene (EPS) and ethylene vinyl acetate (EVA)

14.09 There are also other petrochemical plants located in various parts of the country. The major ones include:

- ammonia and urea fertiliser plants in Bintulu, Sarawak; and Gurun, Kedah;
- acrylonitrile butadiene styrene (ABS) plant in Pulau Pinang;
- methanol plant in Labuan; and
- nitrile-butadiene rubber (NBR) plant in Kluang, Johor.

There is potential for these areas, especially Bintulu, Gurun and Labuan, to be developed into new petrochemical zones.

(c) Technology Development

14.10 Most of the existing companies are multinational corporations (MNCs) or joint ventures, with the MNCs providing the technology for the production of petrochemicals. Most of the plants have installed the latest equipment, with distributed control system, process reaction kinetics, purification procedures and effluent treatment systems.

14.11 New uses for petrochemical-based products are continually being developed. With advances in technology, the linkages of the petrochemicals to consumers are expected to increase in the future. The emphasis will be on environment-friendly and biodegradable products.

(d) Linkages with Other Industries

14.12 The petrochemical industry has extensive intra-linkages with downstream activities, as well as other industries. Plastics parts and components and products are the preferred materials, in view of their superior properties and lower costs, compared with traditional materials, such as paper and metal. The downstream activities mainly involve polymer compounders, converters (such as plastics packaging producers) and fabricators (plastics injection moulding producers), producing products for application in industries such as electrical and electronics (E&E), medical devices, automotive, construction and agriculture. The involvement of Malaysian-owned companies, including small and medium enterprises (SMEs), is mainly in downstream activities, mostly producing plastics parts and components, and packaging materials.

14.13 The availability of polymers and plastics resins has encouraged the development of plastics fabrication activities. At least 60 per cent of the plastics resins and polymers consumed by the domestic market are sourced locally. These manufacturers are mainly involved in the production of packaging materials, parts and components for the E&E, construction, automotive, furniture and

agriculture industries and household consumer products. Plastics packaging is the largest market segment, with a share of 37 per cent of the total market for plastics products, followed by parts and components for E&E (25 per cent), household consumer products (15 per cent), and parts and components for construction (8 per cent), automotive (7 per cent) and agriculture (3 per cent).

14.14 The industry also has significant linkages with many other industries. Fertilisers made from petrochemicals, such as urea and ammonia, are used by the agriculture industry, resins by the fibre and fabrics industry, and coatings and adhesives by the wood and paper industries. Speciality and fine chemicals derived from petrochemicals are used as food additives, flavours and preservatives, as well as in the manufacture of pharmaceuticals, cosmetics and paints.

(e) Investments

14.15 During the IMP2 period, the total approved investments for petrochemicals, including petroleum products, amounted to RM31.2 billion, of which RM27.8 billion, or 89.1 per cent, were for petrochemicals, and RM3.4 billion (10.9 per cent) for petroleum products (Table 14.1). As at 2005, a total of 40 companies were in operation, with investments amounting to RM31.5 billion. Of the total investments, RM15.6 billion, or 53.2 per cent, were foreign direct investments (FDIs), mainly from the USA, Germany and Japan. PETRONAS is the largest domestic investor. Of the total 40 companies in operation, 19 were joint venture companies, 14 wholly foreign-owned and seven wholly-owned by Malaysians.

TABLE 14.1

INVESTMENTS IN THE PETROCHEMICALS INDUSTRY

	1996-2000	*2001-2005*	*1996-2005*
Total investments (RM billion)	**20.9**	**6.9**	**27.8**
Domestic (RM billion)	7.6	1.1	8.7
Foreign (RM billion)	13.3	5.8	19.1
No. of projects	36	34	70
Employment (persons)	5,734	1,130	6,864
CIPE[1] (RM million per employee)	3.6	6.1	4.1

Note: [1] Capital investment per employee ratio

Source: Malaysian Industrial Development Authority

14.16 The industry employs an estimated workforce of 10,000 persons, largely at the packaging line. Reflecting the capital and skills intensive nature of the industry, the capital investment per employee (CIPE) ratio recorded during the IMP2

period was RM4.1 million, higher than the average ratio of RM0.4 million in the manufacturing sector. The ratio increased from RM3.6 million in the first phase of the IMP2 (1996-2000) to RM6.1 million in the second phase (2001-2005). This reflected a shift towards more capital and technology intensive operations, with the production of higher value-added products.

(f) Exports and Imports

14.17 During the IMP2 period, total exports of petrochemicals increased by an average annual rate of 21.8 per cent, from RM2 billion in 1996 to RM14.6 billion in 2005. Total imports of petrochemicals increased by an average annual rate of 10.1 per cent, from RM5.8 billion in 1996 to RM17.2 billion in 2005. (Table 14.2). Major exports of petrochemicals in primary forms were commodity grade polymers, such as polyethylene (PE) and polypropylene (PP), and petrochemical derivatives, such as acrylic acid, methanol, methyl tertiary butyl ether (MTBE) and speciality chemicals. Polymers were mainly exported to the People's Republic of China, India and ASEAN. Exports of speciality chemicals were mainly to the People's Republic of China, the European Union (EU) and the USA. Major imports comprised specialised and engineering grade polymers and co-polymers from the USA, Japan and the Republic of Korea.

TABLE 14.2

EXPORTS AND IMPORTS OF PETROCHEMICALS

	1996		*2005*		*1996-2005*		*1996-2005*	
	Exports	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*
	(RM billion)						*Average Annual Growth (%)*	
Petrochemicals	2.0	5.8	14.6	17.2	69.4	101.4	21.8	10.1

Note: Exports and imports of petrochemicals are recorded as polymers in primary forms and organic chemicals, excluding oleochemicals.

Source: Department of Statistics

14.18 Presently, Malaysia is a net importer of petrochemicals. This situation arises because the petrochemicals which are imported are used as materials in the manufacture of various products, including other petrochemicals, which are subsequently exported as intermediate or consumer goods. As an example, plastics products may be exported as components of E&E, automobiles or medical devices, or used as packaging materials in almost all exported products. Petrochemicals may also be exported as adhesives in plywood or furniture, or as surface coatings in lacquers and paints. Food additives and pharmaceuticals which are exported may also contain petrochemicals. Imports of certain petrochemicals are required to manufacture other downstream petrochemical

products. While naphtha from crude petroleum and natural gas plus condensates are the main raw materials which are available locally, imports of other petrochemical-based raw materials are required to produce certain petrochemical products. For example, ethylene dichloride, for the production of vinyl chloride monomers and subsequent production of polyvinyl chloride resins, is not produced locally and needs to be imported. Similarly, 40 per cent of the resins requirements, mainly engineering and specialised grade plastics resins for the manufacture of plastics products, are imported.

14.19 In terms of intra-ASEAN trade, with the full realisation of the Common Effective Preferential Tariffs Scheme (CEPT) under the ASEAN Free Trade Area (AFTA), the volume of trade for petrochemicals between Malaysia and its ASEAN partners has increased significantly. Total exports to ASEAN countries increased by 149.3 per cent, from RM2.1 billion in 2001 to RM5.2 billion in 2005. ASEAN accounted for 35.6 per cent of Malaysia's exports of petrochemicals in 2005. Imports from ASEAN countries increased by 138.6 per cent, from RM2.8 billion in 2001 to RM6.7 billion in 2005. ASEAN accounted for 38.9 per cent of Malaysia's imports of petrochemicals in 2005. Malaysia's major trading partners in ASEAN were Singapore, Thailand and Indonesia.

SECTION III PROSPECTS

(a) Regional Market

14.20 Features of the regional market include:

- in ASEAN, Singapore, Thailand and Indonesia are major producers of petrochemical products and are direct competitors for foreign investments;
- the People's Republic of China is expected to remain the largest market for Malaysia's exports of petrochemicals. There will be considerable potential for the export of higher value-added products, for example, petrochemical derivatives, to the People's Republic of China;
- demand for commodity-type petrochemicals from ASEAN countries, especially Cambodia, Lao PDR, Myanmar and Viet Nam, is expected to increase, in tandem with the growth of their economies; and
- demand for higher value-added products, such as fine and speciality chemicals, from other ASEAN countries, namely Thailand, Indonesia and the Philippines, is also expected to increase.

14.21 The industry has linkages with many other industries. Malaysia has an advantage over Singapore, in that there are downstream industries using the products produced. However, the downstream industries are not as developed as in Thailand. This is attributed to the limited local market, due to the smaller

population. With the progressive implementation of the ASEAN Investment Area (AIA), there is a need for ASEAN to be considered as a single market. Producer countries in ASEAN will need to focus on areas where they have resources or key competencies. Malaysia will need to further develop the downstream industries, thereby increasing the demand for locally produced petrochemicals.

(b) Creation of New Zones

14.22 There is potential to develop additional petrochemical zones in Bintulu, Sarawak; Labuan; Gurun, Kedah; and Port of Tanjung Pelepas, Johor:

- presently, Bintulu has an LNG complex, a urea and ammonia plant, a MDS plant, deep water port and supply of natural gas and LPG. In the medium term, there are opportunities to integrate these plants into a petrochemical zone, with the provision of centralised utilities and facilities (CUF). This will, in turn, attract new investments in downstream activities, depending on the available feedstocks;

- Labuan has a modern methanol complex, which is presently undergoing expansion. There is a potential to promote an oil refinery, catering for the export market and downstream products, based on methanol. Dedicated infrastructure facilities will be required to realise its potential to become a fully developed petrochemical zone;

- presently, Gurun has an ammonia, urea and formaldehyde plant each. It is situated close to the gas available from the Joint-Development Area between Malaysia and Thailand, which has an initial capacity of 390 million standard cubic feet daily. The gas is being piped to Gurun and linked to the gas separation plant in Southern Thailand via the Peninsular Gas Utilisation Project facilities. Port facilities, and common utilities and services will need to be developed to attract investments in downstream products; and

- another possible area for development into a new petrochemical zone is Tanjung Pelepas, Johor. Development in the area is initially focused on bunkering activities, with the potential to attract new investments in a petroleum refinery and a petrochemical complex for downstream products.

(c) Development of the Potential Growth Areas

14.23 The full integration of petrochemical zones will require further investments in related services, such as logistics, tank farms and CUF. Other services include regional distribution centres (RDCs) for petrochemicals and regional maintenance centres for petrochemical equipment and spares. There are investment potentials for testing laboratories and R&D activities for petrochemical process technologies, including pilot plants for new and innovative materials.

14.24 The infrastructure and manufacturing-related services with potential for development include:

- enhancement of the petrochemical zone in Gebeng, Pahang by extending the existing CUF in Gebeng 3 to all the petrochemical projects in the entire Gebeng industrial estate;

- CUF and other support facilities, for example, centralised waste water treatment, in Pasir Gudang-Tanjung Langsat, Johor and all future petrochemical zones;

- manufacturing-related services, such as engineering and maintenance services, storage facilities, tank farms and transportation, in all existing and new petrochemical zones; and

- deep-water ports, as well as new rail links to ports and roads, to facilitate product movements in the domestic market and exports.

(d) Linkages with Other Sectors

14.25 Based on the present and future market trends, there is potential to create greater synergies, by increasing Malaysia's share in both the domestic and regional markets for petrochemical products. This can be realised by taking advantage of the high intra- and inter-linkage nature of the industry. As an example, the plastics product manufacturing industry can contribute in enhancing the value chain. It has the potential to drive petrochemical developments in specific strategic applications. They include engineering plastics, composite materials and environment-friendly products. In line with the current 'green' requirements, there are opportunities to develop renewable raw materials and biodegradable materials, as well as hybrid of natural materials. Due to the growing global awareness on the environment, products made from such materials will attract higher demand and prices.

SECTION IV CHALLENGES

(a) High Cost of Developing New Petrochemical Zones

14.26 The establishment of new petrochemical zones is costly, in view of the high investments required in the provision of dedicated infrastructure facilities, such as ports and CUF, as well as support services. Upstream linkages to a refinery or gas processing plants, including a cracker, will be an advantage to ensure the availability of feedstocks. However, the challenge will be to structure the downstream products, which will generate optimum value-added in the utilisation of oil and gas resources.

(b) Competition for Investments and Markets

14.27 The cyclical nature of the petrochemical business is a characteristic of the industry. The industry will need to overcome short-term and sporadic volatilities in feedstock costs, product prices and low margins, brought about by competition in the global and regional markets, notably from West Asia and other ASEAN producers. Malaysian petrochemical companies will face increasing competition to gain greater access to the ASEAN markets, as these countries are also developing their own petrochemical industries. Malaysia will need to increase the volume of production of petrochemicals and provide a more conducive environment to promote investments in a wider range of high value-added products.

14.28 The challenge for the industry is the need to:

- maintain a long-term perspective of the business and build a business portfolio with a range of products, which will sustain its competitiveness throughout the business cycle;

- improve its cost structure through enhancing supply chain management;

- develop superior customer-service orientation, with niche market products; and

- create awareness in the development of environment-friendly products.

(c) Lack of Synergies and Economies of Scale

14.29 Main users of petrochemicals, which mostly comprise SMEs, generally lack economies of scale, capital, and technical and marketing expertise to become major producers. There will be a need to encourage consolidation within the industry, through joint ventures, strategic partnerships and other forms of collaborations with MNCs, to benefit from technology transfers, cost efficiencies and larger markets in areas such as medical devices, automotive parts and biotechnological products.

(d) Availability and Reliability of Feedstocks

14.30 The availability and reliability of feedstocks at competitive prices is a key factor for the further development and enhancement of the industry. Natural gas and condensates, obtained from the gas fields off the coast of Terengganu, are the main raw materials for petrochemicals in Kertih, Terengganu and Gebeng, Pahang. In Pasir Gudang-Tanjung Langsat, Johor, naphtha is the main raw material. Although naphtha is available from the oil refineries in the country, the current requirement of naphtha is still met mainly through imports.

14.31 The challenge is to ensure the availability of sufficient feedstocks at competitive prices for existing and new petrochemical zones. For gas and condensates, major sources will be from the Joint Development Area with Thailand, new gas discoveries offshore or the purchase of gas from neighbouring countries, for example, Indonesia. For naphtha, new refineries will need to be built in the petrochemical zones. The refineries will also be able to supply alternative feedstocks, for example, gas oils, leading to greater feedstock flexibility and wider growth options in the industry.

(e) Insufficient Infrastructure and Support Services

14.32 The future growth of the industry in the existing and new petrochemical zones requires the further development of infrastructure, utilities, facilities and manufacturing-related services. Such infrastructure, facilities and services will need to be provided at competitive costs.

(f) Technology Enhancement

14.33 There is potential to improve the process technologies. Efforts will need to be channelled towards development in specific areas, such as high-end polymer applications, engineering plastics and composite materials. The key challenges include:

- establishing R&D centres for chemical processes and process technologies at the local institutions of higher learning, in particular, PETRONAS University;
- nurturing expertise in management and innovative utilisation of catalysts to improve yields;
- encouraging applications of composite materials by formulating guidelines for the definition, production and usage of such materials, which will, in turn, lead to the diversification in the range of petrochemicals produced; and
- focusing on research in new materials and development of renewable raw materials and biodegradable materials (for example, polylactic acid) and hybrids of natural materials (for example, glucose or palm oil) with petrochemicals, leading to new products (for example, polyhydroxybutaric acid or esters). Such technologies are relatively new and expensive.

(g) Shortage of Skilled Personnel

14.34 There is a shortage of experienced workforce with the relevant technical skills, awareness and responsibility towards safety, health and environmental concerns. There will be a need to enhance collaboration between industries and training institutes to nurture the technical skills of trainees. This collaboration can take the form of an industrial apprenticeship scheme, as practised in more developed countries.

SECTION V STRATEGIES AND POLICIES

TARGETS

14.35 During the IMP3 period, the petrochemicals industry will continue to remain important in the manufacturing sector. Its linkages with other industries will be further strengthened, with the integration of the petrochemical zones. The target for investments in the industry has been set at RM34 billion for the entire IMP3 period, while that for exports, at RM36.7 billion in 2020 (Table 14.3).

TABLE 14.3

PROJECTIONS FOR THE PETROCHEMICALS INDUSTRY

	2006-2010	*2011-2015*	*2016-2020*	*2006-2020*	*2006-2020*
	(RM billion)				*Average Annual Growth (%)*
Investments	8.3	11.3	14.5	34.0	6.9
Investments per year	1.7	2.3	2.9	2.3	n.a.[1]
Exports (end period)	20.4	27.7	36.7	36.7	6.3

Note: [1] Not applicable
Source: Ministry of International Trade and Industry

STRATEGIC THRUSTS

14.36 To realise the targets, ten strategic thrusts have been set:

(1) expanding and enhancing the value-added of existing capacities and broadening the range of petrochemicals produced;

(2) diversifying into manufacturing-related services and support industries;

(3) enhancing linkages with the downstream industries, in particular, plastics and oleochemicals;

(4) intensifying the development of technologies in materials and product applications;

(5) improving chemical process technologies and the application of catalysts to increase yields;

(6) undertaking the full integration of existing petrochemical zones in Kertih, Terengganu; Gebeng, Pahang; and Pasir Gudang-Tanjung Langsat, Johor;

(7) establishing new petrochemical zones in Bintulu, Sarawak; Gurun, Kedah; Tanjung Pelepas, Johor; and Labuan;

(8) making available feedstocks at competitive prices;

(9) improving market access through free trade agreements (FTAs); and

(10) enhancing the technological and management skills and expertise of the workforce.

(1) EXPANDING AND ENHANCING THE VALUE-ADDED AND BROADENING THE RANGE OF PRODUCTS

14.37 The establishment of three new crackers will be undertaken to provide additional feedstocks to encourage the expansion of capacities of existing petrochemical plants. These additional feedstocks will provide a base for the broadening of the range of petrochemical products produced. The promoted growth areas within the industry include alpha-olefins and fatty alcohols, vinyl acetate, ethylene dichloride, propylene oxide/polyols, cumene/phenols, acetones, adipic acid/caprolactam, toluene diamine and diisocyanate, methyl methacrylic, polybutadiene, butadiene-styrene-rubber, nylons and polyurethanes.

(2) DIVERSIFYING INTO THE MANUFACTURING-RELATED SERVICES AND SUPPORT INDUSTRIES

14.38 The following manufacturing-related services and supporting facilities will be promoted:

- engineering and maintenance services;
- storage facilities and tank farms;
- CUF;
- other support facilities, such as waste water treatment and catalyst regeneration;
- RDCs; and
- logistics and transportation services.

14.39 The private sector will be encouraged to invest in the support facilities, infrastructure and supply services, which are important to the development of the petrochemical zones. These investments will be undertaken through a consortium or joint ventures, to enable the setting and sharing of the costs in building and maintaining the facilities at competitive levels.

(3) ENHANCING LINKAGES WITH THE DOWNSTREAM INDUSTRIES

14.40 The development of the plastics fabrication industry will be accelerated and made more efficient, with the establishment of a plastics industry park within the vicinity of the petrochemical zones. The benefits of the plastics industry park include:

- shortening the supply chain, thus leading to cost savings among the producers and customers; and
- providing synergies, especially to converters and fabricators, which mainly comprise SMEs, in mobilising resources and sharing common facilities and services available at the petrochemical zones at competitive costs.

14.41 With the widening of the range of petrochemicals produced in the country, the existing oleochemical companies will be encouraged to utilise the available range of petrochemical products for the manufacture of higher value-added products, such as surfactants and washing preparations.

(4) INTENSIFYING THE DEVELOPMENT OF TECHNOLOGIES IN MATERIALS AND PRODUCT APPLICATIONS

14.42 Potential areas of development of technologies in materials and product applications include:

- continuing to develop new uses for petrochemical-based products, with emphasis on environment-friendly and biodegradable products. New applications of petrochemical products will also be developed, through the adoption of new technologies, such as photonics and nanotechnology;
- undertaking efforts to encourage applications of composite materials. This will include the formulation of guidelines for the definition, production and usage of such materials, which will, in turn, create new demand for petrochemical products; and
- undertaking new research on the development of renewable and biodegradable materials, for example, polyhydroxybutaric acid or esters, which are hybrids of natural materials (either glucose or palm oil) with petrochemicals.

(5) IMPROVING CHEMICAL PROCESS TECHNOLOGIES AND THE APPLICATION OF CATALYSTS TO INCREASE YIELDS

14.43 To enhance technology improvement and R&D, PETRONAS Polymer Research Centre in Bangi and local universities will be encouraged to undertake research in priority areas, including:

- chemical processes and process technologies;
- management and innovative utilisation of catalysts;
- new composite materials and applications; and
- inter-linkages with other industries.

(6) UNDERTAKING THE FULL INTEGRATION OF EXISTING PETROCHEMICAL ZONES

14.44 Efforts will be undertaken to realise the full potential of the existing petrochemical zones, through a more systematic and coordinated approach. The zones will be complemented with the full range of related manufacturing services and other industries, for example, manufacturers of plastics products, which utilise petrochemical products, to take advantage of the existing infrastructure.

14.45 A review of the facilities, services and infrastructure of the integrated petrochemical zones in Kertih, Terengganu and Gebeng, Pahang will be undertaken, in terms of costs and capacities, to enhance their positions as strategic locations for the further development of the petrochemical industry. The full provision of the facilities, services and infrastructure will prepare the zones for the next phase of development of the industry. In this respect, the extension of CUF in Gebeng 3 to all the petrochemical projects in the entire Gebeng industrial estate, will be considered. The Government will consider improving the utilities, facilities and infrastructure of the petrochemical zone in Pasir Gudang-Tanjung Langsat, Johor for the further development of the zone.

(7) ESTABLISHING NEW PETROCHEMICAL ZONES

14.46 The development of new petrochemical zones will be considered. Factors which will be considered include the need to adopt competitive pricing in providing all the required facilities, such as port facilities and CUF, as well as support services. Upstream and downstream linkages will also be developed for the zones. Areas with potential for development into new petrochemical zones include Bintulu, Sarawak; Gurun, Kedah; Tanjung Pelepas, Johor; and Labuan.

(8) ENSURING THE AVAILABILITY OF FEEDSTOCKS AT COMPETITIVE PRICES

14.47 The availability and stable supply of basic feedstocks at competitive prices is important for the development of the industry. The enhancement of existing petrochemical zones and the development of new petrochemical zones depend on sufficient feedstocks being made available.

14.48 Natural gas and condensates will continue to remain the major feedstocks for the petrochemical zones in Kertih, Terengganu and Gebeng, Pahang. PETRONAS will be able to harness enough natural gas feedstock to consider another ethane cracker and propane dehydrogenation plant. Nevertheless, the present dependence on the gas resources as basic feedstocks to the industry in these two zones, will be broadened and diversified in the future to include oil-based feedstocks, to provide greater feedstock flexibility and wider growth options in the industry. To develop the petrochemical zone in Pasir Gudang-Tanjung Langsat, Johor, there will be a need to facilitate the supply of naphtha to this zone. Backward integration into the production of naphtha from an oil refinery will be considered.

(9) IMPROVING MARKET ACCESS THROUGH FREE TRADE AGREEMENTS

14.49 Market access for the petrochemical products will be further facilitated through the various regional and bilateral FTAs. Outward investments in the other ASEAN countries and inflow of foreign investments will be encouraged through the progressive implementation of the AIA and other bilateral agreements. Investments in the downstream industries, through joint-ventures and M&As with regional partners, will be promoted.

(10) ENHANCING THE TECHNOLOGICAL AND MANAGEMENT SKILLS AND EXPERTISE

14.50 Efforts will be undertaken to create a sufficiently large pool of the required skills to support the implementation of the next phase of development in the industry. Special training programmes will be designed to create the pool of skilled human resources, with the cooperation of the industry. The training programmes will address, among others, issues related to safety, health and the environment. In addition, strategies will be undertaken to enhance total factor productivity (TFP) in the industry. Apart from sustaining the quality of the workforce, other strategies on TFP include applying technologies in the downstream processing activities and diversifying into high value-added products, as well as improving operations by focusing on long term investments in R&D and applying new technologies.

Chapter 15

PHARMACEUTICAL INDUSTRY

PHARMACEUTICAL INDUSTRY

SECTION I OVERVIEW

15.01 The pharmaceutical industry is an important component of the healthcare sector in Malaysia. The industry has high growth potential, both in the domestic and export markets, in view of its present strength in the production of generic drugs. There are also vast opportunities to capitalise on the country's diversified natural flora and fauna to develop resource-based and biogeneric drugs.

15.02 During the period of the Second Industrial Master Plan (IMP2), 1996-2005, the industry registered encouraging growth, with further expansion and diversification into a wider range of generic products and increased exports. Greater efforts in research and development (R&D) had resulted in the production of higher value-added products, such as large and small volume parenteral preparations and the development of drug delivery systems and novel dosage forms.

15.03 During the period of the Third Industrial Master Plan (IMP3), 2006-2020, further development of the industry will be driven by rising wealth, increased longevity of the population, greater awareness of healthcare and better access to medicines. The industry is expected to focus on the production of high-margin niche products, add value to the existing products through improved drug delivery technologies, and increasingly move into biopharmaceuticals and branded generics, including bio-generics (biologic drugs, for which patents have expired).

SECTION II PERFORMANCE DURING THE SECOND INDUSTRIAL MASTER PLAN

(a) Status of the Industry

15.04 The industry covers a wide range of products, including:

- prescription medicines;
- over-the-counter medicines; and
- herbal preparations and health supplements, including traditional medicines.

15.05 There are two main groups of pharmaceutical products:

- modern pharmaceutical products, which mainly comprise analgesics, antacids, diuretics, antibiotics and anti-histamines in the forms of tablets, capsules, drops, powders, creams, ointments, injections, syrups, and ophthalmic and nasal preparations; and

- traditional pharmaceutical products, which mainly comprise herbal health supplements, ethnic pharmaceuticals and other traditional medicines in the forms of tablets, capsules, powder and granules.

15.06 As at December 2005, there were 235 pharmaceutical companies registered with the Drug Control Authority, Ministry of Health, comprising 148, producing traditional medicines and 87, manufacturing modern medicines. The majority of the companies in the industry comprise small and medium enterprises (SMEs), mostly producing generic drugs, such as antibiotics and painkillers. The larger multinational corporations (MNCs) are mainly licensed importers. Their products, which are mostly branded drugs, are distributed by locally incorporated foreign or joint venture companies.

(b) Investments

15.07 During the IMP2 period, a total of 69 projects were approved, with proposed investments of RM1 billion (Table 15.1). The bulk of the investments were from domestic sources, amounting to RM756.5 million or 75 per cent of the total investments, while foreign investments were valued at RM250.4 million (25 per cent). Sources of foreign investments were Germany, Taiwan, India, the United Kingdom (UK), Australia, Norway, Singapore and the People's Republic of China. In terms of the average capital investment per employee (CIPE) ratio, during the IMP2 period, the ratio increased from RM164,074 in the first phase (1996-2000) to RM427,590 in the second phase (2001-2005), indicating the progression towards a more capital-intensive industry.

TABLE 15.1

INVESTMENTS IN THE PHARMACEUTICAL INDUSTRY

	1996-2000	*2001-2005*	*1996-2005*
Total investments (RM million)	**95.7**	**911.2**	**1,006.9**
Domestic (RM million)	62.2	694.3	756.5
Foreign (RM million)	33.5	216.9	250.4
Number of projects	13	56	69

Source: Malaysian Industrial Development Authority

(c) Domestic Market

15.08 During the IMP2 period, the domestic pharmaceutical market registered an average annual growth of 11 per cent. In 2005, the market was estimated at RM2.7 billion, of which about 80 per cent were met by imports. The leading therapeutic group, in terms of sales, was antibiotics, followed by hypolipid and anti-atheroma products, and renin-angioten system agents. Local production of pharmaceuticals mainly comprised generic drugs, health supplements and injectables. The sales value of locally produced pharmaceutical products grew at an average annual rate of 10.8 per cent, from RM334 million in 1996 to RM852 million in 2005 (Table 15.2). The growth was largely attributed to an increase in demand, resulting from better health awareness and rising affluence, as well as increased healthcare spending, especially by the Government, to provide better quality medical services to the public.

TABLE 15.2

SALES VALUE OF LOCALLY MANUFACTURED PHARMACEUTICALS

Year	*Sales Value (ex-factory) (RM million)*
1996	334
2000	443
2005	852

Source: Department of Statistics

15.09 The industry has expanded its production into a wider range of generic products, with the expiry of more patented, branded pharmaceutical drugs. Generic versions of newly 'off patented' products, which are being developed and produced, include clavulanate, amoxicillin, omeprazole, ranitidine, loratadine, dexclorpheniramine, simvastatin and acyclovir. However, production of patented drugs was still limited and mainly confined to contract manufacturing by a few local companies, with the exception of one company, which manufactures its own patented pharmaceutical product, namely Vitamin E (tocotrienol and tocopherols), extracted from palm oil.

15.10 Production of traditional and herbal medicine products expanded, as a result of increased R&D activities undertaken, involving the development, testing and standardisation of local extracts. Production of traditional or herbal formulations included standardised extracts of local herbs, such as eurycoma longifolia (*tongkat ali*), phyllantus niruri (*dukung anak*), centella asiatica (*pegaga*), orthosiphon stamineus (*misai kucing*) and ocimum sanctum (*selasih*).

15.11 Production of veterinary pharmaceuticals expanded from mainly vitamins and growth promoters, animal feed supplements, and vaccines for Newcastle Disease, to antibiotics, chemotherapeutic agents, hormones and steroid preparations,

probiotics and antiprotozoal agents. Other products which had been introduced into the market included medical diagnostic kits (Elisa-based, Immunological-based and Deoxyribonucleic acid-based) for dengue and other infectious diseases.

15.12 Presently, there are two local companies manufacturing active pharmaceutical ingredients. In respect of genetically engineered drugs (presently known as biotech drugs), eight companies were approved to manufacture human insulin, recombinant hepatitis B vaccine and biopharmaceuticals, as well as monoclonal antibodies and anti–cancer vaccines. The approved companies were in various stages of implementing their projects.

(d) Exports

15.13 During the IMP2 period, exports of pharmaceutical products grew at an average annual rate of 10.6 per cent, from RM194 million in 1996 to RM494.3 million in 2005 (Table 15.3). In 2005, the main types of pharmaceuticals exported were:

- medicaments in measured dosage forms (37.9 per cent);
- vitamins (19.7 per cent);
- medicaments not in measured dosage forms (13.1 per cent);
- pharmaceutical goods and reagents (10.1 per cent); and
- antibiotics (10 per cent).

TABLE 15.3

EXPORTS OF THE PHARMACEUTICAL INDUSTRY

Product	*1996*	*2000*	*2005*	*1996-2005*
	(RM million)			*Average Annual Growth (%)*
Total	**194.0**	**284.2**	**494.3**	**10.6**
Medicaments in measured dosage forms	98.7	148.5	187.3	7.7
Vitamins	2.3	13.1	97.5	49.9
Medicaments not in measured dosage forms	26.9	40.9	65.0	11.1
Pharmaceutical goods, reagents and dental alloys	14.4	33.2	50.1	12.2
Antibiotics	12.3	40.5	49.5	10.8
Other pharmaceuticals	39.4	8.0	44.9	3.0

Source: Ministry of International Trade and Industry

15.14 Presently, the industry exports to more than 30 countries, including those in Africa and Central America. Major export destinations were Singapore, Viet Nam, Brunei, Hong Kong, Taiwan, India, Japan and Germany. Exports to ASEAN countries accounted for about 55 per cent of the total exports of pharmaceutical products. Exports to countries in the European Union (EU) were facilitated by the admission of the Ministry of Health of Malaysia as a member of the Pharmaceutical Inspection Convention and the Pharmaceutical Inspection Cooperation Scheme in 2002. The convention accords mutual confidence on quality assurance and good manufacturing practices (GMP) among the health regulatory authorities in 29 member countries.

(e) Imports

15.15 Although Malaysia has achieved progress in exporting pharmaceuticals, the industry is largely import-oriented. Imports constituted a major portion of the local pharmaceutical market, with about 80 per cent of the drugs, by value, being imported. During the IMP2 period, imports registered an average annual growth of 11.7 per cent, from RM829.3 million in 1996 to RM2.4 billion in 2005 (Table 15.4). Major types of drugs imported were lifestyle drugs, such as cholesterol lowering and anti-diabetic drugs, newer generation of antibiotics, drugs to treat erectile dysfunction, and cardiovascular and oncology drugs.

TABLE 15.4

IMPORTS OF THE PHARMACEUTICAL INDUSTRY

Product	*1996*	*2000*	*2005*	*1996-2005*
	(RM million)			*Average Annual Growth (%)*
Total	**829.3**	**1,290.1**	**2,378.9**	**11.7**
Medicaments in measured dosage forms	549.2	871.1	1,758.0	12.8
Medicaments not in measured dosage forms	77.8	91.8	143.4	4.6
Pharmaceutical goods, reagents and dental alloys	32.7	77.8	121.9	16.0
Antibiotics	59.2	71.8	114.1	8.0
Vaccines and cultures	58.6	81.5	104.2	7.8
Vitamins	35.5	61.0	98.6	12.5
Other pharmaceuticals	16.3	35.1	38.7	13.6

Source: Ministry of International Trade and Industry

(f) Employment and Human Resource Development

15.16 The industry is technology and research-intensive, requiring highly qualified professionals, such as pharmacists, chemists, biotechnologists, microbiologists, biologists and chemical engineers, especially at the supervisory level, in production, quality assurance and R&D activities. According to the Ministry of Health, the present employment of the industry is estimated at about 8,700 persons, with 75 per cent engaged in modern pharmaceuticals. About 60 per cent of the jobs are in the managerial, technical, supervisory and skilled workforce categories.

15.17 Pharmacy courses are being offered by several public universities and private institutions of higher learning. The universities are *Universiti Sains Malaysia*, *Universiti Malaya* and *Universiti Kebangsaan Malaysia*. The private institutions of higher learning are International Medical University, Sepang Institute of Technology and University College Sedaya International. Two more public universities, namely, *Universiti Teknologi Mara* and International Islamic University, introduced pharmacy courses in their curricula. Additional courses introduced in these universities include microbiology, biotechnology, biochemistry and biomedicinal sciences.

(g) Research and Technology Development

15.18 Domestic pharmaceutical manufacturers have made significant progress in expanding R&D activities in areas such as drug formulations, improved drug delivery systems and product development. Industry sources indicated that average expenditures on R&D constituted 2 per cent of the sales turnover, with some larger pharmaceutical companies spending up to 5 per cent of the sales turnover. Product development activities undertaken included studies in pre-formulation, stability, bio-availability and bio-equivalence, as well as clinical trials and efficacy testing, especially in the development of lower cost alternative generic products. These activities were usually outsourced to, or conducted in collaboration with, clinical trial centres or universities, such as *Universiti Malaya* and *Universiti Sains Malaysia*.

15.19 Presently, there are 14 companies undertaking R&D activities. Joint R&D collaborations and commercialisation of research projects have been established between the industry, universities and research institutes. The universities and research institutes involved included *Universiti Sains Malaysia, Universiti Malaya, Universiti Kebangsaan Malaysia* and Malaysian Institute of Nuclear Technology. Some of the local pharmaceutical companies have also established scientific collaborations with foreign companies to enhance their R&D efforts. The development of own brands of pharmaceutical products has been undertaken by some of the pharmaceutical manufacturers for over-the-counter and prescribed pharmaceutical products, including herbal products, for both the local and export markets.

15.20 Other public research institutes, such as the Forest Research Institute of Malaysia, Institute of Medical Research and SIRIM Berhad, have also undertaken R&D, involving activities mainly related to extraction, purification of natural extracts, toxicology, efficacy studies and clinical trials. R&D activities undertaken by the institutes include:

- **Biotechnology Division of the Forest Research Institute of Malaysia**
  - research on anti-diabetic properties of local herbs, such as phyllanthus niruri (*dukung anak*) and gynura procumbens (*daun sambung nyawa*);
  - evaluation of antioxidant activity in nine species of local salads (*ulam*); and
  - utilisation of fungi by rural communities in Peninsular Malaysia for food and medicine;
- **Institute of Medical Research**
  - commercialisation of research results to produce Malaria Rapid Test Kit by the Cancer Research Centre; and
  - development of a new process for the production of microbial-free larvae of a local strain of lucilia cuprina (flies or pests found in sheep) by the Infectious Disease Research Centre and Entomology Unit. This innovation will undergo a clinical trial for the treatment of ulcers; and
- **Research and Technology Division of SIRIM Berhad**
  - provides services in bioprocessing technology, including R&D in areas such as microbiology, mycology, cell cultures, molecular biology and enzyme technology.

15.21 Research collaborations were also established between the Government, local universities and Malaysian companies with foreign research institutes. The foreign research institutes included:

- Cuban Research Institute, on R&D for the production of vaccines for meningitis and cholera; and
- Massachusetts Institute of Technology (MIT), under Malaysia-MIT Biotechnology Partnership Programme, on natural product discovery and oil palm biotechnology.

15.22 Increasing R&D activities were undertaken by manufacturers of traditional and herbal medicines, using local herbs, such as eclipta prostrata (*urang aring*), portulaca oleracea (*beremi gelang pasir*) and andrographis paniculata (*hempedu bumi*). A local company has developed a proprietary process to modify the chemical nature of active ingredients to manufacture herbal and non-herbal pharmaceuticals for human and veterinary uses.

15.23 Various initiatives were introduced by the Government to ensure that only appropriate, safe and effective pharmaceuticals of consistent quality, including herbal medicines, were developed and made available to the public. The initiatives included:

- establishment of the National Committee for Herbal Medicines in 2002, which coordinates all R&D activities for herbal medicines, including approving standards and providing guidelines for the development and manufacture of such medicines;

- establishment of the National Institute of Natural Products and Vaccinology in 2003, to undertake research, develop and produce its own vaccines and natural health products. By 2008, RM220 million will have been allocated to this institute for R&D on vaccines and other products;

- publication of the 'Compendium of Medicinal Plants Used in Malaysia' in 2002, by the Herbal Medicine Research Centre of the Institute for Medical Research. The compendium contains a comprehensive documentation of traditional knowledge on more than 2,000 medicinal plants used in Malaysia; and

- proposed establishment of the Centre of Excellence for Pharmaceuticals and Nutraceuticals, to complement the activities of the research institutions and enable the commercialisation of research findings. The establishment of the centre will be undertaken under the National Biotechnology Policy, launched in April, 2005.

SECTION III PROSPECTS

15.24 The pharmaceutical manufacturers in the developed countries, especially the United States of America (USA) and European countries, are the fastest growing drug companies in the world. Most of the large drug manufacturers are based in the USA and they meet about two-third of the demand of the global pharmaceutical market. According to IMS Health, total global pharmaceutical sales in 2005 grew by 7 per cent at constant exchange rates, while sales in emerging markets, including the People's Republic of China, Republic of Korea, Mexico, Russia and Turkey, recorded double-digit growth, outpacing global performance and signalling important shifts in the marketplace. The increase in world expenditures on pharmaceuticals, arising mainly from the growing size of the ageing population, will provide further impetus for the industry's growth. A report by DataMonitor indicated that, with an anticipated annual growth rate of 7.5 per cent for the period 2005-2010, the global pharmaceutical market is projected to increase from US$534.8 billion in 2005 to US$762.2 billion by the end of 2010.

15.25 Patents of many drugs made by the US and European companies have either expired or will be expiring during the next few years. It is estimated that the patent expiry will involve about US$100 billion worth of branded drugs of the major pharmaceutical companies. This will create market opportunities for generics worldwide, which are expected to grow at an average annual rate of 10 per cent. Malaysian generic drug manufacturers will need to leverage their position to benefit from the positive market development. The expected increase in the Government purchase of generic drugs, as a measure to contain healthcare costs, together with the anticipated expiry of several branded drugs, offers vast opportunities for the production of patent expired generic drugs, for both the local and export markets.

15.26 There is also potential in the production of oncology drugs, due to the high incidence of cancer worldwide. Most of the oncology drugs are injectables, which are handled by specialist doctors and hence command a premium price. As many of the patents for oncology products are also expiring, there are opportunities for Malaysian companies to produce these drugs. Towards this end, trials for the testing of new cancer vaccines developed in Cuba were planned to be undertaken in Malaysia. Local production will help to reduce Malaysia's dependence on imports of these drugs.

15.27 Another prospect for the growth of the industry in Malaysia is the positive development worldwide for biotech drugs. Malaysia is one of the world's 12 most bio-diverse countries and offers high potential for sourcing active compounds for therapeutics and wellness products. The industry can leverage not only upon the highly diversified flora, fauna and medicinal plants, but also the vast R&D experience in regional diseases and the country's multi-ethnic population, which facilitates clinical trial activities.

15.28 The market for bio-generics is relatively unexplored, with vast opportunities for further development. The expiry of patents of highly demanded protein therapeutics allows further development of lower cost and non-branded versions of conventionally highly priced protein drugs. The market for bio-generics is estimated to grow at an annual average rate of 70 per cent during the period 2007-2011, and will generate a total revenue of more than US$16 billion by 2011.

15.29 Niche pharmaceutical products are also expected to create a significant market segment, as well as high export potential. These products have unique formulations or use special ingredients, targeted at specific smaller segments of the market, but commanding premium prices. Examples are nutripharmaceuticals, products in novel dosage forms, herbal drugs and drugs for tropical diseases.

15.30 Membership of Malaysia in the Pharmaceutical Inspection Convention and the Pharmaceutical Inspection Cooperation Scheme reflects that the local industry has established high pharmaceutical manufacturing standards. Presently, the

industry is progressing from adopting Good Manufacturing Practice (GMP) to current Good Manufacturing Practice (cGMP). The adoption of high manufacturing standards offers potential for increased exports to the more developed countries and also the development of a wider range of sterile products, for example, topical preparations which require stringent manufacturing standards. There are also opportunities for expanding the current range of sterile injections to other sterile products, such as sterile medicated dressings for burns, insulin and other products, which require aseptic manufacture.

SECTION IV CHALLENGES

(a) Increasing Competition

15.31 Countries in Asia, such as India, the People's Republic of China, Republic of Korea and Taiwan, are recognised as the leading manufacturers regionally, producing and exporting a large number of drugs in bulk, as well as dosage forms, to the more developed countries. Global competition will intensify, as these major generic manufacturers in the region increase their efforts to expand their presence in emerging markets. Competition also arises from MNCs, which acquire companies manufacturing generic products in these countries.

15.32 Given the limited domestic market, there is a need for local manufacturers to venture into export markets, as part of their growth strategy. The industry will need to adopt effective measures to enhance their level of efficiency and reduce costs of production. The domestic market is also expected to face further competition from imports, as a result of trade harmonisation efforts and mutual recognition arrangements (MRAs) with trading partners, especially ASEAN countries. To facilitate and enable Malaysian manufacturers to compete on fair grounds internationally, efforts are needed to reduce and eliminate non-tariff barriers, which impose complex or ambiguous requirements on certifications, labelling, packaging and testing.

(b) Inadequate Research and Development

15.33 Patented pharmaceuticals are the most lucrative products and they command high margins, as the patent holders will have initial monopoly rights and benefits on the products. However, R&D in the development of these drugs is highly risky and costly. It involves not only lengthy approval process, but may also result in litigation, in the event of product failure. It is estimated that an average sum of US$800 million (RM3 billion) is spent to develop a single drug from the laboratory to the marketplace. Due to the high risk and costs involved, pharmaceutical manufacturers in the developing countries, including Malaysia, lack the financial and technical resources to venture into basic research on drugs. Their R&D initiatives are mainly focused on developing pharmaceuticals, for which their patents are about to expire. Most of the R&D

activities undertaken in Malaysia are in the enhancement of existing products, such as more efficient drug delivery system, ingredient compositions, studies on stability, bio-availability and bio-equivalent formulations, clinical trials and efficacy testing.

15.34 To sustain its position, the industry will need to undertake innovative drug discovery activities, especially on natural resource-based new chemical entities for the pharmaceutical, nutraceutical and biotechnology industries. To facilitate advances in natural products discovery programmes, the industry will need to collaborate with international expertise to establish and implement standard methodologies for cataloguing, isolating and characterising natural products. Nutraceuticals and cosmeceuticals manufactured from natural resources will need to be of defined composition, validated in terms of human safety and efficacy. Support will be necessary to promote collaborations between research institutes, academia and the industry on natural products.

(c) Shortage of Skilled Workforce

15.35 Presently, the industry faces a shortage of skilled workforce, especially highly qualified scientists and researchers to conduct R&D activities. There is an insufficient number of scientists and researchers for specific research in the private sector, as most of them are involved in primary research in public research institutes.

15.36 The shortage of skills in the industry also extends to pharmacists. According to the Ministry of Health, as at December 2005, there were 4,344 registered pharmacists in both the public and private establishments in the country. The present pharmacist to population ratio of 1 to 7,000 is below the norm of 1 to 2,000 in developed countries. The target for Malaysia is a ratio of 1 to 3,000 by 2011, which will require 8,000 more pharmacists. The shortage is worsened by the new registration requirement for pharmacists to undergo three years of compulsory service with the Government, before they can be made available to the industry. Presently, about 23 per cent of the registered pharmacists are working for the Government, with the rest serving the private sector, mainly in retailing. Although there are five public universities and three private institutions of higher learning which offer courses on pharmacy, the supply of pharmacy graduates is insufficient to meet the industry's demand, especially in the manufacturing sector, as the training in these institutions is not tailored for the present requirements of the industry.

(d) Market Access

15.37 Pharmaceutical manufacturers incur additional costs in complying with GMP requirements for licensing and product registration in the export markets. These include the cost of inspection of local production facilities by overseas authorities, which have to be borne by the domestic manufacturers.

SECTION V STRATEGIES AND POLICIES

TARGETS

15.38 For the IMP3 period, 2006-2020:

- investments in the pharmaceutical industry have been targeted at RM6.7 billion or RM450 million per annum; and

- exports are targeted to grow at an annual rate of 6.3 per cent to reach RM1.2 billion by 2020 (Table 15.5).

TABLE 15.5

PROJECTIONS FOR THE PHARMACEUTICAL INDUSTRY

	2006-2010	*2011-2015*	*2016-2020*	*2006-2020*	*2006-2020*
	(RM billion)				*Average Annual Growth (%)*
Investments	1.3	2.1	3.3	6.7	10.1
Investments per year	0.3	0.4	0.7	0.5	n.a.[1]
Exports (end period)	0.7	0.9	1.2	1.2	6.3

Note: [1] Not applicable

Source: Ministry of International Trade and Industry

STRATEGIC THRUSTS

15.39 The industry is expected to develop its own niche products to be able to gain a greater share of the global pharmaceutical market. In the pursuit of this objective, seven strategic thrusts have been set for the further development of the industry:

(1) focusing on developing specific pharmaceutical product groups and services which have the potential for growth;

(2) enhancing exports and diversifying markets;

(3) increasing the economies of scale of the industry through consolidations, re-investments and rationalisation;

(4) promoting foreign direct investments (FDIs) into higher value-added pharmceutical products and services;

(5) encouraging further efforts on R&D and commercialisation;

(6) enhancing the development of expertise, with relevant knowledge and skills for the industry, particularly in drug research; and

(7) strengthening the institutional support in the development and promotion of the industry.

(1) DEVELOPING SPECIFIC PHARMACEUTICAL PRODUCT GROUPS AND SERVICES

15.40 Globally, new factors favour the internationalisation of R&D, as the MNCs reassess their core competencies and undertake vertical disintegration of R&D, product development, clinical trials, manufacturing and marketing activities. A large portion of the expenditures on the development of new chemical entities or new molecular entities are spent on clinical trials. In this respect, clinical trial activities in Malaysia will be promoted, as these activities adhere to the guidelines on Good Clinical Practice (GCP), which adopt the basic principles outlined by the International Committee on Harmonisation of Good Clinical Practice.

15.41 Malaysian pharmaceutical manufacturers which basically produce generic drugs, comprising undifferentiated prescription drugs and over-the counter drugs under their own brands, have developed the capability to launch new off-patent products rapidly. These manufacturers, especially SMEs, are encouraged to explore products which have niche markets, such as nutripharmaceuticals, herbal drugs, products in novel dosage forms and drugs for tropical diseases. To enhance their present market position, the manufacturers will be encouraged to venture into the production of specific pharmaceutical products and the supply of services which have the potential for growth. These include:

- new off-patent drugs;
- biopharmaceutical products;
- niche pharmaceutical products;
- sterile products;
- oncology products;
- clinical trial services; and
- dedicated distribution services.

(2) ENHANCING EXPORTS AND DIVERSIFYING MARKETS

15.42 The present export market base, which mainly covers ASEAN and the less developed countries in Africa and South America, will be expanded to include developed countries, such as the European Union (EU) and the USA. Strategic

alliances with these countries will be encouraged. The industry will be encouraged to develop and establish worldwide logistics and marketing networks and linkages to facilitate the expansion into the markets of the developed countries.

15.43 In this respect, measures will be undertaken to encourage Malaysian companies to intensify exports. The measures include promoting Malaysian quality and certification standards, as well as developing Malaysian brands. To enhance the quality perception and image of Malaysian products and brands, pharmaceutical companies will be encouraged to collaborate with domestic packaging companies in the production of a more innovative range of packaging materials, which will result in more convenient, aesthetic and secure packaging. Government-to-Government collaborations, including free trade agreements (FTAs), will be leveraged upon to improve the perception of and gain market acceptance for Malaysian pharmaceutical products. Assistance will also be considered to enable companies to keep pace with global requirements, particularly in the area of compliance with international standards, including those on the environment. In addition, domestic pharmaceutical companies will be encouraged to take advantage of opportunities arising from regional and bilateral trade and investment agreements to invest overseas.

(3) INCREASING ECONOMIES OF SCALE AND EFFICIENCY

15.44 Domestic pharmaceutical companies will be encouraged to operate on a larger scale, to be competitive in the global market. The companies, especially the SMEs, will be encouraged to consolidate with larger local manufacturers, including the MNCs, through mergers or smart partnerships, to improve the economies of scale and be competitive in the global market. Support to these companies will be considered, to create more efficient, globally competitive Malaysian-owned pharmaceutical manufacturers.

15.45 Further re-investments and rationalisation in the industry will be promoted, through the application of information and communication technology (ICT) and improvement in production technologies, to enhance efficiency and quality. Existing pharmaceutical companies will be encouraged to enhance their ICT capacities in areas such as logistics and inventory control. The acquisition of new technologies, including process technology, will be encouraged, through licensing, franchising, or outright purchase from countries which are well established in the production of generics and bio-generics. SMEs will be encouraged to acquire key technologies on GMP to comply with international standards and be able to compete globally.

(4) PROMOTING FOREIGN INVESTMENTS

15.46 Promotion will be intensified to encourage MNCs to establish manufacturing plants with R&D facilities in Malaysia, especially those which have international production networks. Their presence will facilitate the development of the entire

pharmaceutical value chain, in terms of production of higher value-added products, technology transfer, support services and employment of highly skilled workforce. MNCs will be encouraged to manufacture products presently not available and undertake activities presently not carried out in Malaysia. These include innovator drugs, active pharmaceutical ingredients, vaccines, inhalation products and novel delivery systems.

(5) ENCOURAGING RESEARCH AND DEVELOPMENT AND COMMERCIALISATION

15.47 Being a research-intensive industry, pharmaceutical companies will require a large allocation of funds for R&D activities, to keep pace with emerging technologies. To reduce the costs of R&D and increase the rate of commercialisation, collaborations will be encouraged between local research institutes, institutions of higher learning and manufacturers.

15.48 For the further development of the industry, local manufacturers are encouraged to undertake innovative drug discovery activities, especially on resource-based new chemical entities and biologics. These manufacturers will also be encouraged to enter into collaborations with foreign companies, especially between small companies having good R&D capabilities and large firms with superior infrastructure. As the development of drugs involves substantive capital expenditures and a long gestation period, support will be provided to encourage research in new chemical entities and biologics. Existing facilities for clinical trials and bio-equivalence studies in various universities, Government hospitals and the private sector will be strengthened and consolidated.

(6) ENHANCING THE DEVELOPMENT OF EXPERTISE

15.49 Productivity in the industry will be further enhanced through a higher contribution from its total factor productivity (TFP) growth. Initiatives on TFP growth include:

- upgrading the quality of the workforce through increasing the number of professional and technical researchers, scientists and pharmacists;

- encouraging the shift from the import-oriented to export-oriented operations of the domestic companies, to take advantage of the growing global demand, and improvements in the operations, including the utilisation of raw materials, and supply chain management;

- promoting the identification of niche products, based on the core competencies of the manufacturers, and their development into high quality products; and

- undertaking coordinated investments in technology and collaborative efforts in R&D.

15.50 Measures will be undertaken to enhance and upgrade the quality of the skilled workforce, in both the short and long terms. A sufficient supply of highly qualified scientists and researchers will be made available to conduct R&D activities in the industry. As a short term measure to overcome the shortage of specific skills, the industry will be allowed to employ foreign skilled personnel, as required. Attachment of pharmacy graduates and post-graduates to the industry will be encouraged to accelerate the transfer of knowledge and the enhancement of technology and skills.

15.51 The content of curriculum in pharmacy in universities will be refocused to reflect the present requirements of the industry. The pharmacy curriculum will be revised to include disciplines relevant to the industry, as well as address key technology needs, including R&D and nurturing of creativity. The intake of students for pharmacy courses will be increased to match the anticipated demand for pharmacists. In the long term, courses on pharmaceuticals and related disciplines will be provided and lecturers made available in both the public and private institutions of higher learning. More sponsorship for post-graduate studies related to pharmaceuticals will be encouraged to increase the supply of qualified researchers for future R&D activities. Greater collaboration will be undertaken between national and international research institutes. With the short and long term measures, it is expected that foreign pharmaceutical companies will be attracted to conduct their clinical trials or bio-equivalence studies in Malaysia.

(7) STRENGTHENING THE INSTITUTIONAL SUPPORT

15.52 Measures in strenghtening the institutional support include:

- reviewing the present assistance programmes, taking into account similar programmes in other competing countries. Support will be provided to:
  - encourage companies to venture into high risk research projects, such as patented and innovator drugs, and active pharmaceutical ingredients;
  - promote accredited testing laboratories, and logistics and sterilisation services; and
  - reduce the costs incurred by intending exporters in the registration of products overseas;
- instituting an effective mechanism, in addition to the present assistance programmes, to promote the conservation of the country's biological diversity and sharing of benefits arising out of the utilisation of genetic resources, in joint research projects, for the further development of the resource-based drugs; and
- expediting, where appropriate, the process of drug registration for local products to enable the domestic manufacturers to take advantage of premium prices, by marketing the newly off-patent products before imports of these products reach the domestic market.

Chapter 16

WOOD-BASED INDUSTRY

WOOD-BASED INDUSTRY

SECTION I OVERVIEW

16.01 The wood-based industry is a major contributor to value-added, export earnings and employment in the manufacturing sector. It has extensive backward linkages with the primary sector, principally tropical hardwood timber and rubberwood, and forward linkages to the metals, and machinery and equipment industries. From being a major supplier of plywood, the industry has progressed to become a major exporter of medium density fibreboards and rubberwood furniture. Malaysia is presently the world's fourth largest exporter of medium density fibreboards and second largest exporter of furniture in Asia.

16.02 During the period of the Second Industrial Master Plan (IMP2), 1996-2005, output of the industry expanded, in tandem with the growing external demand. The industry had also diversified into higher value-added products, such as mouldings, builders' joinery and carpentry, panel products and furniture. Rubberwood furniture was the fastest growing segment, and since 2000, has overtaken plywood as the largest contributor to exports.

16.03 During the period of the Third Industrial Master Plan (IMP3), 2006-2020, the industry will continue to be export driven. The production of timber, including rubberwood, will be enhanced through efficient and effective management of forests and forest plantations, and the promotion in the use of lesser promoted species will be undertaken. Through further improvements in technology, research and development (R&D) and market promotion, the industry is expected to further expand into specialised bio-composites and other high value-added products to cater for niche markets. It will also progress towards improvements of quality and minimisation of waste, through design development, by creating innovative products, and the enhancement of image through branding. The industry will also continue to strengthen its 'green' image, through undertaking and promoting sustainable development, taking into consideration environmental concerns.

SECTION II PERFORMANCE DURING THE SECOND INDUSTRIAL MASTER PLAN

(a) Status of the Industry

16.04 The wood-based industry comprises:

- primary wood processing

- sawntimber; and
- veneer and plywood;

- secondary wood processing
  - reconstituted wood-based panel products, such as particleboards, medium density fibreboards and laminated veneer lumber; and
  - builders' joinery and carpentry, and mouldings;
- tertiary, namely, wooden furniture and components; and
- pulp and paper products.

16.05 In 2005, there were a total of 4,549 mills in operation, with the majority being Malaysian-owned small and medium enterprises (SMEs). More than half of these mills were located in Peninsular Malaysia. Furniture mills accounted for about half of the total mills in operation (Table 16.1). The industry has diversified into the production of downstream products, such as composite furniture products and engineered wood products, including laminated veneer lumber, medium density fibreboards and particleboards. The average annual growth rate for the export of downstream products increased by 5.7 per cent, from RM12.8 billion in 1996 to RM21 billion in 2005. In comparison, the total volume of exports of logs decreased by an average rate of 3.1 per cent, from 7 million cubic metres in 1996 to 5.8 million cubic metres in 2005.

(b) Production

16.06 In 2005, the production of selected intermediate wood-based products amounted to 11.3 million cubic metres (Table 16.2). Major products were plywood, at 5.1 million cubic metres or 45.4 per cent of the total production, and sawntimber, at 5.1 million cubic metres or 45.1 per cent. Output of the intermediate products was subject to the annual allowable cutting rate of the forests under the policy of Sustainable Forest Management.

16.07 The production of paper doubled from 680,600 metric tonnes in 1996 to 1.4 million metric tonnes in 2005. The types of paper produced were liner paper, at 59.6 per cent of the total production, newsprint (17.7 per cent), writing and printing (12 per cent), tissue paper (9.8 per cent) and joss paper (0.9 per cent). Local paper manufacturers supplied 60 per cent of the domestic requirement of paper. Tissue and joss papers were mostly sourced locally, whereas 40 per cent of the domestic demand for liner paper (kraftpaper), newsprint, writing and printing, and speciality paper were met by imports.

TABLE 16.1

MAJOR WOOD-BASED PROCESSING MILLS

Product Category	*Peninsular Malaysia*		*Sarawak*		*Sabah*		*Total*	
	1996	*2005*	*1996*	*2005*	*1996*	*2005*	*1996*	*2005*
Total	**3,841**	**2,995**	**525**	**829**	**592**	**725**	**4,958**	**4,549**
Furniture, joinery and other woodworking	2,620	1,774	215	389	120	200	2,955	2,363
Sawmills	712	664	220	290	234	178	1,166	1,132
Mouldings	136	167	21	28	149	157	306	352
Kiln drying	120	123	7	46	3	74	130	243
Veneer and plywood	48	52	43	55	68	67	159	174
Wood preservations	117	118	10	n.a.[1]	10	39	137	157
Laminated boards	34	34	6	12	4	n.a.	44	46
Parquet	25	26	1	1	1	n.a.	27	27
Particleboards and chipboards	10	12	n.a.	1	2	3	12	16
Woodchips	3	6	n.a.	4	n.a.	5	3	15
Medium density fibreboards	6	9	1	3	n.a.	1	7	13
Prefabricated houses	10	10	1	n.a.	n.a.	n.a.	11	10
Integrated pulp and paper mills	n.a.	n.a.	n.a.	n.a.	1	1	1	1

Note: [1] Not available

Source: Ministry of Plantation Industries and Commodities

TABLE 16.2

PRODUCTION OF SELECTED WOOD-BASED PRODUCTS

	1997	*2000*	*2005*
	('000 cubic metres)		
Total	**13,532**	**11,857**	**11,284**
Plywood	4,448	4,435	5,126
Sawntimber	7,176	5,590	5,087
Mouldings	743	716	375
Veneer	1,165	1,116	696
Pulp and paper ('000 metric tonnes)	681[1]	1,078	1,372

Note: [1] Figure was for 1996
Sources: Forestry Department, Peninsular Malaysia; Forestry Department, Sarawak; Sarawak Timber Industry Development Corporation; Forestry Department, Sabah; and Malaysia Pulp and Paper Manufacturers Association

(c) Exports

16.08 During the IMP2 period, the total exports of wood-based products increased by an average annual rate of 5.7 per cent, from RM12.8 billion in 1996 to RM21 billion in 2005 (Table 16.3). Significant increases were recorded in panel products (plywood, particleboards and chipboards, and fibreboards), builders' joinery and carpentry, wooden frames, wooden furniture, and pulp and paper. During the same period, exports of sawntimber and veneer decreased by average annual rates of 1.4 per cent and 3.1 per cent, respectively. This was attributed to the decline of the supply of logs, as well as higher utilisation of these intermediate products for further value-added downstream processing.

(d) Imports

16.09 During the period, imports of wood-based products increased by an average annual rate of 6.1 per cent, from RM3.3 billion in 1996 to RM7 billion in 2005 (Table 16.4). Pulp and paper products were the major products imported, with an average annual growth of 4.2 per cent. They accounted for RM2.8 billion, or 86.2 per cent, of the total imports of wood-based products in 1996 and RM5.3 billion (75.3 per cent) in 2005. Imports of sawntimber and veneer also increased, at average annual rates of 14.4 per cent and 13.2 per cent, respectively, to meet part of the growing demand by downstream processing activities.

TABLE 16.3

EXPORTS OF WOOD-BASED PRODUCTS

Product	1996		2000		2005		1996-2005
	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)	Average Annual Growth (%)
Total	**12,800.2**	**100.0**	**16,710.7**	**100.0**	**20,965.8**	**100.0**	**5.7**
Wooden furniture	2,089.1	16.3	4,411.0	26.4	5,826.3	27.8	13.3
Plywood	4,539.4	35.5	3,976.6	23.8	5,574.9	26.6	4.4
Sawntimber	3,309.2	25.9	3,305.5	19.8	3,471.0	16.6	-1.4
Pulp and paper	684.2	5.3	1,341.4	8.0	1,966.8	9.4	9.9
Builders' joinery and carpentry	403.0	3.1	767.8	4.6	1,162.6	5.5	13.1
Fibreboards	211.2	1.6	751.5	4.5	1,106.7	5.3	20.3
Mouldings	561.7	4.4	750.8	4.5	698.2	3.3	1.8
Veneer	632.4	4.9	809.9	4.8	422.3	2.0	-3.1
Particleboards and chipboards	72.2	0.6	153.5	0.9	245.2	1.2	19.4
Wooden frames	50.4	0.4	91.5	0.5	126.9	0.6	10.4
Rattan furniture	80.8	0.6	69.5	0.4	46.0	0.2	-6.6
Others[1]	166.6	1.3	281.6	1.7	319.0	1.5	8.2

Note: [1] Such as pallets, box pallets, fuel wood and charcoal, woodchips, packing cases, tools and brooms or brushes (bodies and handles)

Source: Ministry of International Trade and Industry

(e) Investments

16.10 During the IMP2 period, a total of 958 projects were approved, with capital investments of RM25.5 billion, of which 59.9 per cent were from domestic sources and 40.1 per cent, foreign sources (Table 16.5). Major investments approved were for pulp and paper, which accounted for RM16.6 billion, or 65 per cent, of the total investments in wood-based products, followed by panel products, RM4.3 billion (16.9 per cent), wooden furniture and components, RM2.8 billion (10.9 per cent), and mouldings and builders' joinery and carpentry, RM1.1 billion (4.4 per cent). Four major projects in pulp and paper were approved, with total investments of RM12.9 billion. Main sources of foreign direct investments (FDIs) were the People's Republic of China, Singapore, Pakistan, Japan and the United States of America (USA). Together, they accounted for 65.6 per cent of the total FDIs.

TABLE 16.4

IMPORTS OF WOOD-BASED PRODUCTS

Product	1996		2000		2005		1996-2005
	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)	Average Annual Growth (%)
Total	**3,302.7**	**100.0**	**5,431.6**	**100.0**	**6,993.1**	**100.0**	**6.1**
Pulp and paper	2,847.9	86.2	4,545.1	83.7	5,265.8	75.3	4.2
Sawntimber	161.6	4.9	364.2	6.7	652.2	9.3	14.4
Wooden furniture	62.1	1.9	74.6	1.4	443.1	6.3	30.4
Veneer	75.4	2.3	139.5	2.6	168.8	2.4	13.2
Particleboards and chipboards	39.8	1.2	69.1	1.3	107.1	1.5	9.6
Mouldings	43.9	1.3	55.5	1.0	95.8	1.4	8.9
Fibreboards	14.5	0.4	35.6	0.7	62.2	0.9	18.9
Plywood	8.5	0.3	25.3	0.5	41.1	0.6	6.7
Builders' joinery and carpentry	7.6	0.2	39.0	0.7	18.7	0.3	11.6
Rattan furniture	5.3	0.2	15.1	0.3	6.9	0.1	5.9
Wooden frames	1.0	neg.[2]	1.0	neg.	6.0	0.1	21.0
Others[1]	35.0	1.1	67.2	1.2	125.5	1.8	16.1

Notes: [1] Such as pallets, box pallets, fuel wood and charcoal, woodchips, packing cases, tools and brooms or brushes (bodies and handles)

[2] Negligible

Source: Ministry of International Trade and Industry

(f) Employment

16.11 Employment in the industry, including printing and publishing, increased by an average annual rate of 5.4 per cent, from 332,200 persons in 1996 to 511,500 in 2005. The increase was largely contributed by the expansion in wood processing mills, for example, furniture, and plants for builders' joinery and carpentry.

(g) Major Sub-Sectors

(i) Wooden Furniture and Components

16.12 The furniture sub-sector is largely export-oriented, with more than 90 per cent of its production exported. In 2005, wooden furniture contributed 27.8 per cent to the total export earnings in the industry. Malaysian furniture was exported

TABLE 16.5

APPROVED INVESTMENT PROJECTS IN THE WOOD-BASED INDUSTRY

Product	1996-2000				2001-2005				1996-2005			
	Number of Projects	Domestic	Foreign	Total	Number of Projects	Domestic	Foreign	Total	Number of Projects	Domestic	Foreign	Total
		(RM million)				(RM million)				(RM million)		
Total	**450**	**6,345.0**	**4,357.7**	**10,702.7**	**508**	**8,959.8**	**5,883.3**	**14,843.1**	**958**	**15,304.7**	**10,241.0**	**25,545.7**
Pulp and paper	78	3,281.2	3,280.2	6,561.3	92	5,381.6	4,655.1	10,036.7	170	8,662.8	7,935.2	16,598.0
Panel products	95	1,571.2	522.6	2,093.8	83	1,632.9	602.5	2,235.5	178	3,204.2	1,125.0	4,329.2
Wooden furniture and components	180	837.3	343.6	1,180.9	223	1,311.4	285.4	1,596.8	403	2,148.7	629.0	2,777.7
Mouldings and builders' joinery and carpentry	85	616.9	179.8	796.7	47	192.7	133.0	325.7	132	809.6	312.8	1,122.4
Sawntimber	5	25.6	2.1	27.7	26	248.2	171.2	419.3	31	273.8	173.2	447.0
Others	7	12.7	29.5	42.2	37	193.0	36.1	229.1	44	205.7	65.5	271.3

Source: Malaysian Industrial Development Authority

to more than 160 countries. Apart from the traditional markets, comprising the USA, Japan, the United Kingdom (UK) and Australia, exports of Malaysian furniture had diversified into non-traditional markets, such as South America, West Asia, Africa, Russia and the Association of Southeast Asian Nations (ASEAN).

16.13 Major types of furniture exports were kitchen furniture, bedroom sets, upholstered furniture and wooden office furniture. Malaysia is a major supplier of office furniture to the market in West Asia. Exports of garden and outdoor furniture are mainly for the US and European markets. Malaysian wooden furniture are manufactured from several types of wood. More than 80 per cent of the wooden furniture exported are made of rubberwood (heveawood or Malaysian oak). Furniture for garden and outdoor use are mainly made of tropical hardwood, which are known for their durability under different climatic conditions.

16.14 A number of companies had achieved progress in their production capabilities. From supplying to the original equipment manufacturer (OEM) markets, these companies have moved into the manufacture of own design and brand furniture, which are both aesthetic and functional, incorporating ergonomic features and durability. There was also a growing trend among the more established companies to concentrate on product design and quality finishing, as well as marketing and outsourcing of components.

16.15 The sub-sector has improved its processes in the areas of spraying and drying, especially hot air drying. It has adopted new technologies, such as computerised numerical control (CNC) and computer-aided manufacturing (CAM). For export oriented companies, computer-aided design (CAD) is widely used in designing. These efforts have resulted in improved product quality and enhanced productivity.

(ii) Plywood and Veneer

16.16 Sarawak is the main producer and exporter of plywood. In 2005, there were 174 plywood and veneer mills in operation, with most of the larger mills located in Sarawak and Sabah. The production of plywood increased from 4.4 million cubic metres in 1997 to 5.1 million cubic metres in 2005. However, the production of veneer decreased, from 1.2 million cubic metres in 1997 to 696,264 cubic metres in 2005, as most of the companies had converted their veneer production into plywood and panel products.

16.17 The sub-sector has diversified into the production of high value-added plywood overlaid with printed paper and polyester plywood, and plywood for concrete formwork and marine applications. Malaysian plywood manufacturers are able to meet international standards, such as Japan Agricultural Standards, British Standards, Harmonised European Standards (European Norms) and International Hardwood Products Association Standards (for the US market). Plywood is a major export earner. In 2005, it accounted for 26.6 per cent of the total

export earnings of the wood-based products. Exports of plywood increased at an average annual rate of 4.4 per cent, from RM4.5 billion in 1996 to RM5.6 billion in 2005. Major export destinations were Japan, the USA, Republic of Korea, the UK and the People's Republic of China.

(iii) Reconstituted Wood-Based Panels

16.18 Reconstituted panel products, including particleboards and chipboards, medium density fibreboards and wood cement boards, utilise solid wastes, such as small branches, off-cuts, edgings or slabs, chippings and sawdust. In Sarawak and Sabah, the solid wastes are from mixed tropical hardwood, while in Peninsular Malaysia, the wastes are from rubberwood.

16.19 Malaysia is a major exporter of particleboards. The products comply with the international standards, such as British Standards, European Norms Standards and Japan Industrial Standards. Presently, there are 16 particleboard manufacturers in operation. Over the years, these manufacturers have been able to enhance their production and export capabilities. Main export destinations include the People's Republic of China, Viet Nam, Republic of Korea and Taiwan.

16.20 Presently, 13 companies produce medium density fibreboards, with nine in Peninsular Malaysia, three in Sarawak and one in Sabah. In 2005, exports of medium density fibreboards amounted to RM1.1 billion, constituting 5.3 per cent of the total export earnings of wood-based products. Major export markets included the People's Republic of China, Japan, United Arab Emirates and Viet Nam. Malaysian medium density fibreboards have attained the international standards, such as British Standards; Japan, Australia and New Zealand Standards; and European Norms Standards. A number of companies have also ventured into the production of laminated and printed medium density fibreboards for exports.

(iv) Builders' Joinery and Carpentry, and Mouldings

16.21 Products under builders' joinery and carpentry include architectural mouldings (such as panelling, skirting, crowns and chair rails); doors, windows and accessories; and wooden floorings and railings. In 2005, exports of builders' joinery and carpentry amounted to RM1.2 billion and contributed 5.5 per cent of the total exports of wood-based products. Major products were wooden doors and floorings, which together, accounted for 64.2 per cent of the total exports of builders' joinery and carpentry. Exports of builders' joinery and carpentry, and mouldings, were mostly to the USA, Japan, Australia and the UK.

16.22 Most of the plants producing mouldings are generally small and located within existing sawmills and factories for furniture and components. The volume of production of mouldings decreased by 49.5 per cent, from 743,000 cubic metres in 1997 to 375,070 cubic metres in 2005, as a result of the slowdown

in the construction sector in the country. Nevertheless, exports of mouldings increased from RM561.7 million in 1996 to RM698.2 million in 2005.

(v) Paper and Paper Products

16.23 The production of paper includes liner paper, such as corrugating medium paper and testliner, printing and writing paper, newsprint, tissue paper and joss paper. The production of paper products includes paper packaging products, labels and stickers, carbon and self-copy papers, wall papers and disposable diapers. There are 20 paper mills in operation, producing various types of paper. All mills rely on recycled paper as their source of fibre, except a company in Sabah, which uses new pulp from its own plantation, to produce writing and printing paper. The mills supply 60 per cent of the domestic requirement for paper and employ about 10,000 persons.

16.24 The bulk of the production in paper products consist of corrugated carton boxes. There are 86 corrugated carton manufacturers in Malaysia, employing 12,700 persons. Major users of corrugated carton are electrical and electronics (E&E), food, chemicals, textiles and garments, and furniture industries. Apart from corrugated carton boxes, other packaging products manufactured include inner packaging and cushioning materials.

16.25 While imports of paper and paper products continue to be substantial, progress has been achieved in exporting the products. In respect of paper and paperboards, imports increased from RM2.3 billion in 1996 to RM4 billion in 2005. On the other hand, exports increased by three-fold, from RM201.2 million in 1996 to RM668.4 million in 2005. For paper (cut to size) and paper products, imports increased from RM466.9 million in 1996 to RM772.8 million in 2005, whereas exports increased at a faster rate, from RM476.9 million in 1996 to RM1.3 billion in 2005.

(vi) Sawntimber

16.26 In 2005, there were 1,132 sawmills in operation, mainly in Peninsular Malaysia (58.7 per cent), followed by Sarawak (25.6 per cent) and Sabah (15.7 per cent). Production of sawntimber from natural forests decreased from 7.2 million cubic metres in 1997 to 5.1 million cubic metres in 2005, mainly due to the lower supply of logs. In contrast, production of rubberwood sawntimber increased from 137,084 cubic metres in 1997 to 289,259 cubic metres in 2004, mostly in Peninsular Malaysia.

(vii) Engineered Panel Products

16.27 A number of large manufacturers of veneered panel products have diversified into engineered products, such as laminated veneer lumber, laminated veneer cross-band and laminated veneer sandwich, to meet the demand for structural

and industrial applications. The manufacturers have combined modern technology with efficient use of veneer and off-cuts from sawntimber to produce these products for the export market. Besides being environment-friendly, such products have enhanced the structural quality to meet different climatic conditions. A number of companies have also ventured into the manufacture of high value-added reconstituted composite products, for example, fibre-reinforced polymer composites, to meet the demand for new structural and industrial applications.

(h) Institutional Support

(i) Research and Development and Technology Development

16.28 Efforts have been undertaken to intensify R&D activities in related timber research agencies. The aim is to improve the wood recovery rate and utilisation, and the usage of wood wastes and biomass. During the period 1996-2000, the Forest Research Institute of Malaysia and institutions of higher learning undertook more than 100 studies on timber. The studies were undertaken through the Intensification of Research in Priority Areas (IRPA) programme, under the Ministry of Science, Technology and Innovation. The studies covered areas in both the upstream (forestry) and downstream (wood-based products, and technology development and enhancement) segments.

16.29 Commercialisation of R&D projects is undertaken with the collaboration between the industry, R&D institutes and implementing agencies. For example, in 2003, collaboration was initiated between the Malaysian Wood Industry Association, Forest Research Institute of Malaysia, Malaysian Timber Industry Board and Malaysian Timber Council, to develop and market new and value-added products, for example, laminated scantlings, for the European market.

(ii) Market Access and Market Promotions

16.30 Agencies involved in enhancing market access and undertaking market promotions of the wood-based industry are:

- Malaysia External Trade Development Corporation (MATRADE);
- Malaysian Timber Certification Council;
- Malaysian Timber Council;
- Malaysian Furniture Promotion Council; and
- Malaysian Timber Industry Board.

16.31 The Malaysian Timber Certification Council was established in 1998 to operate a national timber certification scheme. The objective of the scheme is to provide independent assessment of forest management practices, as well as

meet the demand for certified timber products. For the purpose of certification, the standard used for assessing Forest Management Unit is the Malaysian Criteria, Indicators, Activities and Standards of Performance for Forest Management Certification, MC&I (2001). This standard is based on the 1998 International Tropical Timber Organisation Criteria and Indicators for Sustainable Management of Natural Tropical Forests. Starting 2006, Malaysian Timber Certification Council's certification uses a new standard, referred to as MC&I (2002), which has been developed, based on the Principles and Criteria of Forest Stewardship Council. As at 2005, nine Forest Management Units, covering 4.7 million hectares, or 32.8 per cent, of the total of 14.4 million hectares of Permanent Forest Reserves in Malaysia, have been awarded the Certificate for Forest Management by the council. Exports of certified timber products (sawntimber, mouldings, laminated finger jointed products and plywood) totalled 55,400 cubic metres. Efforts are being undertaken to increase the trade of certified timber.

16.32 The Malaysian Timber Council was established in 1992 to promote the development of the timber-based industry and the marketing of timber products. The council also provides training facilities, technical services and information services, as well as assistance in obtaining the supply of raw materials.

16.33 Malaysian Furniture Promotion Council was established in 2003 to develop and promote the furniture industry, as a globally recognised source of high quality furniture. In the pursuit of this objective, the council introduced Furniture Design Services Programme in May 2004, where young designers are assigned to work in furniture companies to create new designs. As at 2005, a total of 49 designers have participated in the programme.

16.34 The Malaysian Timber Industry Board was appointed by SIRIM Berhad as the Standards Writing Organisation on May 25, 1999 for the timber industry and made responsible for the development of standards on wood-based products. Presently, there are more than 45 Malaysian Standards on timber and related activities, and 20 standards on wood products and processes. Among the standards developed were on sawntimber, sawlogs and semi-manufactures of timber; wood-based panels; mouldings and builders' joinery and carpentry; wooden furniture; and usage of timber and timber products, including grading, nomenclature, technology and processes. The standards include:

- Quality Assurance Manuals;
- Technical Guidelines (Specifying Timber for Building Construction);
- Grading Rules on Malaysian oak (Hevea brasiliensis); and
- Visual Strength Grading for Timber.

As at 2005, a total of 83 wood-based companies have been awarded quality system certification (MS ISO 9001: 2000), and product certification and environmental certification (MS ISO 14000) by SIRIM Berhad.

16.35 The Wood Industry Skills Development Centre, established in 1995, provides skills training and technical advisory services to the industry. The training programme can be categorised into two, namely, market driven and technology driven courses. The centre provides short-term courses in basic wood technology, application of CAD in furniture design, model making, management and quality improvement. In 2003, a special apprenticeship programme was initiated by the centre. The programme was a result of collaboration between the industry, *Pembangunan Sumber Manusia Berhad* and *Majlis Latihan Vokasional Kebangsaan* under the Ministry of Plantation Industries and Commodities. To cater for the training needs in Sabah, a similar centre had been established in Kota Kinabalu Industrial Park, in 2001.

16.36 Technical co-operation is also being initiated with foreign countries, on a Government to Government basis, to address specific needs of the industry. In this respect, the Wood Industry Skills Development Centre collaborates with relevant agencies in countries such as Japan, Taiwan, Italy and Germany. The collaborations are generally in the form of attachment of experts to assist timber companies in strengthening their manufacturing capabilities and competitiveness, particularly in areas such as design, production technology and finishing.

16.37 To promote the industry, facilities have been established in various states:

- five furniture parks, known as Furniture Industry Parks, have been established by the Ministry of Plantation Industries and Commodities, in collaboration with the State Governments of Terengganu, Pahang, Perak, Selangor and Kedah, for the development of the SMEs in the industry. Three of these parks were furnished with a common facility (kiln drying plant);

- one furniture finishing centre was established in an existing project in Melaka; and

- five wood-based industrial complexes have been established in Sarawak, to develop SMEs in the industry. These complexes are in Kuching, Miri, Kota Samarahan, Bintulu and Sarikei.

16.38 During the IMP2 period, incentives have been introduced to promote investments in specific areas of the industry:

- reinvestments in wood-based projects;

- investments in forest and rubber plantations; and

- development, testing and processing of engineered wood products.

(i) Supply of Logs

16.39 The production and supply of logs in Peninsular Malaysia are subject to the National Forest Policy, which determines the annual allowable cut, in line with Malaysia's commitment towards sustainable forest management. The State Government of Sarawak has introduced Forests (Planted Forests) Rules 1997, which provide for the orderly development of forest plantations in the State. Main sources of logs are from Sarawak, followed by Sabah, with supplies from natural forests, plantation forests and rubber plantations. Major species of logs produced are *meranti, kapur, selangan batu* and *sepetir*.The production of logs from natural forests, plantation forests and rubber plantations declined from 30.4 million cubic metres in 1996 to 26.9 million cubic metres in 2005 (Table 16.6). Apart from local production, the availability of logs is supplemented by imports. In 1996, imports amounted to RM101 million and increased to RM241 million in 2000. Imports declined to RM103 million in 2005, due to a lower supply of logs or ban of exports by supplying countries.

TABLE 16.6

PRODUCTION OF LOGS FROM NATURAL FORESTS, PLANTATION FORESTS AND RUBBER PLANTATIONS

Year	*Peninsular Malaysia*	*Sarawak*	*Sabah*	*Total*
	('000 cubic metres)			
1996	8,419	16,080	5,931	30,430
2000	5,074	14,270	4,151	23,495
2005	8,585	12,040	6,280	26,905

Sources: Forestry Department, Peninsular Malaysia; Forestry Department, Sarawak; and Forestry Department, Sabah

16.40 Presently, a total of 310,553 hectares of forest plantations have been established. As forest plantation projects require high capital investments and a long gestation period, the Malaysian Timber Industry Board has established a Special Purpose Vehicle Company, known as Forest Plantation Development Sdn. Bhd., in 2006, to coordinate and monitor the implementation of forest plantation projects. The company is responsible in disbursing soft loan and monitoring the development of forest plantations.

SECTION III PROSPECTS

16.41 The industry will remain a major contributor to export earnings. By 2020, export earnings from downstream products, mainly comprising furniture and panel products, such as medium density fibreboards and plywood, are estimated to reach RM53 billion. In 2010, world consumption of sawntimber is estimated by the Food and Agriculture Organisation of the United Nations to reach 498 million cubic metres and wood-based panels, 179 million cubic metres.

16.42 To remain competitive and resilient, the industry needs to review its business strategies and reinforce its strength and competency. The industry needs to restrategise from competing on price to that of product differentiation and niche market. The future strengths lie in the efficiency of the industry to manufacture specialised, quality downstream products to serve the upper market segments, and its image of reliability in all aspects of the trade. In line with the new focus, growth areas identified are:

- utilisation of lesser promoted species, non-wood fibres and wood waste materials;
- production of higher value-added wood products; and
- shift towards the production of own design and brand furniture.

SECTION IV CHALLENGES

(a) Sustainable Supply of Raw Materials

16.43 The industry requires regular and easy access to raw materials, such as forest logs and rubberwood. However, there is a rising concern on the long term availability of these resources. To sustain the development of the industry, especially the downstream segment, measures need to be undertaken to ensure a consistent supply of the raw materials.

(b) Global Competition and Market Access

16.44 Competition from other tropical timber and temperate timber producing countries, as well as emerging producing countries, is expected to intensify. The introduction of stringent standards, regulations and purchasing policies, and environmental and legal issues will have an influence on the future trade in timber. The demand for environment-friendly or 'green' products has increased at the international level, especially from developed countries. In line with this trend, an increasing number of developed countries, such as New Zealand, the Netherlands, Belgium and Australia, have introduced public timber procurement policies, requiring the certification of imported timber products as originating from sustainable sources. This trend will pose additional pressure on Malaysian manufacturers of sawntimber and mouldings to comply with this requirement, to gain access to these markets.

(c) Lack of Automation

16.45 Since labour is a major cost component, after raw materials, increasing labour cost is eroding Malaysia's competitive advantage. While some efforts in automation are being undertaken, the industry is still labour intensive. The working environment is less attractive to the local workforce and has resulted in the industry's dependence on foreign workers. To remain competitive, the industry needs to increase its utilisation of automated equipment and machinery, as well as upgrade its human capital. Although the technology is available in certain processes, for example, spraying, the industry is reluctant to automate, due to the availability of foreign labour and the financial constraint faced by the SMEs.

(d) Reliance on Original Equipment Manufacturer Market

16.46 Presently, most of the Malaysian-owned manufacturers supply to the OEM market. They rely heavily on designs supplied by buyers and the technology employed is largely imported. The heavy dependence on the OEM market has exposed furniture manufacturers to direct competition from lower cost producing countries, which also supply to the same market. Since the furniture produced for the OEM market mainly cater for the mass market, they are generally lower priced and perceived to be of lower quality. To sustain the industry's presence in the global market, the furniture manufacturers will need to move up the value chain and undertake own design and branding of their products to become own design manufacturers (ODM) and own brand manufacturers (OBM).

(e) Skills Upgrading

16.47 The development of the industry during the IMP3 period will require the use of advanced manufacturing and other related technologies, together with the support infrastructure of information and communication technology (ICT), to manage the global supply chain and factory automation. To remain competitive, the industry will require highly skilled production and managerial personnel. Manufacturers will also need to upgrade their designing, branding and marketing capabilities to facilitate the shift towards becoming ODMs and OBMs.

(f) Multiple Licensing

16.48 Presently, multiple licences are required for the industry, issued by various ministries and agencies, with different rates imposed. Such a requirement has created difficulties for the industry, in terms of administrative burden and increase in the costs of doing business.

SECTION V STRATEGIES AND POLICIES

TARGETS

16.49 During the IMP3 period, 2006-2020, the wood-based industry is expected to continue to contribute substantively to the production of timber products, made from raw materials sourced from Malaysia's sustainable forests. The industry will be more resilient by reinforcing its strengths and competencies, through product differentiation, branding and market expansion and diversification. The total investments in the industry for the IMP3 period are targeted at RM25.4 billion or RM1.7 billion per annum. Exports are targeted to grow at an annual rate of 6.4 per cent to reach RM53 billion by 2020 (Table 16.7).

TABLE 16.7

PROJECTIONS FOR THE WOOD-BASED INDUSTRY

	2006-2010	*2011-2015*	*2016-2020*	*2006-2020*	*2006-2020*
	(RM million)				*Average Annual Growth (%)*
Investments	6.9	8.5	10.0	25.4	4.8
Investments per year	1.4	1.7	2.0	1.7	n.a.[1]
Exports (end period)	29.5	40.1	53.0	53.0	6.4

Note: [1] Not applicable

Source: Ministry of International Trade and Industry

STRATEGIC THRUSTS

16.50 To achieve the targets for the industry, eight strategic thrusts have been set:

(1) developing regional production and supply chains;

(2) promoting the efficient and effective management of forest resources and forest plantations;

(3) expanding market access through intensified marketing and the promotion of Malaysia's 'green' image;

(4) developing and promoting the growth potential in:

- utilisation of lesser promoted species, non-wood fibres and wood waste materials; and
- production of higher value-added wood products;

(5) expanding the production of own design and brand furniture;

(6) enhancing R&D and technology development;

(7) increasing the supply of highly skilled workforce; and

(8) strengthening the institutional support and improving the delivery system related to the industry.

(1) DEVELOPING REGIONAL PRODUCTION AND SUPPLY CHAINS

16.51 To supplement the supply of logs and other raw materials for the industry, domestic manufacturers will be encouraged to outsource logs and other semi-finished components through outward investments in resource rich countries. A database on investment and trade opportunities in the wood-based industry in ASEAN and other resource rich countries will be developed to disseminate information and facilitate business decisions. Efforts will be undertaken to develop Malaysia into a regional centre on design, distribution and marketing for the furniture industry.

(2) EFFICIENT AND EFFECTIVE MANAGEMENT OF TIMBER RESOURCES

16.52 Efforts will be undertaken to promote the efficient and effective management of timber resources. The use of non-conventional raw materials will be intensified, including agricultural wastes, bamboo, rattan and kenaf. Specific material requirements will be ascertained for various manufacturing processes and products. In addition, agro-forestry activities will be encouraged to provide intermediate returns to sustain the viability of forest plantation projects. Programmes will also be undertaken to continue to make available timber from natural forests for the industry. Strategies will focus on adopting good forest practices, through improved silviculture treatment, forest rehabilitation, afforestation and R&D, as well as enhancing efficiencies in the utilisation of forest and mill residues from natural forests.

(3) EXPANDING MARKET ACCESS

16.53 With the growing concern on the environment in the developed markets, the 'green' image of the industry will be promoted through sustainable forest management. Companies will be encouraged to obtain certification from the Malaysian Timber Certification Council. Other 'green' initiatives will be undertaken, such as promoting the utilisation of wood waste, non-wood fibres and bio-composites, and encouraging manufacturers to attain international environment standards, for example, ISO 14000.

16.54 In terms of market development and promotion, efforts will be intensified to gain access to non-traditional markets, such as India, West Asia and Africa. The adoption of certification of wood products, according to international

trading requirements, will be encouraged. The greater utilisation of wood products will be promoted through the introduction of new applications of wood products in the export markets. Activities which will be undertaken include:

- promoting wood products among Malaysian construction companies operating abroad, which have secured large-scale projects overseas;
- promoting the use of Malaysian wood products among project developers, consultants and architects in the overseas markets; and
- encouraging the greater participation by the industry in specialised exhibitions on building materials, and architectural and design fairs to promote the usage of Malaysian wooden products.

16.55 With increased competition in the global market for furniture, Malaysian furniture manufacturers will be encouraged to shift their strategy and diversify into the contract furniture market, by supplying customised and specialised furniture products to hotels, residential buildings and large international events.

(4) PROMOTING THE GROWTH POTENTIAL

(i) Utilisation of Lesser Promoted Species and Non-Wood Fibres

16.56 Lesser promoted species, such as lithocarpus (*mempening*), lauraceae (*medang*), azadirachta excelsa (*sentang*), elateriospermum tapos (*perah*), castanopsis (*berangan*) and paraserianthes falcataria (*batai*), will be promoted. Research undertaken by the Forest Research Institute of Malaysia on some of these wood species will be disseminated to the private sector for commercialisation.

16.57 To supplement the wood supply, the industry will be encouraged to utilise natural fibres, such as kenaf and palm biomass:

- kenaf, a fast growing specie, is being promoted as an alternative to wood, due to its versatility. It is suitable for different applications, such as composites for building materials, pulp and paper, and panel products; and
- about 30 million tonnes of oil palm biomass, in the forms of empty fruit bunches, oil palm trunks and oil palm fronds, are available presently for processing into blockboards, moulded particle boards, medium density fibreboards and plywood.

(ii) Utilisation of Wood Waste Materials

16.58 Measures will be undertaken to establish a comprehensive inventory of all the potential supply of wood wastes in the country. In addition, a more systematic collection and distribution of these wastes to the industry will be organised.

Conversion of timber wastes into solid and engineered products for construction and household applications will be promoted. Such applications include deckings, windows, door profiles, fences, benches, floor panels and furniture.

(iii) Production of Higher Value-Added Products

16.59 Manufacturers will be encouraged to further expand into specialised, bio-composites and other high value-added products, to cater for niche markets. R&D activities will be intensified in wood engineering, finishing technology and designs to produce products which are in greater demand in various aspects, such as quality, design, finishing, product services and delivery. Innovative products using new technologies to improve recovery will be promoted. Such products include laminated scantlings (lamscants) for the production of windows and doors, and oriented strand boards, utilising woodchips suitable for the production of panel products.

(5) PRODUCTION OF OWN DESIGN AND BRAND FURNITURE

16.60 Measures will be introduced to encourage the industry to shift from the production of OEM furniture products to ODM and OBM furniture products. Strategic alliances, through collaborations or joint ventures between local furniture manufacturers with established manufacturers or international design houses in developed markets, will be promoted to enhance the design and branding capabilities of the local manufacturers, and market access. In developing component manufacturers, large furniture companies will be encouraged to outsource the production of components to SMEs. Efforts will also be undertaken to turn Malaysia into a regional centre for furniture, such as organising large scale, international furniture fairs and promoting Malaysia as 'The High Point of the East', which will attract major international companies, marketers and other participants in all activities related to the furniture trade.

(6) RESEARCH AND DEVELOPMENT

16.61 R&D will continue to be undertaken for the further development of the industry. Areas include:

- forest plantation management, including felling and harvesting techniques;
- downstream applications, focusing on selected fast growing and high value species;
- new applications to diversify the use of panel products, such as composite boards or glued beams, in collaboration with industry;
- production technology to minimise wood waste; and
- potential of new resources, such as oil palm fibre and kenaf, for the production of composites and bio-composites. Appropriate process technology and equipment will be adopted to support these new materials.

16.62 To enhance R&D activities related to wood based development, the Bio-Composite Development Centre has been established under the Malaysian Timber Industry Board. The centre will promote and coordinate the commercialisation of potential R&D findings on bio-composite products. Collaboration between the industry and local research institutes will be encouraged in the areas of engineering and designs to upgrade and promote the use of suitable technologies and production processes. The acquisition of appropriate technologies will also be encouraged.

(7) SUPPLY OF HIGHLY SKILLED WORKFORCE

16.63 To enable the industry to move up the value chain, the development and expansion of the required skills will be emphasised. Among the skills to be developed and expanded are production management, maintenance, draughtsmanship and designing, machine operation and finishing techniques. Hands-on training will be provided in specialised areas, such as forest plantation management, advanced wood processing and manufacturing, manufacture of bio-composites and furniture designs. The development of expertise in marketing and market intelligence will be given priority. The industry will be encouraged to take advantage of joint training and workshops, under the ASEAN integration initiatives, to develop and upgrade the skills in the industry.

16.64 Productivity in the industry will be further enhanced through strategies on total factor productivity (TFP). In its efforts to move up to higher value chain and improve productivity and quality, the industry will be encouraged to increase the utilisation of automated equipment and machinery, including high speed moulders, to attain higher mill efficiency and productivity, as well as upgrade the quality of the human capital. Collaboration with wood-based training centres and institutions of higher learning will facilitate the supply of highly skilled workforce.

16.65 Other initiatives to address the skills requirement include:

- further collaborations among wood-based training centres, for example, the Wood Industry Skills Development Centre, with relevant agencies, institutions of higher learning and the industry, through on-the-job training and upgrading of training syllabi to match the needs of the industry;
- collaborations among standards development organisations overseas with those in Malaysia, namely, the Department of Standards Malaysia and SIRIM Berhad, in the development of relevant standards. Areas of collaboration include training in conformity assessment and enforcement; and
- intensification in the application of the Industrial Building Systems to improve manufacturing techniques, reduce dependency on labour and enhance production capacity.

(8) STRENGTHENING THE INSTITUTIONAL SUPPORT AND IMPROVING THE DELIVERY SYSTEM

(i) Assistance Programmes

16.66 Efforts will continue to be undertaken to promote the growth areas in the industry, especially the production of environment-friendly products acceptable in the developed markets. The present assistance programmes will be reviewed to encourage companies to shift towards higher value-added innovative wood products, as well as promote:

- automation and use of advanced manufacturing processes and ICT to support the integration of the industry into the global supply chains;
- designs and branding of furniture;
- investments in improving the work environment in wood processing plants; and
- outsourcing and outward investments.

(ii) Establishment of Timber Procurement Centre and Database

16.67 To facilitate trade activities and enhance the competitiveness of companies in the industry, especially those in furniture, the Government will consider the establishment of the Material City, to be located within the major wood-based industrial area. The project will be a joint-venture between the Government and the industry. It will make available all timber raw materials, accessories and timber products to the industry at competitive prices. The aim is to facilitate the growth of the industry by reducing the cost of transportation and other related costs borne by the industry. To facilitate manufacturers to comply with specific standards enforced by importing countries, the Malaysian Timber Industry Board will develop a database on standards, including product safety and liabilities, for reference by the industry.

(iii) Role of Timber Associations

16.68 The role of timber associations at Federal, regional and State levels will be strengthened through consolidation. This is to enable their members to reap optimum benefits from the facilities and other programmes provided by the Government.

(iv) Linkages

16.69 Efforts will be continued in developing and strengthening sectoral linkages between the upstream and downstream activities to match the needs of those activities. Collaborative efforts in research and technology development,

and adaptation will be strengthened, in consultation with the local machinery associations and manufacturers, to facilitate the production of appropriate locally assembled machinery.

(v) Support Services

16.70 Wood-based companies will be encouraged to utilise the services and technologies developed by the Malaysian Energy Centre, under the Ministry of Energy, Water and Communications, to reduce the energy cost and increase efficiency. Present rules and regulations, including the annual renewal of licences, will be reviewed to reduce bureaucratic burden and business costs. The duration of the validity of the licences will be extended between three to five years. Rules and regulations imposed by the various state authorities will also be standardised.

Chapter 17

RUBBER PRODUCTS INDUSTRY

RUBBER PRODUCTS INDUSTRY

SECTION I OVERVIEW

17.01 The rubber products industry has grown significantly during the period of the Second Industrial Master Plan (IMP2), 1996-2005, achieving steady growth, especially in terms of consumption of local rubber and export revenues. Presently, Malaysia is the world's leading producer and exporter of catheters, latex thread and natural rubber gloves. The sustained growth of the industry was attributed, in part, to continued efforts by domestic manufacturers at enhancing quality, upgrading manufacturing processes and undertaking research and development (R&D) activities. Market promotion programmes have contributed to the increase in the export demand. Small and medium enterprises (SMEs) assumed an important role in the growth of the industry, providing a vital link in the business supply chain to large companies and multinational corporations (MNCs).

17.02 During the period of the Third Industrial Master Plan (IMP3), 2006-2020, Malaysia's position as the leading producer of latex products will be enhanced by measures in expanding export markets and encouraging outward investments. Production of industrial and general rubber products will also be increased, by diversifying the product range. In addition, measures will be undertaken to upgrade the technology, improve the skills and develop a regional centre for the testing and certification of rubber products.

SECTION II PERFORMANCE DURING THE SECOND INDUSTRIAL MASTER PLAN

(a) Status of the Industry

17.03 The industry comprises four product sub-sectors, namely:

- latex products (medical devices, industrial and household gloves, latex threads, balloons, finger stalls and foam products);
- tyres for passenger cars, trucks, earthmovers and graders, and tyre-related products, such as tubes and valves;
- industrial and general rubber products (conveyor belts, dock fenders, automotive parts and components, floor covers, door stoppers, floor tiles, pipe seals, rail pads, hot water bottles, golf balls, toys and other articles of rubber); and
- rubber footwear.

17.04 The number of manufacturers in the industry had increased from 438 in 1996 to 492 in 2005. Presently, the value of output of rubber products has almost doubled to RM9.7 billion from RM5 billion in 1996. Consumption of rubber has also increased by 25 per cent to 500,000 tonnes since 1996. The growth of the industry was attributed to its increased competitiveness and ability to meet the demands for rubber based products in the health care sub-sector, as well as parts and components for the automotive, and machinery and equipment industries.

17.05 In 2005, the industry generated RM7.9 billion in export earnings, while the total imports of rubber products amounted to RM1.8 billion. The United States of America (USA) remained Malaysia's single largest export market for rubber products, valued at RM2.1 billion. Latex products accounted for RM6.2 billion or 78.7 per cent of the total value of exports of rubber products. Main items exported were medical devices of latex products (gloves and catheters) and latex thread, valued at RM5.4 billion. Malaysia continues to maintain its position as the world's leading producer and exporter of catheters, supplying 80 per cent of the world market, latex thread (70 per cent), and natural rubber gloves (60 per cent).

(i) Latex Products

17.06 Latex products constitute the largest sub-sector within the rubber products industry. A total of 138 manufacturers are involved in the sub-sector. Main products include medical devices, household and industrial gloves, latex threads, balloons, finger stalls and foam products. A number of local companies have developed to become major global producers of latex products. They have established their own brands and marketing channels, as well as expanded their operations abroad.

17.07 Medical devices of latex, such as medical gloves, condoms and catheters, have registered increases in demand. The higher demand was attributed to requirements for better healthcare services, arising from increasing affluence, promotion of health and higher expectations of the general public in the quality of medical treatment.

17.08 Rubber gloves constitute a major product in the sub-sector, contributing RM4.5 billion or 57 per cent to the export earnings of the industry in 2005. Presently, there are 104 companies producing rubber gloves. Production of rubber gloves totalled 19 billion pairs in 2005, of which 80 per cent were produced by Malaysian-owned companies.

17.09 The introduction of the Standard Malaysian Glove (SMG) scheme and technological developments, such as polymer coated and powder-free gloves, have supported the shift by the manufacturers towards producing higher value-added products, particularly speciality gloves. Most of the local companies undertake activities

along the entire value chain, from R&D to manufacturing, marketing and customer service. However, SMEs are still dependent on the R&D undertaken by the Malaysian Rubber Board.

(ii) Tyres and Tyre-Related Products

17.10 Production of tyres and tyre-related products is mainly geared for the domestic market. There are 150 companies in the sub-sector. Presently, there are four major tyre manufacturers, producing tyres for passenger cars, trucks, earthmovers and graders. In 2005, production of pneumatic tyres amounted to 15 million pieces. Other manufacturers in the sub-sector produce retreaded tyres, inner tubes and tyre valves. In 2005, the sub-sector contributed RM484.2 million or 6.1 per cent to the country's export earnings and employed more than 6,800 workers.

17.11 The sub-sector has achieved a high degree of industrial linkage, having established its own in-house R&D, and marketing and distribution channels. Strong growth of pneumatic tyres was primarily supported by the expansion of the domestic automotive industry. However, manufacturers of pneumatic tyres face stiff competition in the domestic and export markets from competitively-priced tyres, originating from other countries in the Association of Southeast Asian Nations (ASEAN) and the People's Republic of China.

(iii) Industrial and General Rubber Products

17.12 Presently, there are 190 companies in the industrial and general rubber products sub-sector. Most of the companies are SMEs, producing a wide range of rubber products for the automotive, electrical and electronics (E&E), machinery and equipment, and construction industries. In 2005, exports of the sub-sector amounted to RM738.9 million. Most of the SMEs are contract manufacturers for local and foreign companies. These contract manufacturers produce original automotive and industrial parts and components, such as seals and mountings, rubber hoses and tubes, beltings, dock fenders and seismic bearings.

17.13 The need to expand into the export market has encouraged the manufacturers to establish strategic partnerships and business alliances. This business arrangement has led to improvements in production processes, materials and technologies to capitalise upon opportunities being made available through this arrangement.

(iv) Rubber Footwear

17.14 Presently, there are 14 manufacturers in the rubber footwear sub-sector. Most of the locally-owned companies have ceased operations, due to the high workforce requirement and competition from lower cost producing countries.

(b) Investments

17.15 During the IMP2 period, approved investments in the industry totalled RM4.2 billion, involving 260 projects (Table 17.1). Domestic investments contributed RM2.4 billion, or 55.8 per cent of the total investments. Projects in latex products accounted for RM2 billion, or 48 per cent of the total investments, followed by industrial and general rubber products, RM1.5 billion (36.7 per cent), and tyres and tyre-related products, RM646 million (15.3 per cent).

TABLE 17.1

INVESTMENTS IN THE RUBBER PRODUCTS INDUSTRY, 1996-2005

Product	*No. of Companies*	*Investments (RM million)*		
		Domestic	*Foreign*	*Total*
Total	**260**	**2,350.8**	**1,858.6**	**4,209.4**
Latex products	144	1,169.8	849.9	2,019.7
Industrial and general rubber products	96	777.6	766.2	1,543.8
Tyres and tyre-related products	20	403.4	242.5	645.9

Source: Malaysian Industrial Development Authority

(c) Output

17.16 During the IMP2 period, the total value of output of the industry increased by an average annual rate of 8.2 per cent, from RM5 billion to RM9.7 billion. Sub-sectors which registered growth in output were latex products, tyres, and industrial and general rubber products. Main products in the sub-sectors which registered growth were gloves, catheters, tyres and rubber bands (Table 17.2). The most significant growth was recorded by latex products, and industrial and general rubber products, which together registered an average annual growth rate of 9.7 per cent, from RM3.5 bilion to RM7.6 billion (Chart 17.1).

TABLE 17.2

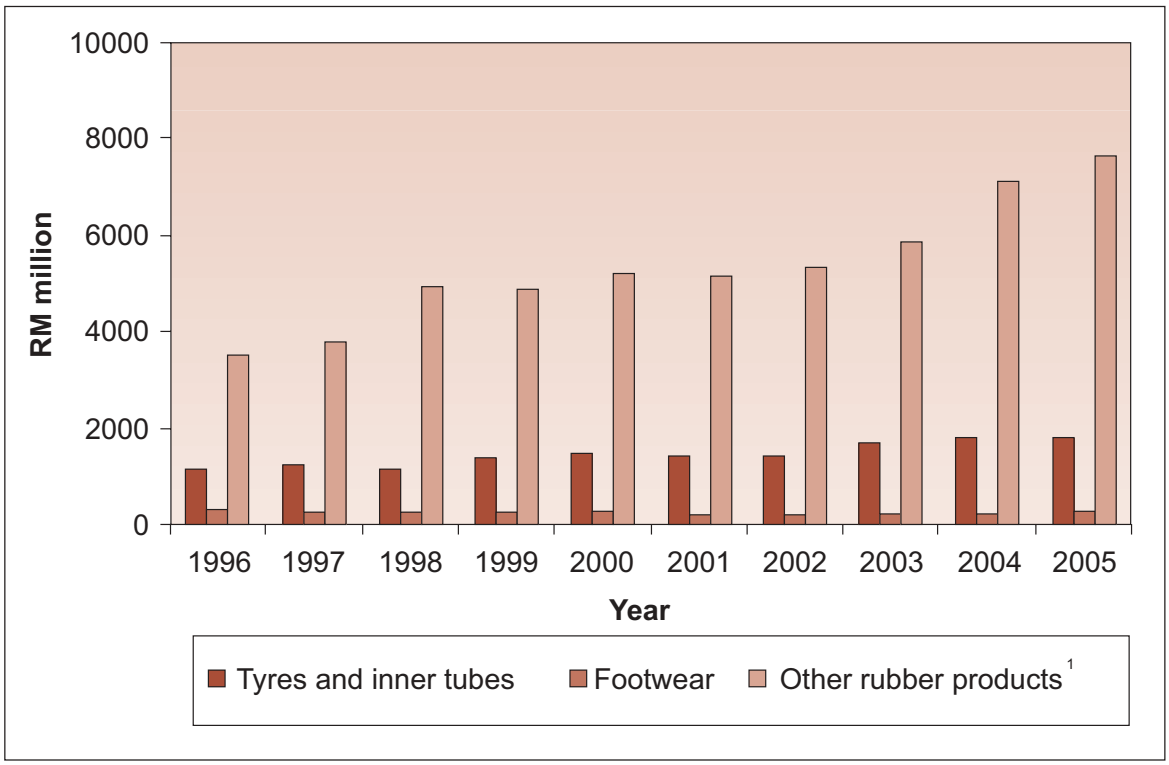
OUTPUT OF MAJOR RUBBER PRODUCTS

Product	*1996*	*2005*	*Average Annual Growth (%)*
	Volume		
Gloves (million pairs)	8,507	19,005	9.7
Catheters (million units)	88	103	2.7
Tyres (million units)	12	15	2.8
Rubber bands (tonnes)	4,213	11,655	8.3

Source: Department of Statistics

CHART 17.1

VALUE OF OUTPUT OF RUBBER PRODUCTS, 1996-2005



Note: [1] Refer to latex, and industrial and general rubber products

Source: Department of Statistics

(d) Employment

17.17 During the IMP2 period, employment in the industry increased by 17.5 per cent to 62,118 persons, accounting for 6.2 per cent of the total workforce in the manufacturing sector. The latex products sub-sector absorbed 40,000 persons of the workforce or 64 per cent of the employment in the industry. Glove manufacturers accounted for the bulk of employment in the sub-sector. Employment in this sub-sector, combined with that of the industrial and general rubber products sub-sector, accounted for 87.8 per cent of the industry workforce. The tyres and tyre-related products, and footwear sub-sectors employed 10.8 per cent and 1.4 per cent, respectively, of the industry workforce.

(e) Consumption

17.18 Manufacturers of latex products were the largest consumers of natural and synthetic rubber in 2005, consuming 345,520 tonnes, or 70.8 per cent, of the total consumption of natural and synthetic rubber. This was followed by producers of tyres (76,691 tonnes or 15.7 per cent) and manufacturers of industrial and general rubber products (64,167 tonnes or 13.2 per cent) (Table 17.3).

TABLE 17.3

CONSUMPTION OF NATURAL AND SYNTHETIC RUBBER

	1996	*2000*	*2005*
	(Tonnes)		
Total	**407,452**	**389,557**	**487,758**
Natural rubber	**360,784**	**340,845**	**396,600**
Latex products	265,022	263,548	308,119
Tyres	39,155	31,206	49,984
Industrial and general rubber products	53,024	41,211	37,554
Footwear	3,583	4,880	943
Synthetic rubber	**46,668**	**48,712**	**91,158**
Latex products	3,711	12,947	37,401
Tyres	19,995	15,735	26,707
Industrial and general rubber products	21,750	19,198	26,613
Footwear	1,212	832	437

Source: Malaysian Rubber Board

17.19 In 2005, the domestic production of natural rubber totalled 1.2 million tonnes. Imports of natural rubber amounted to 462,620 tonnes, mainly from Thailand, which supplied 74 per cent of the imports, Indonesia (9 per cent), the Philippines (7 per cent) and Myanmar (5 per cent), collectively accounting for 95 per cent of the overall imports. Main imports of natural rubber consisted of latex concentrates, standard rubber and ribbed smoked sheets.

17.20 Malaysia is the largest consumer of natural rubber latex in the world, and the fifth largest consumer of natural rubber, after the People's Republic of China, the USA, Japan and India. Compared with rubber industries in the industrialised countries, which consume more synthetic rubber, Malaysia's consumption is mainly of natural rubber. Nevertheless, the consumption of synthetic rubber has steadily increased from 11.5 per cent in 1996 to 18.7 per cent in 2005.

(f) Exports

17.21 During the period 1996-2005, exports of the industry increased by an average annual rate of 7.4 per cent, from RM4.2 billion in 1996 to RM7.9 billion in 2005 (Table 17.4). In 2005, latex products contributed RM6.2 billion, or 78.7 per cent, to the total export earnings of the industry. Main products exported were

rubber gloves, tyres and inner tubes, footwear, and industrial rubber and general rubber products. Malaysia remains the largest supplier of natural rubber medical gloves to the US market, with 30 per cent of the market share. Other major export markets were the European Union (EU) and Japan, with shares of 18.8 per cent and 5.5 per cent, respectively.

TABLE 17.4

TRADE PERFORMANCE OF RUBBER PRODUCTS

	1996	*2000*	*2005*	*1996-2005*
	(RM million)			*Average Annual Growth (%)*
Exports				
Total	**4,219.0**	**5,581.7**	**7,901.7**	**7.4**
Latex products	3,381.8	4,455.7	6,215.3	7.2
Industrial and general rubber products	389.4	555.3	738.9	7.0
Tyres and tyre-related products	207.4	257.2	484.2	10.8
Footwear	240.4	313.5	463.3	6.9
Imports				
Total	**632.1**	**1,027.1**	**1,750.3**	**11.3**
Industrial and general rubber products	350.9	537.4	680.8	8.4
Tyres and tyre-related products	100.0	199.0	516.0	15.6
Latex products	68.3	128.1	323.3	15.0
Footwear	112.9	162.6	230.2	9.4

Sources: Ministry of International Trade and Industry, and Department of Statistics

(g) Imports

17.22 Despite expanding domestic production capabilities, Malaysia continues to import substantial amounts of rubber products. In 2005, the import of all rubber products amounted to RM1.8 billion, compared with RM632.1 million in 1996. The increase was attributed to cheaper imports from other producing countries, such as Thailand, Indonesia and the People's Republic of China, and rising domestic costs of production. The bulk of the imports of rubber products were from ASEAN countries, namely, Thailand, at 21 per cent, and Indonesia and Singapore (both at 5 per cent). Other import sources were from non-ASEAN countries, such as Japan, at 22 per cent, and the People's Republic of China and the USA (both at 5 per cent).

17.23 There have been substantial imports of tyres (in particular, new pneumatic tyres), footwear (sports footwear and other rubber footwear), general rubber goods (unhardened vulcanised rubber articles and seal rings) and latex products. With respect to latex products, the increase was partly due to the imports of gloves and condoms by Malaysian-owned companies from their offshore operations, for repackaging and other value-added activities for re-export.

(h) Research and Development and Technology Support

17.24 Local institutions in R&D have continued to undertake downstream R&D activities and provide technical support services to the industry. During the IMP2 period, major areas of R&D included:

- latex protein allergy faced by the latex products sub-sector;
- development in manufacturing process to improve efficiency and reduce costs;
- diversification of product base and import substitution in high value-added engineering products; and
- development of advanced materials, for example, thermoplastic vulcanisates, and environmental effluent management.

17.25 The SMG for latex examination gloves (powdered and powder-free) was launched in 1998. Technical specifications of the scheme comply with standards of the American Society for Testing and Materials, and the US Food and Drug Administration. At the end of 2005, a total of 33 glove manufacturers were certified as SMG producers. Output of these companies accounts for about half of the total glove production capacity in Malaysia.

SECTION III PROSPECTS

17.26 The demand for rubber products is dependent upon economic growth, as the demand is related to income and living standards. In addition, improvements in health and medical services will result in an increase in the demand for rubber medical products, such as gloves, condoms, breathing bags, cushioning or supporting materials, prosthetics, implants and catheters. Therefore, Malaysia needs to capitalise upon the growth potential and strengthen its position as a global leader in the manufacture and export of latex products, particularly gloves, catheters and latex threads. Similarly, the manufacture of and demand for industrial and general rubber products are also expected to increase, particularly in the Asia Pacific region, in tandem with the expansion of the sports and automotive markets, and developments in construction and infrastructure. There are prospects for new products, as well as enhancement of existing products, to meet the increased demand. Product diversification

in the latex products, and industrial and general rubber products sub-sectors will continue to be pursued in the IMP3. This will contribute towards maintaining sustainability, improving competitiveness and diversifying markets and export earnings.

(a) Latex Products

17.27 Gloves, rubber threads and catheters will continue to be the major products manufactured in the latex products sub-sector. Malaysia has the edge over other countries, in terms of R&D, manufacturing technology, designs and marketing. To enhance the efficiency and competitiveness in the manufacture of latex products, there will be a need for greater adoption of automation technologies. To further strengthen Malaysia's position, existing products will need to be upgraded and improved, and the promotion of branding intensified.

17.28 Application of latex in high-end pharmaceutical or medical products, such as coronary catheters used in surgeries and speciality gloves used in clean rooms, will need to be given greater emphasis to broaden the product range. The USA is the major market, where these catheters are used for angiography, electro-physiology, angioplasty, atherectomy and ultrasound procedures in the heart or peripheral veins and arteries. Typical end-users for these precision devices are interventional cardiologists and radiologists. With the experience and R&D support, Malaysia will be able to be the leader for producing medical devices of latex for niche markets.

17.29 Another latex product which has potential growth is latex foam mattress. With the increasing awareness on the environment, the EU has established the European Eco-Labelling Scheme, favouring natural rubber latex foam mattress over polyurethane. European furniture markets are sourcing latex foam mattresses from Asia. Malaysian rubber product manufacturers will need to consider moving into value-added product innovation, using latex foams with different firmness, to ensure optimal orthopaedic support. The Malaysian Rubber Board is developing a local testing facility for flame retardation to support the industry, which presently sends its products overseas for testing.

(b) Industrial and General Rubber Products

17.30 This sub-sector has been identified for product diversification into high value-added products, such as seismic bearings, rubber fendering systems, automotive rubber-metal components (such as engine mountings and suspension bushes), high pressure hoses with barrier applications, insulating gloves and components for the E&E goods (for example, anti-static rubber components). Presently, only a few companies have ventured into manufacturing such products. More coordinated and concerted efforts are required to realise the growth potential in these high value-added products.

17.31 There is substantial export potential for these high value-added products. For example, it has been estimated that during the IMP3 period, the annual global demand for engine mountings will be US$1.7 billion, while the markets for suspension bushes and bridge seismic bearings will be US$1 billion and US$26 million, respectively. Major inputs for the manufacture of the technical products in this sub-sector are natural rubber, chemical additives, including carbon black, and metal plates. These inputs will need to be made readily available at competitive prices to the local manufacturers. In addition, other related products, such as ethylene propylene rubber and ethylene propylene diene rubber, will need to be promoted. These will be new raw materials for the industry.

(c) Outward Investments

17.32 The shortage of natural latex domestically has compelled some of the local producers, especially in low value-added rubber products, to relocate to other countries. The availability of natural latex and lower costs of production are the two main factors for consideration for outward investments. Some countries in ASEAN, which meet these criteria, are attractive locations for outward investments.

SECTION IV CHALLENGES

(a) Supply of Raw Materials

17.33 While Malaysia produces adequate supply of natural rubber in dry forms, the domestic supply of latex is insufficient to meet the demand by the latex products sub-sector. The shortage was met by imports, which increased four-fold, from 114,966 tonnes in 1996 to 462,320 tonnes in 2005. The bulk of the imports were from Thailand.

(b) Product Diversification

17.34 The industry will need to be further diversified, with emphasis on high value-added and high technology rubber products, especially for engineering, construction and marine applications. More efforts in R&D will need to be undertaken on new product development and downstream activities, including the extraction of biochemical products from latex.

(c) Shortage of Local Workforce

17.35 The labour-intensive rubber products industry is faced with a shortage of local workforce, due to its physically demanding work environment. There is a high turnover among local workers. This has compelled the industry to employ

foreign workers, who account for 32 per cent of the industry's workforce. The challenge is to reduce the labour component and improve productivity. This can be achieved by developing and adopting automated production processes.

17.36 Apart from factory floor workers, there is increased demand for rubber scientists and technologists, mechanical engineers, technicians and production managers. Newly recruited graduates and technicians will need to be provided with relevant training on process operations and equipment utilisation. Regular upgrading of skills through training is needed to meet the technical requirement of knowledge-based operations, as well as diversify the product base.

(d) Markets

17.37 Although Malaysia is already the world's leading exporter of latex products, there is a need to improve promotion and branding strategies to retain its position in the export market. In the industrial and general rubber products sub-sector, which is more domestic market-oriented, there is a need to maintain its sustainability in the domestic market, by upgrading and improving existing products, as well as introducing new products. To ensure that Malaysia continues to be the major global leader in selected rubber products, measures need to be undertaken to enhance product quality, upgrade manufacturing processes, broaden R&D activities and intensify market promotions.

SECTION V STRATEGIES AND POLICIES

TARGETS

17.38 During the IMP3 period, it is projected that:

- new investments in the industry will total RM12.9 billion, or RM862 million per annum; and
- export earnings will amount to RM23.6 billion by 2020 (Table 17.5).

STRATEGIC THRUSTS

17.39 Six strategic thrusts have been set to achieve the targets for the industry:

(1) strengthening and enhancing Malaysia's position as the leading producer and exporter of latex products. This will involve, among others, building and safeguarding Malaysia's image as a supplier of quality and reliable rubber products;

(2) expanding the export market for Malaysian rubber products;

(3) encouraging outward investments for low value-added rubber products to countries with lower costs of production and availability of natural rubber;

(4) diversifying the product range by developing the industrial and general rubber products sub-sector;

(5) developing Malaysia as a regional centre for the testing and certification of rubber products; and

(6) upgrading the existing technology, especially in process automation, and improving the skills of the workforce.

TABLE 17.5

PROJECTIONS FOR THE RUBBER PRODUCTS INDUSTRY

	2006-2010	*2011-2015*	*2016-2020*	*2006-2020*	*2006-2020*
	(RM billion)				*Average Annual Growth (%)*
Investments	3.8	4.3	4.9	12.9	3.5
Investments per year	0.7	0.9	1.0	0.9	n.a.[1]
Exports (end period)	13.1	17.8	23.6	23.6	7.6

Note: [1] Not applicable

Source: Ministry of International Trade and Industry

(1) ENHANCING MALAYSIA'S POSITION AS THE LEADING PRODUCER OF LATEX PRODUCTS

17.40 Efforts will be undertaken to intensify the promotion of Malaysian brand names and expand the market for latex products. The Government will undertake greater promotion of SMG, to make it recognised and accepted internationally. At the same time, more companies will be encouraged to obtain the certification under SMG to ensure the quality and reliability of their products.

(2) EXPANDING THE EXPORT MARKETS

17.41 Greater coordinated and comprehensive trade promotion activities will be undertaken among relevant Government agencies, involving Malaysia External Trade Development Corporation (MATRADE), Ministry of Plantation Industries

and Commodities, Malaysian Rubber Board and Malaysian Rubber Export Promotion Council. Greater participation in international exhibitions, either in Malaysia or overseas, will be organised by MATRADE. New markets, such as Latin America, Africa, and West and Central Asia, provide substantial export potential for the industry. Automotive, petroleum, construction, marine transportation and power supply industries offer vast end-use potential for Malaysian rubber products.

(3) ENCOURAGING OUTWARD INVESTMENTS

17.42 Efforts will be undertaken by Malaysian Industrial Development Authority (MIDA) to further promote and support outward investments in the industry. Strategic outward investments will be encouraged in activities which complement the operations of existing companies in Malaysia, especially within the other ASEAN countries, which have raw materials and lower costs of production.

(4) DIVERSIFYING THE PRODUCT RANGE

17.43 R&D activities will be intensified to ensure Malaysian latex products meet international standards in health and safety. In addition, there will be greater focus on R&D in advanced manufacturing technologies and higher value-added products, such as:

- bridge and seismic bearings;
- engine mountings and marine fenders;
- advanced, nano and smart materials; and
- environment friendly rubber products.

17.44 There are strong linkages between the rubber products industry and industries in plastics, metals, chemicals, packaging materials, machinery and equipment, moulds and dies, automotive products and construction. To enhance the linkages, support industries, such as rubber chemicals, tools and dies, and packaging, will be further developed. The setting up of a production facility for ethylene propylene rubber and ethylene propylene diene rubber will be promoted to enable Malaysia to produce high value-added and advanced products.

(5) REGIONAL CENTRE FOR TESTING AND CERTIFICATION

17.45 To strengthen the support services for the industry, Malaysia will develop a regional and global centre for the testing and certification of rubber products, especially for use within ASEAN. Testing facilities of the Malaysian Rubber Board will be upgraded.

(6) UPGRADING TECHNOLOGY AND IMPROVING SKILLS

17.46 A pool of experts in rubber technologies, advanced materials, moulds and dies, and nanotechnologies will be created to meet market and R&D demands. Greater collaborations will be encouraged among institutions of higher learning, research institutes and the private sector to develop the required expertise. There is a need to extend R&D activities into further downstream and new products. In this respect, training in polymer technology will be enhanced. This will facilitate the industry in acquiring the required skills to cater for the development of new materials and products, for example, high precision products, and research into the linkages of polymers and metals.

Chapter 18

OIL PALM-BASED INDUSTRY

OIL PALM-BASED INDUSTRY

SECTION I OVERVIEW

18.01 Presently, palm oil is one of the major oils produced in the world. In 2005, it contributed about 24 per cent to the world's production of oils and fats. Presently, Malaysia is the world's largest producer and exporter of palm oil, contributing about 45 per cent of the production of palm oil and 51 per cent, exports of palm oil.

18.02 During the period of the Second Industrial Master Plan (IMP2), 1996-2005, the oil palm-based industry continued to expand. The production of crude palm oil (CPO) recorded an average annual growth of 6.7 per cent. The industry remains an important foreign exchange earner, contributing about 5.3 per cent to Malaysia's total exports in 2005. The growth in oleochemicals, which form an important segment of the industry, had been significant:

- plant capacities registered more than three-fold increase, from 823,562 tonnes in 1996 to 3 million tonnes in 2005; and

- presently, Malaysia is the world's leading producer of fatty acids and natural fatty alcohols, accounting for 25 per cent of the world's capacity for these products.

18.03 During the period of the Third Industrial Master Plan (IMP3), 2006-2020, the industry is expected to expand its downstream manufacturing activities into a wider range of high value-added products. The commercialisation of research and development (R&D) activities will also be intensified, through greater collaboration between Government research institutes and industry. Market research and brand promotion will be further strengthened to enhance market access and acceptance. To maintain Malaysia's position as a global producer and exporter of oil palm products, and taking into consideration the increasing consumer awareness on the environment and sustainable development, the industry will adopt a sustainable approach in the development of products from plantation to consumers. In addition, a positive image of the industry will be projected through adopting a zero waste strategy, involving the utilisation of oil palm biomass and promotion of bio-diesel.

SECTION II PERFORMANCE DURING THE SECOND INDUSTRIAL MASTER PLAN

(a) Status of the Industry

18.04 The industry can be categorised into:

- palm oil and palm kernel oil products, which include processed palm oil (refined palm oil, palm olein and palm stearin), palm kernel oil and its products, palm kernel cake and downstream processing of palm oil products, such as margarine, shortening, *vanaspati* and cocoa butter substitutes;

- oleochemicals, which comprise basic oleochemicals, such as fatty acids, fatty alcohols, methyl esters and glycerine; oleochemical derivatives, such as fatty amides, fatty esters, metallic stearates and soap noodles; oleochemical preparations, such as soap, cosmetics, personal care and toiletry products; and other palm oil-based products, such as printing ink, polyols, carotenoids and tocotrienols;

- bio-diesel (palm methyl ester), which can be used as a substitute for, or additive to, petroleum diesel in most transport and non-transport applications; and

- products from palm biomass, which include products such as 'green plywood' from oil palm trunks, particleboards or fibreboards, composite products from the mixture of palm biomass and other materials, moulded products (for example, food containers) and energy generation from palm biomass.

Palm Oil Processing Facilities

18.05 Palm oil processing facilities comprise palm kernel crushers, refineries and oleochemical plants. All these facilities had expanded, in tandem with the expansion of the oil palm cultivated areas, from 2.7 million hectares in 1996 to 4.1 million hectares in 2005, and the increase in the production of CPO, from 8.4 million tonnes in 1996 to 15 million tonnes in 2005.

(i) Palm Kernel Crushers

18.06 As at the end of 2005, there were 35 palm kernel crushers (Table 18.1). Most of the crushers were small, in terms of size and investments. In 1996, the total capacity of the crushers was 2.4 million tonnes, which more than doubled to 5.2 million tonnes in 2005.

TABLE 18.1

PALM OIL PROCESSING FACILITIES

Processing Facilities	*1996*		*2000*		*2005*	
	Number	*Capacity (million tonnes)*	*Number*	*Capacity (million tonnes)*	*Number*	*Capacity (million tonnes)*
Refineries	41	11.5	46	14.6	48	17.3
Palm kernel crushers	35	2.4	37	2.9	41	5.2
Oleochemical plants	13	0.8	16	1.8	41	3.1

Sources: Malaysian Palm Oil Board and Malaysian Industrial Development Authority

(ii) Refineries

18.07 As at the end of 2005, there were 48 palm oil refineries. The refineries were large and owned by multinational corporations (MNCs) and Government-linked companies (GLCs). The annual capacity of the refineries increased from 11.5 million tonnes in 1996 to 17.3 million tonnes in 2005.

(iii) Oleochemical Plants

18.08 Among the three types of facilities, oleochemical plants registered considerable expansion, in terms of the number of plants in operation and plant capacity. In 1996, there were 13 plants, with a total capacity of 0.8 million tonnes, which increased to 41 plants, with a total capacity of 3.1 million tonnes in 2005. The manufacturers comprised local, foreign and several joint-venture companies with the MNCs. All the plants are located in Peninsular Malaysia. Of the 41 plants, 13 were involved in the production of basic oleochemicals, three in both basic oleochemicals and oleochemical derivatives, and the remaining 25, oleochemical derivatives. Major uses of oleochemicals are in the manufacture of soaps, detergents and surfactants; rubber and plastics; paper; lubricants; personal care products (toiletries and cosmetics); textile auxiliaries; paints and pharmaceuticals.

(b) Investments

18.09 During the IMP2 period, approved investments for oil palm-based projects amounted to RM9 billion, of which RM6 billion, or 66.6 per cent, were from domestic sources and RM3 billion (33.4 per cent) from foreign sources (Table 18.2). Major investments were in oleochemicals, with RM4.6 billion, followed by palm oil and palm kernel oil products (RM2.8 billion).

TABLE 18.2

INVESTMENTS IN THE OIL PALM-BASED INDUSTRY

Products	1996-2000			2001-2005			1996-2005			Number of projects
	Domestic	Foreign	Total	Domestic	Foreign	Total	Domestic	Foreign	Total	
	(RM million)									
Total	**1,140.4**	**717.7**	**1,858.1**	**4,836.1**	**2,276.8**	**7,112.9**	**5,976.5**	**2,994.5**	**8,971.0**	**249**
Oleochemicals	357.5	487.5	845.0	2,479.8	1,296.8	3,776.6	2,837.3	1,784.3	4,621.6	54
Palm oil and palm kernel oil products	701.9	228.9	930.8	1,299.0	589.7	1,888.7	2,000.9	818.6	2,819.5	117
Products from biomass	81.0	1.3	82.3	386.5	69.1	455.6	467.5	70.4	537.9	50
Bio-diesel	nil	nil	nil	231.1	292.4	523.5	231.1	292.4	523.5	7
Energy from biomass	nil	nil	nil	439.7	28.8	468.5	439.7	28.8	468.5	21

Source: Malaysian Industrial Development Authority

(i) Palm Oil and Palm Kernel Oil Products

18.10 Total approved investments in palm oil and palm kernel oil products amounted to RM2.8 billion, of which RM2 billion, or 71 per cent, were from domestic sources. Investments in this segment mainly comprised diversification and expansion projects in Peninsular Malaysia, while investments in new palm oil refineries were based in Sabah and Sarawak. Investment levels for refineries are guided by the availability of CPO and existing capacity. Based on the present policy, investments are allowed only for integrated projects based in Sabah and Sarawak. Other approved investments were for the processing of palm oil-based value-added products, such as margarine, shortenings, cocoa butter substitutes and speciality fats. These investments were mainly expansion and diversification projects of existing palm oil companies located in Johor and Selangor.

(ii) Oleochemicals and Derivatives

18.11 Approved investments in oleochemicals totalled RM4.6 billion, of which RM2.8 billion, or 61.4 per cent, were from domestic sources. Investments increased during the second phase of the IMP2 period (2001-2005) for the production of basic oleochemicals, detergents and personal care products, carotenoids and tocotrienols. The increased investments reflected the continuing trend towards the use of natural or plant-based products and the growing affluence of global economies. For example, the demand by the People's Republic of China is estimated to grow at between 8 per cent and 10 per cent during the next five years. With this development, the oleochemicals segment is expected to focus on further developing higher value-added oleochemical derivatives and consumer products, such as soaps, surfactants, polyols, food additives and nutraceuticals, such as tocotrienols (Vitamin E), carotenoids (Vitamin A) and flavonoids.

(iii) Bio-Diesel

18.12 The interest in investments in bio-diesel in Malaysia started during the second phase of the IMP2 period, in line with the growing demand for 'green' energy in developed countries. Governments in Europe and the USA are increasingly promoting the use of bio-diesel as an alternative fuel, to reduce the dependence on imports of crude oil and the adverse effect of greenhouse gas emissions. During the period 2003-2005, a total of seven bio-diesel projects were approved, with investments amounting to RM523.5 million. Foreign investments accounted for RM292.4 million, or 55.9 per cent, while domestic investments, RM231.1 million (44.1 per cent). These projects are in various stages of implementation.

(iv) Products from Palm Biomass

18.13 Approved investments in palm biomass products totalled RM537.9 million, of which RM467.5 million, or 86.9 per cent, were from domestic sources. Investments

in biomass products, such as particleboards, fibreboards, 'green plywood' (plywood from oil palm trunks) and moulded products, recorded a substantial increase during the second phase of the IMP2 period.

18.14 Biomass can also be used for energy generation. A target of 5 per cent has been set for electricity generation from renewable energy sources. As at the end of 2005, a total of 21 projects, with investments of RM468.5 million, were approved for the production of energy generation from palm biomass. These projects will utilise palm biomass from palm kernel shells and empty fruit bunches to produce energy in the forms of electricity, gas and steam.

(c) Production

18.15 During the IMP2 period, the highest growth in the industry was registered in the production of refined, bleached and deodorised (RBD) palm oil. Production grew at an average annual rate of 14.8 per cent, from 3.6 million tonnes in 1996 to 11.6 million tonnes in 2005. For other palm oil products category, the growth areas were in the production of bakery fats and cocoa butter substitutes, replacers and equivalents. The production of crude palm kernel oil and palm kernel cake increased at an average annual rate of 5.9 per cent and 4.9 per cent, respectively (Table 18.3).

TABLE 18.3

PRODUCTION OF SELECTED OIL PALM PRODUCTS

Products	*1996*	*2000*	*2005*	*1996-2005*
	(Tonnes)			*Average Annual Growth (%)*
RBD palm oil	3,588,689	8,902,327	11,568,242	14.8
RBD palm olein	3,917,047	5,282,950	7,649,185	7.1
RBD palm stearin	1,082,118	1,356,163	2,225,229	7.9
Palm kernel cake	1,383,034	1,639,227	2,095,876	4.9
Crude palm kernel oil	1,107,045	1,384,685	1,842,628	5.9
Other palm oil products				
Margarine	55,700	30,550	28,658	-5.8
Vanaspati	35,938	118,604	21,641	-2.5
Cocoa butter substitutes/ replacers/equivalents	204	8,523	21,336	12.9
Bakery fats	nil	6,459	18,525	18.4
Dough fats	547	7,981	2,264	8.0
Red palm oil	nil	nil	92	n.a.[1]

Notes: [1] Not applicable
Source: Malaysian Palm Oil Board

18.16 During the IMP2 period, the industry had diversified into the production of edible speciality oils and fats, such as red palm oil; trans-free formulation for margarine, shortening and reduced fat spread; speciality animal fat replacers; and emulsifiers and food ingredients (such as salad dressing and palm-based *santan* powder). Commercial production of these products started during the second phase of the IMP2 period.

18.17 During the IMP2 period, the production of oleochemicals registered an average annual growth of 11.1 per cent. The production of fatty acids, methyl esters, fatty alcohols and glycerine increased by more than two-fold, from 710,000 tonnes in 1996 to 2 million tonnes in 2005 (Table 18.4). The oleochemical segment had diversified into the production of:

- oleochemical derivatives, including fatty nitrogen compounds, such as fatty amines and fatty amides, ethanolamides and metallic stearates;
- consumer products, such as cosmetics and personal care products and toiletries, printing ink, polyols and cleaning agents; and
- biotechnology-based products, such as vitamin E concentrates, palm mixed carotenoids, palm tocotrienols, emulsifiers and lipase modified oils.

TABLE 18.4

PRODUCTION OF OLEOCHEMICAL PRODUCTS

Products	*1996*	*2000*	*2005*	*1996-2005*
	('000 tonnes)			*Average Annual Growth (%)*
Total	**710.0**	**1,305.8**	**1,974.4**	**11.1**
Fatty acids	335.3	689.3	1,197.6	14.3
Fatty alcohols	143.9	259.5	320.2	10.2
Glycerine and others	108.2	168.8	250.9	8.3
Methyl esters	122.6	188.1	205.6	3.8

Source: Malaysian Palm Oil Board

(d) Exports

18.18 Exports of oil palm products comprise processed palm oil, crude and processed palm kernel oil, palm kernel cake, oleochemical products and other palm oil-based finished products. During the IMP2 period, exports of oil palm products grew at an average annual rate of 7.9 per cent, from RM11.6 billion in 1996

to RM26.3 billion in 2005 (Table 18.5). Processed palm oil, mostly in the form of RBD palm olein, remained the largest item of palm oil exports, contributing 67.7 per cent of the total exports of palm oil products in 2005. Exports of palm oil-based finished products also recorded a substantial increase, with an average annual growth rate of 28 per cent during the same period. Main products exported were shortening, vegetable ghee or *vanaspati*, dough fats and cocoa butter substitutes.

TABLE 18.5

EXPORTS OF OIL PALM PRODUCTS

Product	*1996*		*2000*		*2005*		*1996-2005*
	Value (RM mil)	*Share (%)*	*Value (RM mil)*	*Share (%)*	*Value (RM mil)*	*Share (%)*	*Average Annual Growth (%)*
Total	**11,569.4**	**100.0**	**14,587.5**	**100.0**	**26,311.0**	**100.0**	**7.9**
Processed palm oil	9,222.9	79.7	9,885.9	67.8	17,808.3	67.7	5.8
Oleochemicals	1,166.6	10.1	3,036.8	20.8	5,137.8	19.5	15.4
Processed palm kernel oil	744.8	6.4	1,034.0	7.1	1,916.3	7.3	11.3
Palm oil-based finished products	62.3	0.5	402.1	2.8	829.1	3.2	28.0
Palm kernel cake	255.1	2.2	196.4	1.3	353.6	1.3	6.4
Crude palm kernel oil	117.7	1.0	32.3	0.2	265.9	1.0	16.9

Source: Malaysian Palm Oil Board

18.19 Towards the end of the IMP2 period, exports to the People's Republic of China and the European Union (EU) surpassed those to Pakistan and India. The share of exports to the People's Republic of China increased from 12.7 per cent in 1996 to 21.3 per cent in 2005, while that to the EU increased from 9.4 cent in 1996 to 16.2 per cent in 2005 (Table 18.6). Exports to the People's Republic of China mainly comprised RBD palm olein, while those to the EU were mostly CPO. The higher exports to the People's Republic of China were mainly due to the benefits of higher import quota allocation for palm oil and the exemption of palm stearin from the import quota requirement. The increased exports to the EU were due to the lower supply of soyabean and sunflower oil, and competitive prices of palm oil vis-à-vis other oils and fats. The decline in exports to India and Pakistan was a result of a sharp increase in the countries' domestic output of vegetable oils, as well as the higher tariff rate for processed palm oil, compared with those for CPO and soyabean oil.

TABLE 18.6

EXPORTS OF PALM OIL[1] TO TOP TEN DESTINATIONS

Destination	*1996*		*2000*		*2005*	
	Value (RM mil)	*Share (%)*	*Value (RM mil)*	*Share (%)*	*Value (RM mil)*	*Share (%)*
Total	**9,308.9**	**100.0**	**10,227.3**	**100.0**	**20,033.7**	**100.0**
People's Rep. of China	1,183.0	12.7	1,113.0	10.9	4,270.9	21.3
EU	878.0	9.4	1,110.5	10.9	3,249.6	16.2
Pakistan	1,474.0	15.8	1,161.0	11.4	1,407.2	7.0
Egypt	423.0	4.5	460.2	4.5	886.6	4.4
India	1,336.0	14.4	2,300.6	22.5	862.6	4.3
USA	120.0	1.3	181.2	1.8	774.4	3.9
Bangladesh	132.0	1.4	107.1	1.0	756.3	3.8
Japan	491.0	5.3	441.4	4.3	729.7	3.6
Singapore[2]	334.0	3.6	414.1	4.0	563.9	2.8
United Arab Emirates	110.0	1.2	230.8	2.3	406.1	2.0

Notes: [1] Crude and processed palm oil
[2] Include re-exports

Source: Malaysian Palm Oil Board

18.20 Exports of oleochemical products increased more than four-fold, from RM1.2 billion in 1996 to RM5.1 billion in 2005 (Table 18.7). The rise in exports was attributed to the global consumer preference for environment-friendly products and the competitive prices of oleochemical products, compared with petroleum and animal fat-based products. Fatty acids were the major oleochemicals exported, accounting for 36.8 per cent of the total exports of oleochemicals in 2005, followed by fatty alcohols (26.5 per cent) and methyl esters (14.4 per cent). Traditionally, the EU, the USA and Japan were the major markets for oleochemicals. In 1996, they accounted for 78.8 per cent of the total exports of oleochemicals (Table 18.8). Towards the end of the IMP2 period, the People's Republic of China had joined the rank as a major export market for Malaysian oleochemicals. Exports to India, Republic of Korea and the United Arab Emirates had also expanded substantially.

(e) Research and Development and Technology Development

18.21 R&D is important to sustain the growth and competitiveness of palm oil vis-à-vis other oils and fats. Towards this end, both the Government and private sector have undertaken extensive R&D in the industry.

TABLE 18.7

EXPORTS OF OLEOCHEMICAL PRODUCTS

	1996		2000		2005		1996-2005
	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)	Average Annual Growth (%)
Total	**1,166.6**	**100.0**	**3,036.8**	**100.0**	**5,137.8**	**100.0**	**15.4**
Fatty acids	316.0	27.1	1,062.9	35.0	1,888.4	36.8	17.6
Fatty alcohols	618.0	52.9	770.1	25.4	1,363.8	26.5	13.9
Methyl esters	43.0	3.7	423.8	14.0	738.8	14.4	14.2
Soap noodles	12.0	1.0	213.3	7.0	631.2	12.3	41.6
Glycerine	177.0	15.2	564.5	18.6	507.4	9.9	6.8

Source: Malaysian Palm Oil Board

TABLE 18.8

EXPORTS OF OLEOCHEMICALS TO TOP TEN DESTINATIONS

Destination	1996		2000		2005	
	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)	Value (RM mil)	Share (%)
Total	**1,166.6**	**100.0**	**3,036.8**	**100.0**	**5,137.8**	**100.0**
EU	450.0	38.6	882.1	29.0	1,410.8	27.5
People's Rep. of China	14.0	1.2	254.8	8.4	753.1	14.7
USA	226.0	19.4	585.7	19.3	707.6	13.8
Japan	243.0	20.8	476.2	15.7	686.8	13.4
India	21.0	1.8	92.9	3.1	248.9	4.8
Republic of Korea	31.0	2.7	111.5	3.7	193.4	3.8
Singapore[1]	39.0	3.3	70.3	2.3	152.2	3.0
Taiwan	43.0	3.7	104.3	3.4	132.6	2.6
Philippines	24.0	2.1	63.3	2.1	93.8	1.8
United Arab Emirates	1.0	0.1	34.4	1.1	68.5	1.3

Note: [1] Include re-exports

Source: Malaysian Palm Oil Board

18.22 Up to 2005, the Government had developed a total of 302 products and technologies, of which about 100 had been commercialised and licensed to the industry:

- some of the commercialised products were pourable margarine, non-dairy ice-cream, salad dressings, red palm oil, vitamin E, palm oil-based printing ink, cosmetics and personal care products; and

- some of the new technologies developed were trans-free formulations for margarine, shortening and reduced fat spread, and extraction of minor components for health food supplements (nutraceuticals).

Some of the large plantation companies, through their own R&D facilities, had undertaken agriculture-related research to support their plantation operations. The companies had enhanced their planting materials through breeding programmes and undertaking agronomic trials to optimise plantation output, and control pests and diseases.

18.23 R&D activities had been undertaken to further develop downstream products related to oleochemicals, bio-diesel and biomass:

- in oleochemicals, the Government focused its research on polyurethanes, polyols, printing inks, surface coatings, surfactants and cosmetics. Pilot plants, such as those for polyols and methyl ester sulphonates, had been established to expedite commercialisation;

- the Government had also ventured into technically-viable bio-diesel formulations, which are expected to be commercialised during the initial phase of the implementation of the IMP3; and

- in biomass, the focus was on promoting the utilisation of biomass in products, such as pulp and paper, medium density fibre boards, moulded particle boards and 'green plywood'.

(f) Supply of Raw Materials

18.24 During the IMP2 period, increases were registered in the total oil palm planted areas and production of CPO:

- total planted areas increased at an average annual rate of 4.8 per cent, from 2.7 million hectares in 1996 to 4.1 million hectares in 2005. This was a result of the expansion in new cultivated areas in Sabah and Sarawak (Table 18.9): and

- production of CPO increased at an average annual rate of 6.7 per cent, from 8.4 million tonnes in 1996 to 15 million tonnes in 2005.

TABLE 18.9

OIL PALM PLANTED AREAS AND PRODUCTION OF CRUDE PALM OIL

Product	*1996*		*2000*		*2005*		*1996-2005*
	Area ('000 ha[1])	*CPO ('000 tonnes)*	*Area ('000 ha[1])*	*CPO ('000 tonnes)*	*Area ('000 ha[1])*	*CPO ('000 tonnes)*	*Average Annual Growth for Area (%)*
Total	**2,692**	**8,385**	**3,377**	**10,841**	**4,051**	**14,961**	**4.8**
Peninsular Malaysia	1,926	6,407	2,046	7,211	2,299	8,291	1.9
Sabah	626	1,703	1,001	3,110	1,209	5,334	8.8
Sarawak	140	275	330	520	543	1,337	16.5

Note: [1] Hectares

Source: Malaysian Palm Oil Board

18.25 Taking into consideration the growth prospects of the industry, against the scarcity of land and shortage of labour in Malaysia, a number of Malaysian companies have expanded their operations overseas. In oil palm plantations, the countries selected included Indonesia, Thailand and Viet Nam. In refining and downstream activities, the People's Republic of China had been one of the countries for location. Other companies have gained access into the developed markets, for example, the Netherlands, through mergers and acquisitions (M&As). This trend is expected to continue in areas where there is market potential for palm oil products.

(g) Institutional Support and Policy

18.26 Major developments in the institutional support and policy initiative for the industry were:

- the merger between the Palm Oil Research Institute of Malaysia and the Palm Oil Registration and Licensing Authority in May 2000, with the establishment of Malaysian Palm Oil Board (MPOB). The objective is to provide more effective services, and greater national and international focus to the industry;

- the consolidation of the representation of interests of the industry among its various associations, advisory bodies and councils, with the formation of Malaysian Palm Oil Association in 1999. The main function of the new association is to represent the interests of producers of oil palm, both at national and international levels;

- the introduction of several incentives to further promote investments in the industry in the areas of utilisation of renewable energy resources (for example, biomass), utilisation of oil palm biomass in value-added products, reinvestments in resource-based industries (including palm oil products) and commercialisation of findings by public sector research institutes; and

- the formulation of the National Biofuel Policy, to encourage the production and utilisation of palm oil-based bio-fuel as an alternative, environment-friendly, renewable energy source. Legislation will be introduced, requiring all diesel to be converted to a blend of bio-diesel.

(h) Developments of the Palm Oil Industrial Clusters

18.27 To accelerate the development of the industry, the Ninth Malaysia Plan (RMK-9), 2006-2010, has earmarked the development of palm oil industrial clusters in the trans-border areas of Eastern Johor-Southern Pahang and Southern Kelantan-Northern Terengganu, as well as Sabah and Sarawak.

18.28 During the IMP2 period, oil palm cultivation in Sabah expanded rapidly. Presently, the state has the largest oil palm cultivated area in the country, covering a total of 1.2 million hectares. The state produces about 5.3 million tonnes, or 35.7 per cent, of the total output of CPO in Malaysia. The Sabah State Government has identified two palm oil industrial clusters, namely, Lahad Datu and Sandakan, as the main areas for growth. These clusters will be managed by a State-owned agency. The industry in Sarawak is relatively less developed. In 2005, Sarawak produced 1.3 million tonnes, constituting 8.9 per cent of the total output of CPO. To enhance the development of the industry, the state intends to increase the plantation areas from the present 543,000 hectares to 1 million hectares by 2010. Presently, there are nine refineries in operation in Sabah and three in Sarawak. Nearly all of these refineries confine their operations to producing refined products, including cooking oil. However, in Sarawak, one of the refineries also produces downstream products, such as margarine and shortening.

SECTION III PROSPECTS

(a) Global Production of Oils and Fats

18.29 During the period 1996-2005, the world production of oils and fats, including palm oil, grew at an average annual rate of 4 per cent, from 96.6 million tonnes in 1996 to 139.2 million tonnes in 2005 (Table18.10). The world production of palm oil grew at a higher rate of 8.2 per cent per annum to 33.3 million tonnes, or 23.9 per cent, of the overall production of oils and fats in 2005. The largest contributors were Malaysia, at 45 per cent, and Indonesia (40.9 per cent).

TABLE 18.10

WORLD PRODUCTION OF OILS AND FATS

Oils and Fats	*1996*		*2000*		*2005*		*1996-2005*
	Volume (million tonnes)	*Share (%)*	*Volume (million tonnes)*	*Share (%)*	*Volume (million tonnes)*	*Share (%)*	*Average Annual Growth (%)*
Total	**96.6**	**100.0**	**114.8**	**100.0**	**139.2**	**100.0**	**4.0**
Palm oil	16.2	16.8	21.9	19.1	33.3	23.9	8.2
Soyabean oil	20.2	20.9	25.6	22.3	33.3	23.9	5.0
Animal oils and fats	20.5	21.2	22.3	19.4	23.3	16.8	1.4
Other vegetable oils	16.1	16.7	17.5	15.2	20.5	14.7	2.6
Sunflower oil	9.2	9.5	9.7	8.5	9.7	7.0	1.3
Rapeseed oil	11.5	11.9	14.5	12.6	16.0	11.5	3.9
Coconut oil	2.9	3.0	3.3	2.8	3.1	2.3	-0.9

Source: Oil World, various issues

18.30 The share of palm oil is expected to increase further. Within the initial period of the IMP3, palm oil is expected to overtake soyabean oil as the largest component of the global production of oils and fats. By the end of the Plan period, the world production of palm oil is estimated to reach 59.4 million tonnes. Indonesia will be the main producer of CPO, at 30 million tonnes, while Malaysia's production is expected to be about 25 million tonnes. Malaysia's production will be largely contributed by Sabah and Sarawak, where the planted areas are expected to increase from 1.7 million hectares in 2005 to 2.7 million hectares by 2020.

(b) Global Market for Oils and Fats

18.31 World exports of oils and fats increased from 28 million tonnes in 1996 to 50.3 million tonnes in 2005, registering an average growth rate of 5.5 per cent per annum (Table 18.11). During the period, exports of palm oil recorded higher growth, at 9.9 per cent per annum, to 26.3 million tonnes in 2005. Palm oil continued to dominate the global trade in oils and fats, with its share expanding from 39.3 per cent in 1996 to 52.2 per cent in 2005.

TABLE 18.11

WORLD EXPORTS OF OILS AND FATS

Oils and Fats	*1996*		*2000*		*2005*		*1996-2005*
	Volume (million tonnes)	*Share (%)*	*Volume (million tonnes)*	*Share (%)*	*Volume (million tonnes)*	*Share (%)*	*Average Annual Growth (%)*
Total	**28.0**	**100.0**	**35.9**	**100.0**	**50.3**	**100.0**	**5.5**
Palm oil	11.0	39.3	15.0	41.8	26.3	52.2	9.9
Soyabean oil	5.0	17.9	6.8	18.9	9.6	19.1	5.4
Other vegetable oils	2.6	9.3	3.3	9.2	4.3	8.5	4.4
Animal oils and fats	3.6	12.9	3.9	10.9	3.6	7.2	-1.5
Rapeseed oil	1.7	6.1	1.8	5.0	1.4	2.8	-3.0
Coconut oil	1.4	5.0	2.0	5.6	2.1	4.2	2.1
Sunflower oil	2.7	9.6	3.1	8.6	3.1	6.2	0.7

Sources: Oil World and Malaysian Palm Oil Board

(c) World Demand

18.32 Bio-diesel is being increasingly used as an alternative energy source in the developed countries, such as the USA and the EU. Global demand for bio-diesel, which registered 3.2 million tonnes in 2005, is expected to expand by 25 per cent annually to 10.5 million tonnes by 2010. The rapidly growing global market provides opportunities for the production of bio-diesel. Malaysia is expected to capture at least 10 per cent of the market. In Malaysia, the demand for palm oil is expected to increase, especially during the initial period of the IMP3, due to the introduction of bio-diesel. The production of bio-diesel will require about 500,000 tonnes of palm oil annually, to be blended with petroleum diesel. The demand is expected to increase further, with the implementation of approved bio-diesel (methyl ester) projects.

SECTION IV CHALLENGES

(a) Productivity and Competitiveness

18.33 Although Malaysia is the world leader in the export market for palm oil, rising costs of production, in both plantation operations and processing, are creating

pressures on the country's level of competitiveness. Major cost components in plantation operations are labour and fertilisers, while raw material is the major cost component in processing. To sustain Malaysia's competitiveness, the industry will need to address the issue of rising costs through improvements in productivity, including labour competitiveness. For companies which operate at an uneconomic scale, there is a need to consider consolidation.

(b) Product Image

18.34 Malaysia continues to face competition from other oils and fats, particularly soyabean, rapeseed and sunflower oils. Among the competing oils and fats, Malaysian palm oil is known for its high quality. This image has enabled Malaysia to gain access to the global market for oils and fats. Nevertheless, the industry has to contend with the issue of the negative perception on the quality and sustainable production of palm oil, raised by the competing oil producers. To maintain the country's position as the leading producer and exporter of high quality palm oil products, the branding of Malaysian palm oil becomes important. Therefore, there is a need to create and promote a national brand to project the high quality standard and sustainability of Malaysian palm oil.

(c) Research and Development and Commercialisation

18.35 To sustain leadership in the industry, there is a need for Malaysia to diversify the existing product range to higher value-added products. Although R&D in this direction is being undertaken, more initiatives in commercialising the findings of R&D are required. Commercialisation efforts are limited, partly due to the lack of resources to undertake up-scaling and research on the economic and commercial feasibility of the findings. Collaborative efforts between the industry and the research institutes in this area will need to be strengthened to provide greater certainty in the expected profitability of commercialisation.

(d) Institutional Support

(i) Inadequate Infrastructure

18.36 The basic infrastructure, particularly in Sabah, has not developed, in tandem with the needs of the industry. To promote Sabah and Sarawak as viable locations for investments, there is a need to improve and expand the basic infrastructure, such as the supply of water and electricity, provision of port facilities, and connectivity and quality of roads.

(ii) Regulations

18.37 To maintain and enhance the long term competitiveness of the industry in the global market and promote outward investments, there is a need to review the

regulations related to the industry. Presently, approvals are required at all levels of activities, from production, purchase, storage and transportation, to the import and export of palm oil. These regulations and procedures, as well as the charges involved, such as annual licence fees and cess (and sales tax for Sabah and Sarawak), have led to further increases in the costs of doing business. In addition, activities, such as milling and refining, are subject to capacity control.

(iii) Lack of Coordination

18.38 Presently, the industry is represented by a number of associations, catering for the major interest groups in the industry. This has led to poor coordination and representation of their interests to the Government. There is a need to encourage greater cooperation and consolidation among the associations to enable them to share information and networking, and address issues faced by the industry collectively.

SECTION V STRATEGIES AND POLICIES

TARGETS

18.39 The targets of the industry during the IMP3 period, 2006-2020, are:

- total investments of RM26.1 billion, or RM1.7 billion per annum, to be largely in oleochemicals and bio-diesel; and
- gross export value of RM78.8 billion in 2020 (Table 18.12).

TABLE 18.12

PROJECTIONS FOR THE OIL PALM INDUSTRY

	2006-2010	*2011-2015*	*2016-2020*	*2006-2020*	*2006-2020*
	(RM billion)				*Average Annual Growth (%)*
Investments	5.9	8.6	11.6	26.1	8.2
Investments per year	1.2	1.7	2.3	1.7	n.a.[1]
Exports (end period)	40.5	59.6	78.8	78.8	7.6

Note: [1] Not applicable

Source: Ministry of International Trade and Industry

STRATEGIC THRUSTS

18.40 Five strategic thrusts have been set to strengthen Malaysia's position as a competitive, reliable and technologically capable producer and exporter of palm oil products:

(1) expanding and diversifying into a wider range of higher value-added palm oil products for the international market;

(2) increasing the market share and developing new markets for Malaysian oil palm products;

(3) promoting outward investments and global marketing networks in palm oil products;

(4) enhancing R&D in palm oil and commercialisation of research findings through collaborations with MNCs; and

(5) strengthening the institutional support and infrastructure to enhance domestic capacities and capabilities of the industry.

(1) PRODUCT DIVERSIFICATION

18.41 The following targeted growth areas will be promoted:

- Oleochemical derivatives and preparations
  - oleochemical derivatives and preparations, such as fatty amines, fatty amides, surfactants, detergents, cosmetics, and personal care products and toiletries;
  - active ingredients for cleaning products, for example, alpha-sulfonated methyl esters; and
  - polyols and their applications in polyurethane, coatings and adhesives;
- Bio-diesel and renewable energy
  - bio-diesel (palm methyl ester);
  - production of renewable energy, such as electricity and steam from palm biomass (including shells, empty fruit bunches and fibres); and
  - bio-gas, another renewable energy source, derived from the effluent treatment system of the palm oil mill;

- Nutritional foods and ingredients
  - value-added products derived from red palm oil;
  - trans-free formulated products;
  - palm oil constituents, such as palm carotenoids and palm tocotrienols; and
  - food emulsifiers and ingredients;
- Biotechnology-based products
  - application of tissue culture and genetic engineering to produce better quality oil and insect-resistant clones;
  - transgenic high oleic palm, suitable for food and oleochemical applications;
  - nutraceuticals and pharmaceuticals; and
  - bio-degradable plastics; and
- Biomass products
  - panel products, such as fibreboards, particle boards derived from empty fruit bunches and 'green plywood';
  - moulded automotive components and food grade packaging;
  - pulp and paper; and
  - composite materials, for example, bio-plastics.

(2) MARKET DEVELOPMENT AND PROMOTION

18.42 Malaysia will promote the export of high value-added products to large and emerging markets. A comprehensive global market research network will be developed, involving both the private and public sectors. In addition, Malaysia will continue to negotiate for greater market access for palm oil products through free trade agreements (FTAs) and negotiations at bilateral, regional and multilateral levels.

18.43 Measures will be undertaken to expand the technical advisory network and strengthen the image of Malaysian palm oil-based products through:

- establishing palm oil technical and advisory centres in major importing countries. These centres will provide testing and analytical services

related to the quality, handling and usage of palm oil-based products, undertake technical marketing and promotional activities, and provide feedback on the development of the oils and fats industry in those countries;

- branding Malaysian palm oil and its products. Collaborative efforts between the Government, industry and research institutes will be undertaken to brand Malaysian palm oil and its products on a comprehensive basis. The branding will be based on compliance with stringent standards, incorporating sustainable development and the adoption of good manufacturing practice (GMP) along the value-chain, from plantation to consumers;

- promoting healthy and trans-free palm oil products. Malaysia will leverage upon the consumer preference for healthy products and the requirement for the labelling of trans-fats, imposed by developed countries, for example, the USA, to further promote the positive nutritional benefits of Malaysian palm oil products in the international market for oils and fats; and

- promoting palm oil-based products as derived from sustainable development. The Government will continue to collaborate with industry and relevant international organisations, for example, Roundtable on Sustainable Palm Oil, and other stakeholders, to develop best practices for the sustainable production of palm oil.

18.44 To sustain its competitiveness, the industry will be encouraged to enhance its productivity through higher contributions of total factor productivity (TFP) growth. Measures include:

- enhancing skills training and professional development;

- securing a larger share of the global market through intensified brand promotion, and greater market access and acceptance;

- promoting product diversification and expansion, and the adoption of sustainable approaches in generating higher value-added natural and plant-based products and energy generation from palm biomass and bio-diesel; and

- promoting the integration and commercialisation of R&D between industry and research institutes and the adoption of zero waste strategy.

(3) PROMOTING OUTWARD INVESTMENTS AND GLOBAL MARKETING NETWORKS

18.45 More Malaysian companies will be encouraged to invest in the processing of palm oil products in palm oil resource rich countries, such as Indonesia and Viet Nam. Outward investments in downstream products in major consuming

markets, such as the People's Republic of China, the EU, India, Pakistan, Iran and West Asia, will continue to be encouraged. In respect of production and marketing, companies, including exporters and Government-linked companies (GLCs), will be encouraged to rationalise and consolidate their existing operations into cost effective and efficient profit centres, and integrate or expand their operations into the regional production and marketing networks and establish distribution centres overseas.

(4) RESEARCH AND DEVELOPMENT AND COMMERCIALISATION

18.46 Further research on the economic and commercial feasibilities of research findings will be encouraged to reduce the risk in commercialising innovations, such as pulp and alpha-sulfonated methyl esters, polyols and other oleochemical products. To accelerate the commercialisation of technologies, the Government will provide assistance for such ventures.

18.47 The Incubation Centre in MPOB will undertake strategic research collaborations with world major manufacturers of petroleum and petroleum-based products, and rubber and rubber-based products, to expedite the utilisation of palm oil or palm-based oleochemicals. The collaborations will also involve international R&D centres and MNCs, service laboratories, and testing and certification centres.

(5) STRENGTHENING THE INSTITUTIONAL SUPPORT AND INFRASTRUCTURE

18.48 Measures to strengthen the institutional support and infrastructure include:

- progressively liberalising palm oil refining activities to encourage competition, in line with the global developments.To facilitate the liberalisation process, policy, rules and regulations on refining activities will be streamlined;

- providing adequate assistance to meet the infrastructure requirements to support the growth of the industry in Sabah and Sarawak. The requirements include the need to improve and expand the basic infrastructure, such as the supply of water and electricity, provision of port facilities, and connectivity and quality of roads in the two states. In addition, measures will be introduced to reduce the high cost of transportation between Sabah and Sarawak, and Peninsular Malaysia; and

- encouraging industry associations related to the industry to consolidate, to provide more effective representation of the industry's interests at national and international fora.

Chapter 19

FOOD PROCESSING INDUSTRY

FOOD PROCESSING INDUSTRY

SECTION I OVERVIEW

19.01 The food processing industry forms an important linkage to the agriculture sector. The growth in the primary food production, together with an expansion of the food processing industry, will lead to greater synergy, in terms of value-added creation, product diversification and market expansion. During the period of the Second Industrial Master Plan (IMP2), 1996-2005, the contribution of the industry, including beverages and tobacco, to the total manufacturing output increased from 6.1 per cent in 1996 to 9.9 per cent in 2005. The expansion of the food processing activities resulted in increased exports of processed foods from RM2.8 billion in 1996 to RM7.8 billion in 2005.

19.02 There is an increasing number of local food manufacturers which have developed their brands in the domestic market and are venturing into the export market. These manufacturers, which include small and medium enterprises (SMEs), have automated their production processes and undertaken own product development. During the period of the Third Industrial Master Plan (IMP3), 2006-2020, the industry is expected to expand its capacities and enhance its competitiveness to meet domestic demand and increase exports.

SECTION II PERFORMANCE DURING THE SECOND INDUSTRIAL MASTER PLAN

(a) Status of the Industry

19.03 The food processing industry comprises cocoa and cocoa preparations, prepared cereals and flour preparations, processed seafood, dairy products, prepared and preserved vegetables and fruits, processed meat, sugar and sugar confectionery, coffee, tea, spices, and edible products and preparations. The industry coverage excludes edible oils and fats, including margarine and shortening, which fall under the oil palm-based industry, animal feed, and beverages and tobacco.

19.04 Manufacturers in the industry broadly comprise two groups, namely, larger corporations, including multinational corporations (MNCs), and SMEs. The larger corporations have their own established brands, possess greater financial resources and apply modern technology, including own in-house research and development (R&D) facilities. In comparison, the SMEs generally have limited

resources and capabilities, including in financing and marketing, and mainly cater for the domestic market. They are dependent on public research institutes for advice and support in product and process improvements.

19.05 Based on the findings of the Annual Survey of Manufacturing Industries, 2003 by the Department of Statistics, there were more than 2,000 establishments involved in the food processing industry (Table 19.1). SMEs comprised more than 80 per cent of the total number of establishments. The largest segment was cereal and flour-based, which produced grain mill products, bakery, and noodles and similar products. In addition, there were 1,815 food processing projects supported by the Department of Agriculture, involving about 6,000 rural dwellers. They were mainly small businesses, producing products such as traditional snacks and chips, sauces, bakery products, and coconut-based and fish-based products.

(b) Major Segments of the Industry

(i) Cocoa and Cocoa Products

19.06 Presently, Malaysia is the largest cocoa processing country in Asia and ranked fifth in the world. Malaysia's exports of cocoa products met 6.5 per cent of the total world demand. Local grinding capacity increased from 102,600 tonnes in 1996 to 240,000 tonnes in 2005. Presently, there are 10 grinders in operation, with an installed capacity of about 260,000 tonnes. Malaysia's total grinding capacity is expected to reach 360,000 tonnes in 2010. Presently, there are five big manufacturers of chocolate and more than 40 producers of cocoa confectioneries. In 2005, sales of chocolate and cocoa confectionery amounted to RM442 million.

19.07 There is an increasing dependence on imports of cocoa beans to support processing activities by the cocoa manufacturers. This is attributed to the substantial decline in the hectarage cultivated with cocoa, from 168,200 hectares in 1996 to 33,000 hectares in 2005. The decline was due to the conversion to other crops. As a result, the production of cocoa beans declined from 120,000 tonnes in 1996 to 28,000 tonnes in 2005. About 65 per cent of the present cultivated areas for cocoa are located in Sabah. The reduction in the local supply of cocoa beans and the expansion in secondary processing had resulted in the increase in imports of cocoa beans from 22,200 tonnes, valued at RM73 million, in 1996 to 335,100 tonnes (RM1.5 billion) in 2005. Imports of cocoa beans were mainly from Indonesia. In addition to cocoa beans, imports of cocoa products increased from RM53.4 million in 1996 to RM179.3 million in 2005. Chocolates and confectioneries were the main import items. Imports of chocolates were mainly from Thailand, Australia, the United States of America (USA), Italy and Switzerland.

TABLE 19.1

PROFILE OF THE FOOD PROCESSING INDUSTRY, 2003

Food Segment	*No. of Establishments*	*Gross Output (RM million)*	*Value-Added (RM million)*	*Employment*
Total	**2,335**	**16,793.9**	**4,405.6**	**80,493**
Manufacture of grain mill products, starches and starch products	303	2,565.9	469.3	7,267
Manufacture of dairy products	41	2,185.3	563.2	4,109
Manufacture of cocoa products, chocolate products and sugar confectionery	66	1,828.1	408.4	6,451
Manufacture of biscuits, cookies, bread, cakes and other bakery products	762	1,717.7	588.5	20,045
Processing and preserving of fish and fish products	131	1,447.3	320.7	8,879
Processing and preserving of poultry and poultry products	12	733.2	144.4	2,491
Production, processing and preserving of other meat and meat products	42	648.9	109.5	3,569
Manufacture of spices, curry powder and sauces, including flavouring extracts	97	637.8	211.2	2,709
Manufacture of macaroni, noodles and similar products	258	574.2	167.6	4,684
Manufacture of coffee and tea	129	377.0	116.7	2,607
Canning and preserving of fruits and vegetables (including pineapples)	54	271.0	67.6	1,919
Manufacture of other food products[1]	440	3,807.5	1,238.5	15,763

Note: [1] Include sugar, ice, nuts and nut products, snacks and crackers and chips

Source: Annual Survey of Manufacturing Industries, 2003, Department of Statistics

19.08 Malaysia remained a net exporter of cocoa products, including chocolates. In 2005, the total exports of cocoa products amounted to RM1.9 billion, registering a four-fold increase from RM456 million in 1996 (Table 19.2). Malaysia's cocoa products were exported to more than 66 countries. Major cocoa products exported were:

- cocoa butter, mainly to the USA, the Netherlands, France and Japan;
- cocoa powder, mainly to the USA, Australia and the People's Republic of China; and
- chocolates and cocoa confectioneries, mainly to the Philippines, Indonesia, Yemen, Singapore and Hong Kong.

TABLE 19.2

EXPORTS AND IMPORTS OF COCOA PRODUCTS

Product	*1996*		*2000*		*2005*		*1996-2005*	
	Exports	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*
	(RM million)						*Average Annual Growth (%)*	
Total	**456.0**	**53.4**	**561.8**	**87.5**	**1,873.2**	**179.3**	**15.2**	**15.8**
Cocoa butter	323.5	1.4	318.7	18.9	1,169.2	11.1	13.5	20.6
Cocoa powder	36.9	1.0	89.5	2.5	322.9	11.6	23.2	23.5
Chocolate confectionery	66.1	50.2	86.9	65.9	229.6	151.2	14.6	15.0
Cocoa paste	29.5	0.8	66.7	0.2	151.5	5.4	20.1	22.7

Source: Ministry of International Trade and Industry

(ii) Cereal and Flour-Based Products

19.09 Flour milling and flour-based manufacturing are well established in Malaysia. Flour milling has contributed to the growth of noodles, bakery, biscuits, snacks and confectionery products. Presently, there are 10 wheat flour mills in operation. Production of wheat flour increased from 692,300 tonnes in 1996 to 833,100 tonnes in 2005. The sales value also increased from RM863 million in 1996 to more than RM1 billion in 2005. Presently, there are more than 1,000 flour-based companies. Many of the companies are SMEs, with the exception of a few large companies producing biscuits, premium bread and instant noodles. Cereal and flour-based manufacturers are dependent on imported grains, mainly wheat. Imports increased from RM679 million in 1996 to

RM1.1 billion in 2005. Nevertheless, Malaysia remained a net exporter of prepared cereals and flour preparations, registering an average annual export growth of 9.9 per cent during the period (Table 19.3).

TABLE 19.3

EXPORTS AND IMPORTS OF PREPARED CEREALS AND FLOUR PREPARATIONS

Product	*1996*		*2000*		*2005*		*1996-2005*	
	Exports	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*
	(RM million)						*Average Annual Growth (%)*	
Total	**381.3**	**362.3**	**608.4**	**402.8**	**902.9**	**418.4**	**9.9**	**5.3**
Preparation of cereals and flours	325.4	318.4	501.4	308.4	830.6	280.5	11.1	2.3
Meal and flour of wheat	50.0	5.9	99.9	41.6	66.7	56.3	1.4	45.8
Other meals and flours	5.9	38.0	7.1	52.8	5.6	81.6	5.4	12.5

Source: Ministry of International Trade and Industry

(iii) Processed Fish and Seafood Products

19.10 The processed fish segment had progressed into the production of higher value-added products, such as breaded and *tempura* seafood; food ingredients (for example, semi-processed seaweed); and functional and health foods (such as *chitosan* and fish essence). All the export-oriented seafood processors have been certified under the Hazard Analysis Critical Control Points (HACCP), as required by importing countries.

19.11 Exports of processed fish products, including seafood, increased from RM674.3 million in 1996 to RM2.1 billion in 2005, while imports increased from RM501.7 million in 1996 to RM1.5 billion in 2005 (Table 19.4). Malaysia is a net exporter of fish products, recording a trade surplus of RM554.6 million in 2005. Frozen prawns were the main product exported. Major imports were frozen fish and prawns for consumption and further processing into canned, frozen and cooked seafood products; and *surimi* and *surimi*-based products.

19.12 While imports of prepared and preserved seafood increased from RM74 million in 1996 to RM165.3 million in 2005, exports increased from RM270.2 million to RM354.6 million, thus maintaining Malaysia's position as a net exporter of value-added fish products.

TABLE 19.4

EXPORTS AND IMPORTS OF PROCESSED FISH AND SEAFOOD PRODUCTS

Product	1996		2000		2005		1996-2005	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
	(RM million)						Average Annual Growth (%)	
Total	**674.3**	**501.7**	**1,134.4**	**691.1**	**2,059.7**	**1,505.0**	**11.1**	**12.9**
Processed crustaceans[1]	303.8	155.5	679.9	214.5	1,241.5	631.9	14.5	13.7
Prepared and preserved seafood	270.2	74.0	283.0	100.2	354.6	165.3	2.2	7.1
Processed molluscs and aquatic invertebrates[1]	65.3	22.6	141.8	32.3	281.8	67.8	15.8	10.8
Processed fish[1]	35.0	249.6	29.7	344.1	181.8	640.0	14.6	14.5

Note: [1] Include frozen, salted, dried and smoked

Source: Ministry of International Trade and Industry

(iv) Processed Livestock Products

19.13 Chicken meat comprised 60 per cent of the total production of processed meats. Major meat products manufactured included sausages, burgers, nuggets, meat balls and floss, and canned meat. There was an increasing trend towards the production of convenience foods, mainly chilled and frozen foods, including pre-cooked and retort pouch products.

19.14 Exports of processed livestock products increased from RM251.4 million in 1996 to RM504.8 million in 2005, while imports increased from RM1.4 billion to RM2.8 billion during the same period (Table 19.5). This resulted in a widening of the trade deficit from RM1.2 billion in 1996 to RM2.3 billion in 2005. Dairy products and frozen beef were the main items imported. Nevertheless, exports of prepared and preserved meat products increased at an average annual rate of 13.7 per cent, from RM16.8 million in 1996 to RM56.7 million in 2005.

(v) Processed Fruits and Vegetables

19.15 Processing of fruits and, to a limited extent, vegetables, forms a major activity of the fruits and vegetables segment. Canning is mainly undertaken for pineapples and pineapple juice. In addition, pink guavas and passion fruits are also processed into puree and juices. Other fruits, such as jackfruits, bananas, guavas, starfruits and papayas, are dried, pickled, made into jam, or used in snack food production. Processing of vegetables, such as chilli, tomatoes and peas, are mainly in the form of sauces, and canned and frozen peas. Plants, such as roselle and morinda citrifolia (*mengkudu*), are processed into health food ingredients and products.

TABLE 19.5

EXPORTS AND IMPORTS OF PROCESSED LIVESTOCK PRODUCTS

Product	1996		2000		2005		1996-2005	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
	(RM million)						Average Annual Growth (%)	
Total	**251.4**	**1,440.7**	**291.4**	**1,938.9**	**504.8**	**2,765.0**	**7.9**	**7.7**
Dairy products	167.0	977.1	226.9	1,167.6	418.2	1,716.7	9.8	6.2
Prepared and preserved meat and meat offals	16.8	34.8	30.5	26.5	56.7	20.0	13.7	-4.8
Fresh, chilled and frozen meat	56.7	428.6	28.6	744.0	26.3	1,025.9	-5.7	11.4
Dried, salted, smoked meat and edible offals	10.9	0.2	5.4	0.8	3.6	2.4	-7.4	11.6

Source: Ministry of International Trade and Industry

19.16 The growing domestic market of processed fruits and vegetables has resulted in a shortage in the supply of the raw materials. This has led to increasing imports of processed fruits and vegetables from RM215.3 million in 1996 to RM396.8 million in 2005 (Table 19.6). Exports of major items, such as canned pineapples and pineapple juice, decreased from RM58 million in 1996 to RM45.1 million in 2005.

TABLE 19.6

EXPORTS AND IMPORTS OF PROCESSED FRUITS AND VEGETABLES

Product	1996		2000		2005		1996-2005	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
	(RM million)						Average Annual Growth (%)	
Total	**158.8**	**215.3**	**198.3**	**291.1**	**262.7**	**396.8**	**4.5**	**6.9**
Prepared and preserved vegetables	54.6	114.6	73.3	155.0	106.8	194.8	6.0	4.7
Prepared and preserved fruits	92.1	73.0	77.2	89.5	85.1	126.2	-1.4	8.0
Fruit and vegetable juices	12.1	27.7	47.8	46.6	70.8	75.8	19.8	13.1

Source: Ministry of International Trade and Industry

(vi) Other Food Products

19.17 The food industry has also diversified into the production of convenience foods, including ethnic foods (such as frozen *roti paratha* and *pau*) and ready-to-cook sauces, due to changing lifestyles and consumer preference. These products are exported to countries and regions, such as the USA, Australia, Japan, Republic of Korea, the European Union (EU), West Asia and the Association of Southeast Asian Nations (ASEAN). In line with the global expansion of functional foods, local manufacturers offer a range of healthier choices, along with their regular products. These include vitamin or mineral fortified products, probiotic products, fish and chicken essences, sea cucumber-based products, high-fibre fruit drinks, *chitosan*, aloe vera drinks and products using traditional herbs, such as eurycoma longifolia (*tongkat ali*), coffee and morinda citrifolia (*mengkudu*) juice, as well as wheat grass, probiotic products and ganoderma products.

19.18 Production of food ingredients covers spice products, speciality sauces, seasonings, flavours and food additives. Spices and herbs are significant ingredients in the production of sauces and seasonings. Production is undertaken by SMEs, local companies and MNCs.

19.19 Exports of sauces, mixed condiments and seasonings increased from RM63.2 million in 1996 to RM220.7 million in 2005. Pepper was the major spice produced, with exports amounting to RM121.9 million in 2005. Malaysia contributed 10 per cent of the world exports of pepper. Annual production of pepper is about 25,000 tonnes and about 90 per cent are exported to more than 40 countries worldwide. Other food ingredients produced included starch products, glucose syrup from stevia, carrageenan and palm oil-based additives, such as emulsifiers and stabilisers.

(c) Investments

19.20 During the IMP2 period, a total of 409 food processing projects were approved, valued at RM5.2 billion, of which RM2.7 billion, or 52.2 per cent, were contributed by domestic investments and RM2.5 billion (47.8 per cent), foreign investments (Table 19.7). Expansion and diversification projects accounted for 24.1 per cent of the total investments. During the first phase of the IMP2 period, 1996-2000, approved investments were valued at RM2 billion. Higher investments of RM3.2 billion were recorded during the second phase, 2001-2005, reflecting growing interest by investors in the industry. The major source of foreign investments was Singapore, which accounted for RM935 million or 37.3 per cent of the total foreign investments. Other main sources were Japan, Switzerland and Taiwan. Areas of interest of the foreign investments were mainly in sugar, chocolate and chocolate confectionery, and flour-based products.

TABLE 19.7

APPROVED INVESTMENTS IN THE FOOD PROCESSING INDUSTRY

Product	1996-2000				2001 - 2005				1996 - 2005			
	No. of Projects	Foreign	Domestic	Total	No. of Projects	Foreign	Domestic	Total	No. of Projects	Foreign	Domestic	Total
		(RM million)				(RM million)				(RM million)		
Total	**161**	**1,162.1**	**881.1**	**2,043.2**	**248**	**1,345.0**	**1,852.6**	**3,197.6**	**409**	**2,507.1**	**2,733.6**	**5,240.7**
Flour-based products	55	246.4	317.6	564.0	54	294.2	502.8	797.0	109	540.6	820.4	1,361.0
Processed meat and dairy	24	145.0	273.1	418.1	44	197.8	375.8	573.6	68	342.8	648.9	991.7
Sugar, chocolate and sugar confectionery	22	390.9	91.5	482.4	20	203.1	183.0	386.1	42	594.0	274.5	868.5
Processed seafood	20	213.4	87.8	301.2	38	74.4	345.4	419.8	58	287.9	433.1	721.0
Other food products	23	70.0	77.3	147.3	46	192.2	293.5	485.7	69	262.2	370.8	633.0
Processed fruits and vegetables	17	96.4	33.8	130.2	31	114.8	113.2	228.0	48	211.1	147.0	358.1
Coffee and tea	nil	nil	nil	nil	15	268.5	38.9	307.4	15	268.5	38.9	307.4

Source: Malaysian Industrial Development Authority

19.21 The majority of the investments in food projects were in the range of RM10 million to RM50 million. Projects above RM50 million each totalled 14, of which four were approved in the first phase, 1996-2000 and 10 in the second phase, 2001-2005. This reflected the trend towards more capital-intensive projects. The majority of the investments were in:

- flour-based products;
- processed meat and dairy;
- sugar, chocolate and sugar confectionery; and
- processed seafoods.

(d) Output and Employment

19.22 Total output grew at an average annual rate of 8.9 per cent during the first phase of the IMP2 period, 1996-2000, and 7.8 per cent during the second phase, 2001-2005. In respect of employment, in 2005, the industry, including beverages and tobacco, provided employment to 298,900 persons, or 9.5 per cent, of the total employment in the manufacturing sector, compared with 196,700 in 1996. As the industry moved towards more capital-intensive operations and expanded into higher value-added production, a greater number of food technologists, chemists and nutritionists, as well as skilled workers, were employed to handle more sophisticated machinery and as part of the international requirements on product safety and quality.

(e) Exports

19.23 The total exports of food products, including processed foods, expanded from RM4 billion in 1996 to RM10.7 billion in 2005. The share of exports of processed foods to the total exports of food products increased from RM2.8 billion, or 69.7 per cent, in 1996 to RM7.8 billion (72.9 per cent) in 2005, indicating a rising level of domestic processing (Table 19.8). Compared with the average annual growth rate of 10.7 per cent for the total exports of food products, exports of processed foods grew at a higher rate of 11.3 per cent. The higher growth reflected an increasing acceptance of Malaysia's processed foods in the international market. Major processed foods exported were processed seafoods, cocoa and cocoa preparations, and prepared cereal and flour preparations. Singapore remained the largest export destination, with a share of 16.3 per cent of the total exports of processed foods. Other major destinations for processed foods were Indonesia, the USA, Japan and Thailand, collectively accounting for 27.8 per cent.

TABLE 19.8

EXPORTS OF PROCESSED FOOD

Product	*1996*		*2000*		*2005*		*1996-2005*
	Value (RM million)	*Share (%)*	*Value (RM million)*	*Share (%)*	*Value (RM million)*	*Share (%)*	*Average Annual Growth (%)*
Total	**2,753.8**	**100.0**	**4,325.0**	**100.0**	**7,821.9**	**100.0**	**11.3**
Processed fish and seafood products	674.3	24.5	1,134.4	26.2	2,059.7	26.3	11.1
Cocoa products	456.0	16.6	561.8	13.0	1,873.2	23.9	15.2
Edible products and preparations	426.6	15.5	622.5	14.4	1,249.1	16.0	11.9
Prepared cereals and flour preparations	381.3	13.8	608.4	14.1	902.9	11.5	9.9
Sugar and sugar confectionery	213.2	7.7	353.7	8.2	470.0	6.0	8.8
Dairy products	167.0	6.1	226.8	5.2	418.2	5.3	9.8
Coffee	45.5	1.7	149.8	3.5	277.0	3.5	21.6
Processed fruits and vegetables	158.8	5.8	198.3	4.6	262.7	3.4	4.5
Spices	138.9	5.0	393.8	9.1	188.3	2.4	5.6
Processed meat	84.4	3.1	64.5	1.5	86.6	1.1	2.0
Tea	7.8	0.3	10.9	0.3	34.2	0.4	24.6

Source: Ministry of International Trade and Industry

(f) Imports

19.24 Malaysia's imports of food items grew from RM8.2 billion in 1996 to RM17.9 billion in 2005, resulting in a larger trade deficit of RM7.2 billion in 2005, compared with RM4.2 billion in 1996. However, the rising imports of food items were mainly due to the increased demand from downstream processing of primary and intermediate food products. Major food imports were unprocessed cereals (maize and wheat), raw sugar, cocoa beans, frozen fish, fresh meat and dairy products. Imports of processed foods increased from RM4.4 billion in 1996 to RM8.9 billion in 2005 (Table 19.9). Major processed foods imported were dairy products, processed seafoods, sugar and sugar confectionery, and processed meat (mainly frozen beef). Major sources of imports were Australia, Thailand, New Zealand, the USA and Brazil.

(g) Research and Development and Technology Development

19.25 In general, limited activities in R&D were undertaken by the industry, as the majority of the companies in the industry were SMEs. Nevertheless, a growing number of companies have undertaken research, mainly in product development and diversification. With the greater awareness on food safety and quality, 148 companies have been certified under the Malaysian Certification Scheme for HACCP. An increasing number of food companies have automated their operations and undertaken product R&D. These companies have also adopted new technologies, for example, advanced preservation and processing technology.

19.26 Government agencies which provided R&D and technical support were:

- Malaysian Agricultural Research and Development Institute (MARDI), which expanded its programmes in R&D, technology transfer and technical support to develop new technologies for food production and processing. To enhance the transfer and commercialisation of these technologies to the industry, MARDI introduced new and additional programmes, such as incubator and test-bed systems for the development of technologies, spin-off companies and/or products from the output of R&D. A total of 240 research findings were produced, of which 37 have been transferred to the industry;

- Malaysian Cocoa Board, which conducted 47 research projects, of which 23 were ready for commercialisation;

- in the primary agriculture, the Department of Fisheries, Department of Agriculture and Department of Veterinary Services provided extension services and assistance to the industry; and

- Forestry Research Institute Malaysia, which undertook research in nutritional aspects of herbs.

TABLE 19.9

IMPORTS OF PROCESSED FOODS

Product	*1996*		*2000*		*2005*		*1996-2005*
	Value (RM million)	*Share (%)*	*Value (RM million)*	*Share (%)*	*Value (RM million)*	*Share (%)*	*Average Annual Growth (%)*
T							

(i) Institutional Support

(i) Regulatory Framework for the Development of Malaysia as an International Halal Hub

19.29 The necessary infrastructure and administrative support mechanism are being put in place to facilitate the development of Malaysia as an international *halal* hub, including encouraging investments in *halal* products and services. The Ministry of International Trade and Industry (MITI) is responsible for the overall coordination in the development of the *halal* hub. A number of initiatives have been introduced, which include:

- adopting a uniform or standardised *halal* logo, as a certification mark, under the Trade Mark Act, 1976;
- streamlining procedures and fees;
- providing special incentives; and
- intensifying promotion activities.

(ii) Supply of Raw Materials

19.30 Recognising the need to increase the availability of inputs of raw materials required by food processing companies, the Government has undertaken measures to increase agricultural food production and allow duty-free importation of raw materials to meet the domestic requirement. Among the measures introduced were:

- introduction of the Third National Agricultural Policy (NAP3), which sets the direction for agricultural development up to 2010. The NAP3 identified several measures aimed at developing a modern, commercial and technology-intensive agriculture sector, covering production, packaging, marketing and distribution;
- provision of more attractive incentives to promote primary food production, such as tax deductions equivalent to the amount invested, group relief and full tax exemption for 10 years; and
- establishment of 28 parks, involving 2,000 hectares of Permanent Food Production Parks. These parks are being reserved as permanent agriculture production zones, which can be leased to entrepreneurs.

(iii) Incentives for Food Processing Companies

19.31 Incentives are provided to food processing companies, as well as those providing related services, for example, cold chain facilities:

- further extension of Pioneer Status or Investment Tax Allowance, to encourage companies to undertake reinvestments in the processing of promoted food products; and

- Investment Tax Allowance for new investments in *halal* food production and double deductions to companies for incurring expenses in obtaining the *halal*, safety and quality standards certifications, including those for HACCP, Good Manufacturing Practice (GMP) and International Organization for Standardization (ISO).

(iv) Training and Skills Development

19.32 The Ministry of Agriculture and Agro-Based Industry provides programmes on skills training to improve the productivity in the agriculture and agro-based sector. The programmes comprise three major components:

- establishment of the National Agricultural Training Centre;
- establishment of the College of Agriculture in Kedah; and
- upgrading of existing agricultural training institutes.

MARDI, in collaboration with the Ministry of Health, provides training on HACCP, GMP, hygiene and sanitation. In addition, various public institutions of higher learning provide education and training in food technology and food sciences in the fields of biotechnology, biochemistry and food biology.

(v) Market Development

19.33 Presently, various agencies, such as Malaysia External Trade Development Corporation (MATRADE), Small and Medium Industries Development Corporation (SMIDEC) and Federal Agricultural Marketing Authority (FAMA), provide market development programmes. These programmes:

- facilitate the participation of Malaysian companies in selected international exhibitions and trade missions;
- assist SMEs in marketing their products to large hypermarkets;
- organise specialised marketing missions and incoming trade missions; and
- provide business matching services.

19.34 Various incentives are provided, including:

- Market Development Grant;
- Brand Promotion Grant;
- double deductions for professional fees incurred in the designing of packaging;
- double deductions for the promotion of exports; and
- partial tax exemption on the increase in exports.

(vi) Credit and Financial Assistance

19.35 In 1993, the Government established the Fund for Food under *Bank Pertanian Malaysia*, with an allocation of RM1.3 billion, to facilitate the financing of food production. In 2004, an additional allocation of RM1 billion was provided to meet the increasing demand for the facility.

(j) Linkages

19.36 Industries and services supporting the food processing industry cover packaging, and quality and laboratory testing services. The packaging industry has grown, in tandem with the development of the food processing industry. Basic packaging materials, such as tin and aluminium cans, glass containers and bottles, and aluminium, plastic and paper packaging, are available locally. However, specialised materials are imported, where the demand is inadequate for viable local production. Laboratory services and testing facilities are available, both in the public and private sectors. Presently, there are 35 laboratories accredited under the Laboratory Accreditation Scheme, of which 21 provide microbiological testing and 14, chemical testing for the food industry. In addition, there are 13 laboratories providing services for nutritional labelling. Other services, for example, cold chain facilities, are limited to the Klang Valley and other major cities.

SECTION III PROSPECTS

19.37 The food industry is generally less vulnerable to economic changes in the world. It has been estimated that the present global retail sales in food products are worth US$3.5 trillion and expected to grow at an annual rate of 4.8 per cent to US$6.4 trillion in 2020. The main factors driving demand include:

- changes in disposable incomes, lifestyles and demographics, and increased health consciousness, which influence the demand for convenience, health and functional foods;

- changes in consumer demand, which compel food manufacturers to meet specific requirements and preferences at the regional and domestic levels; and

- in addition, global trade liberalisation, through multilateral and regional trade agreements, will expand market access and world trade in food products.

These trends will also create opportunities for investments in market expansion and product development.

19.38 Presently, food-based MNCs are involved in meeting the bulk of the demand in major markets, including the demand for convenience foods, as well as health and functional foods. While markets in the developed countries had registered high growth in the past, higher growth is expected from developing countries in Eastern Europe, Asia and Asia Pacific, as a result of population increase and growing purchasing power. Recognising the potential in the developing countries, food companies are expanding their operations in these markets.

19.39 Malaysia will need to take advantage of this trend to become the regional food processing hub, especially for the Muslim markets in the West Asian and Asian markets. Malaysian companies will need to take advantage of the globalisation of the food industry to reap the benefits arising from the worldwide networks and build a significant presence in the international market. A major determining factor will be the ability to provide quality and safe food products at competitive prices. Adoption of more stringent food safety measures by the food processing companies is necessary to comply with the standards set by the importing countries. Adoption of such measures will also be of advantage to the domestic companies in the face of increased competition in the food trade and minimise the possibility of a loss in consumer confidence from food contamination and a ban on market entry by the importing countries.

19.40 Biotechnology and nanotechnology are emerging technologies in the developed countries:

- biotechnology is closely related to food processing, using micro-organisms and enzymes. Modern bio-processing provides opportunities in agro-industrial development to convert raw materials into value-added products. These processes are environment-friendly and cost effective;

- nanotechnology offers vast opportunities, especially in food ingredients. A number of nano-food products are already available in the market. Major food companies and nanotechnology start-up companies are conducting research on the use of nanotechnology to engineer, process, pack and deliver food. More than 100 applications of nanotechnology in the food-based industry are in various stages of development; and

- the merging of biotechnology and nanotechnology provides further potential to create living organisms which were non-existent previously. This has been viewed as an advancement in the further development of the food-based industry.

19.41 With the advantages that Malaysia has in being rich in biodiversity and established infrastructure in agriculture, biotechnology has been identified as a core technology which can be used to advance the primary agriculture sector, as well as the food-based industry. Malaysian companies will need to leverage upon biotechnology and other emerging technologies developed

locally or overseas and collaborate with established food-based companies to accelerate the application of biotechnology and nanotechnology in food production. Local universities will need to produce more graduates with relevant expertise to enable more Malaysians to be involved in the development and progress of the industry.

19.42 The global market value for trade in *halal* foods is estimated at US$547 billion a year. This large market has created interest from food producing countries worldwide. In this respect, Malaysia has the edge in being recognised internationally as a progressive Muslim country, with the potential of becoming a major producer of *halal* food products. To realise this potential, apart from the commitment and support by the Government, the food-based industry itself will need to focus its efforts in producing and exporting *halal* food products.

19.43 The comprehensive development programmes under the Ninth Malaysia Plan (RMK-9) to increase food production are expected to provide further impetus to the growth of the food processing industry. The programmes include:

- undertaking large scale production of nine species of fruits, including pineapples, which is targeted to reach 3.7 million metric tonnes by 2010;
- expanding the production of aquaculture, focusing on high value species, such as humpback seabass, six-bended grouper and tiger prawn; and
- undertaking the completion of the Malaysian International Tuna Port in Batu Maung, Pulau Pinang, which is expected to increase tuna landings and accelerate tuna processing activities. By 2010, fisheries production is expected to reach 2.1 million tonnes.

SECTION IV GROWTH AREAS

19.44 Growth areas in the industry have been identified, which took into consideration:

- changes in lifestyles and demographics, which are influencing the types of food products having the potential to be developed and marketed;
- need to develop the entire supply chain for the industry; and
- emphasis on the promotion of Malaysia as the regional and international *halal* hub.

The growth areas are:

- convenience foods, with a focus on the growing niche market for ethnic foods;
- functional foods, focusing on developing products using Malaysia's traditional herbs and resources;

- food ingredients; and
- related support services for the further development of the food-based industry.

(i) Convenience Foods

19.45 The demand for seafoods, meat and vegetable-based convenience foods is a growing worldwide trend, brought about by busier lifestyles. These foods include ready-to-cook and ready-to-serve products, including frozen meals or snacks, retort-pouch-foods, recipe-based ethnic foods and related ingredients, such as sauces and curry mix. The global retail sale of convenience foods was estimated at US$40.1 billion in 2003, and is expected to grow to US$46.3 billion in 2007. Frozen and chilled foods were the two largest categories, accounting for 38.5 per cent and 37 per cent of the total market, respectively. In the domestic market, a study commissioned by FAMA in 2001 had estimated the local market for frozen and chilled foods at RM3 billion in 2005 and more than RM6 billion by 2010. Local food-based manufacturers will need to take advantage of the growing market in convenience foods, particularly in the production of ethnic foods, as they have already developed their expertise in this niche market.

(ii) Functional Foods

19.46 Functional foods comprise those which can promote wellness. The global market for functional foods was estimated at US$66 billion in 2003, of which about 50 per cent were beverages, 25 per cent, cereals and baked goods, and 10 per cent, snacks and food bars. The global market for such foods is expected to grow by 14 per cent annually to reach US$167 billion by 2010.

19.47 Organic products, as a whole, comprise less than 1 per cent of the total world food market. In 2005, worldwide sales of organic products were estimated at US$33 billion, which are expected to reach US$100 billion in 2010. Total sales for Asian countries (Japan, Taiwan, Republic of Korea, Singapore, Indonesia, the People's Republic of China, India and Malaysia) and Australia were estimated at US$3 billion in 2005. More than 80 per cent of the organic products in the market are imported in dried and processed forms.

19.48 On-going research, especially in developed countries, is expected to continue to discover health benefits in certain common foods. Therefore, there is potential for public research institutes in Malaysia to intensify their research efforts and local food manufacturers to commercialise research findings in:

- products using traditional herbs which have medicinal value. Various local herbs have been identified for further R&D, such as eurycoma longifolia (*tongkat ali*), labisia pumila (*kacip fatimah*), morinda citrifolia

(*mengkudu*), orthosiphon stamineus (*misai kucing*) and centella asiatica (*pegaga*). Presently, research is undertaken overseas on the antioxidant, anti-inflammatory and anti-carcinogenic properties of curcuma domestica (*kunyit*);

- products using cocoa, which has a high content of phenolic phytochemicals, or flavonoids, indicating the presence of antioxidants which can prevent cancer, heart disease and other ailments. Products with high growth potential include cocoa beverage with traditional herbs, low-calorie and diabetic chocolates, and dietary fibre drinks from cocoa shells; and

- other functional foods having potential for development in Malaysia include natural and organic products.

(iii) Food Ingredients

19.49 The following intermediate inputs and ingredients, for use by food manufacturers and food service providers, have the potential for growth:

- food premixes, for example, customised formulations required as inputs by food manufacturers;

- palm oil-based food ingredients, for example, modified palm oil;

- functional food ingredients, such as nutrients and vitamin preparations for fortified foods, food fibres and natural food additives and flavours;

- cocoa-based food ingredients, such as cocoa powder, cocoa butter, cocoa liquor, chocolate chips and cooking chocolate, can be further developed, in terms of product range and quality; and

- recipe-based food sauces and other food ingredients, such as spices and dried foodstuffs, which have great potential for use by food chains and restaurants in Malaysia and Asia.

(iv) Related Support Services

19.50 Related support services will need to be further developed and promoted to meet the increasing requirements of the food processing industry. The services include:

- laboratory services for chemical testing, microbiology testing, testing of compounds, nutritional labelling and traceability testing;

- auditing services for companies applying for HACCP certification;

- integrated logistics, including efficient and cost effective cold chain facilities, warehousing, packaging and bulk breaking for raw materials; and

-

19.55 Testing and laboratory facilities are available in both the public and private sectors, including the testing of products for labelling claims. However, certain specialised facilities and expertise, as well as tests requiring sophisticated instruments, such as DNA sequencer and high resolution mass spectrometry, are still inadequate. This is due to the limited scope of the testing services presently provided by the private laboratories. Agencies involved in certification and auditing services for the food processing industry are not well equipped, in terms of expertise and other resources, to meet the increasing demands of the industry. In many instances, this has resulted in delays in the provision of the services and the issuance of the required approvals, which has affected the efficient and timely delivery of the goods and services to end users.

(d) Market Access

19.56 The local food processing industry has gained limited access to the export market and has yet to position itself as a major producer and exporter of food products. Restrictions and constraints on market access for exports of processed foods include tariffs, which are often biased against semi-processed and processed foods, and specific requirements, such as traceability, eco-labelling and animal welfare. The majority of the food processing enterprises, which operate on a small scale, also face several marketing constraints:

- inconsistency in the supply of products, according to the required quality and quantity;
- focus on products which require low initial investments and low level of technology;
- poor production and market planning;
- poor packaging and labelling; and
- poor branding and inadequate advertising and promotional activities.

SECTION VI STRATEGIES AND POLICIES

TARGETS

19.57 During the IMP3 period, 2006-2020, the food processing industry will be expanded and diversified towards making Malaysia a regional food production and distribution hub, with particular emphasis on *halal* foods. Greater initiatives on total factor productivity (TFP) growth will be undertaken to strengthen the competitiveness of the industry. These include upgrading human resource and technology, enhancing R&D, undertaking the production and export of high

value-added and niche products, and adopting quality standards. Targets have been set on investments and exports for the industry:

- total investments in the industry at RM24.6 billion for the entire IMP3 period, or RM1.6 billion per annum; and
- exports to grow at an average annual rate of 7.8 per cent to reach RM24.2 billion by 2020 (Table 19.11).

TABLE 19.11

PROJECTIONS FOR THE FOOD PROCESSING INDUSTRY

	2006-2010	*2011-2015*	*2016-2020*	*2006-2020*	*2006-2020*
	(RM billion)				*Average Annual Growth (%)*
Investments	6.5	8.2	9.8	24.6	5.3
Investments per year	1.3	1.6	2.0	1.6	n.a.[1]
Exports (end period)	13.5	18.3	24.2	24.2	7.8

Note: [1] Not applicable

Source: Ministry of International Trade and Industry

STRATEGIC THRUSTS

19.58 To meet the targets, seven strategic thrusts have been set:

(1) ensuring the availability of the supply of raw materials;

(2) expanding and diversifying food processing activities and promoting the growth of the targeted areas;

(3) enhancing sectoral linkages and support services;

(4) intensifying R&D;

(5) enhancing the competitiveness of and increasing the export of Malaysian food products in the regional and international markets;

(6) strengthening human resource development (HRD); and

(7) strengthening the institutional support and delivery system for the further development and promotion of the industry.

(1) ENSURING THE AVAILABILITY OF THE SUPPLY OF RAW MATERIALS

19.59 During the IMP3 period, the production of food commodities is expected to grow at an average rate of 7.6 per cent per annum. Towards achieving the growth target in production, the Government will continue to promote modern and large scale farming to increase the supply of locally available raw materials, through new land development, replanting, land consolidation and rehabilitation, and productivity improvement. In respect of the supply of fish, the existing fish landing complex in Tanjung Manis, Sarawak, will be further developed into an integrated deep sea fishing complex. The policy to allow imports of raw materials duty-free for the food processing industry will be continued. This is to ensure that the industry is able to source raw materials at competitive prices. The private sector, including agriculture-based Government-linked companies (GLCs), will be encouraged to expand and undertake outward investments in resource rich countries, to supplement and secure the supply of raw materials, on a long term basis, for downstream processing.

(2) EXPANDING AND DIVERSIFYING FOOD PROCESSING ACTIVITIES AND PROMOTING THE GROWTH OF THE TARGETED AREAS

19.60 Food processing companies will be encouraged to expand and diversify their product range in the targeted growth areas:

- convenience foods, with a focus on the growing niche market for ethnic foods;
- functional foods, focusing on developing products using Malaysia's traditional herbs;
- food ingredients; and
- *halal* foods.

19.61 Measures to encourage investments in the industry and related services include:

- reviewing the present incentives and facilities to promote a shift towards higher value added food production; and
- encouraging the establishment of regional production and distribution facilities.

19.62 Related support services will be further developed and promoted to meet the increasing requirements of the industry, including:

- laboratory services for chemical testing, microbiology testing, testing of compounds, nutritional labelling and traceability testing;

- auditing services for companies applying for the HACCP certification; and

- integrated logistics, including efficient and cost effective cold chain facilities, warehousing, packaging and bulk breaking of raw materials.

(3) ENHANCING SECTORAL LINKAGES AND SUPPORT SERVICES

19.63 Linkages between the food-based industry with other related industries and support services will be strengthened, including encouraging:

- local manufacturers of machinery and equipment to collaborate with the food-based industry to customise their machinery and equipment; and

- the packaging industry to collaborate with the food processing manufacturers, in keeping pace with advances in technologies, to meet rising consumer expectations and new lifestyles, in terms of convenience and aesthetics.

(4) INTENSIFYING RESEARCH AND DEVELOPMENT

19.64 Food manufacturers will be encouraged to:

- undertake research, on their own or in collaboration with research institutes, in product development, to keep pace with changing consumer tastes and preferences;

- commercialise R&D findings of public research institutes, such as MARDI and Malaysian Cocoa Board;

- leverage upon emerging technologies, such as biotechnology and nanotechnology, to develop new products and improve the technology in food processing; and

- develop centres of excellence for biotechnology-based food production and processing.

19.65 Technologies which will be enhanced include:

- integrating product and process designs to improve cost and quality, and reduce the time-to-market requirement;

- food preservation and packaging technologies, by incorporating food safety and sanitation practices for foods which undergo minimum processing and food products which do not use preservatives;

- extraction and purification technologies, including the application of biotechnology, to obtain bio-active substances for food ingredients.

Processes such as heat, fermentation, mechanical compression and immersion, will be further developed; and

- efficacy analysis and standardisation, which are important in the processing of functional foods and food ingredients.

(5) ENHANCING COMPETITIVENESS AND INCREASING EXPORTS

19.66 Measures will be undertaken to promote Malaysia's image as a source of supply of safe and quality food products:

- promoting Malaysia's *halal* certification, based on MS1500:2004, as the premium standard in the world market for the production, preparation, handling and storage of *halal* foods;
- ensuring the entire supply chain, from farm to plate, complies with the *halal* requirements;
- establishing a one-stop centre to facilitate the compliance on food safety and quality; and
- encouraging the industry to adopt a self-regulatory approach in meeting the requirements on safety and quality.

19.67 Measures will be undertaken to enhance the competitiveness of and exports of Malaysian foods:

- developing a specific theme for recipe-based ethnic food products, such as 'Malaysia - The Tastes of Asia' and 'Malaysia - The Truly Asian Kitchen';
- developing programmes with Tourism Malaysia to promote Malaysian foods overseas;
- enhancing the role of MATRADE in promoting agro-based products;
- making available Malaysian agricultural specialists in selected countries having high market potential, to promote agriculture produce and agro-based food products;
- encouraging strategic partnerships with companies overseas with strong marketing networks;
- encouraging branding and product differentiation by nurturing the development and promotion of indigenous brands, as well as encouraging local companies to acquire known brands in overseas market, through mergers and acquisitions (M&As);

- promoting the establishment of Malaysian food outlets and restaurants overseas;

- enhancing the access into market information using ICT, as well as encouraging the trading of food products through e-commerce;

- encouraging food-based cluster development, which will involve the provision of comprehensive services and facilities to improve the efficiency and reduce the costs of production. This will include the establishment of integrated *halal* hubs in Kedah, Perlis, Seberang Prai in Pulau Pinang, northern Perak and Pahang, and the development of a new biotechnology centre and a beef valley in Negeri Sembilan;

- encouraging outward investments in cost competitive locations to sustain the competitive edge of local food manufacturers; and

- strengthening the existing support programmes to facilitate the application of modern processing technologies, innovative packaging and branding.

(6) STRENGTHENING HUMAN RESOURCE DEVELOPMENT

19.68 HRD will be strengthened in the following areas to support the growth of the industry and enhance productivity:

- encouraging the industry to collaborate with universities and training institutes to produce the required workforce to support new technologies in areas such as product and process design integration, food preservation, packaging, extraction and product development. In addition, collaboration will include the development of joint apprenticeship programmes;

- encouraging universities and training institutes to expand their courses to produce the required expertise, such as food technologists, bio-technologists, application specialists and analytical chemists; and

- improving the knowledge and training in GMP and HACCP.

(7) STRENGTHENING THE INSTITUTIONAL SUPPORT AND DELIVERY SYSTEM

19.69 Measures will be undertaken to enhance the institutional support for the further development of the industry:

- strengthening the advisory and promotional roles of the Food Safety and Quality Division of the Ministry of Health to improve the food safety and quality standards of the industry, especially among the SMEs;

- strengthening the enforcement on compliance with food regulations. The public sector food testing facilities will be expanded, in tandem with the increasing demand for health certification by the industry; and

- enhancing the role of MARDI in R&D of value-added products, as well as collaboration with the industry. The R&D facilities of the institute will be expanded to accommodate the expected demand for research in product development.

Under the RMK-9, *Halal* Industry Development Board will be established, with the lead role of developing and promoting the *halal* industry.

19.70 In respect of improving the delivery system, measures which will be undertaken include:

- the Government continuing to collaborate with trade, industry and consumer associations in providing a comprehensive education programme on food safety and quality. This will contribute towards inculcating a culture of food hygiene, safety and quality among the manufacturers and distributors; and

- establishing an on-line food industry portal which will, among others, provide comprehensive information to industry on the various support programmes provided by the Government and facilitate the flow of information among various Government agencies involved in providing services and granting the necessary approvals to the industry, for example, approvals for health and *halal* certifications.

19.71 Assistance programmes will be provided to support the industry in complying with standards and undertaking R&D. Areas of assistance include:

- renovation and plant re-design, to enable food manufacturers to comply with safety and quality standards, especially for HACCP and *halal* certifications; and

- technology development up-scaling by public sector research institutes to assess the viability of R&D projects for commercialisation.

Chapter 20

GROWTH AREAS IN SERVICES

GROWTH AREAS IN SERVICES

SECTION I OVERVIEW

20.01 The services sector is a major contributor to the growth of the Malaysian economy. The sector assumes an important intermediary role of supporting businesses and trade in all sectors of the economy. Trade in services has expanded and recorded marked expansion in exports, such as tourism, information and communication technology (ICT), finance and construction. In addition, the sector has generated the largest number of employment opportunities. During the period of the Second Industrial Master Plan (IMP2), 1996-2005, the services sector, which included construction services, but excluded Government services, grew at an average annual rate of 5.6 per cent. In line with the emphasis in the IMP2 on the development of services along the manufacturing value chain, the promotion of manufacturing-related services was initiated.

20.02 The Third Industrial Master Plan (IMP3), 2006-2020, focuses on the further development and growth of the services sector, which includes construction services, but excludes Government services. The sector is targeted to assume a leading role in driving the growth of the economy. Separate targets have been set for the growth of the non-Government and construction components of the sector:

- non-Government services to grow at an average annual rate of 7.5 per cent; and
- construction services, at 5.7 per cent.

To achieve the growth targets, the Government has formulated a set of comprehensive strategies and policy measures.

20.03 Eight services sub-sectors have been identified for further development during the IMP3 period. These are business and professional services, distributive trade, construction, education and training, healthcare services, tourism services, ICT services and logistics. These sub-sectors are selected, based on their expected contributions in the following areas:

- significant role as intermediate service providers in raising productivity through inter- and intra-sectoral linkages;
- potential for integration within the global context, in particular, the potential to further capitalise upon the growth of global business process outsourcing activities;

- significant impact on the economy through the diffusion of best practices and technology enhancement;

- potential in improving the invisible account of the Balance of Payments (BOP) through import substitution and the development of exports; and

- potential in creating knowledge-intensive employment opportunities and skills.

This Chapter focuses on the development and future directions of six of the sub-sectors, namely, business and professional services, distributive trade, construction, education and training, healthcare services and tourism services. The development and future directions of the remaining two sub-sectors, namely, ICT services and logistics, have been addressed in the respective chapters. Financial services are not covered in the IMP3. Specific strategies for the development of the sub-sector are contained in the Financial Sector Master Plan and Capital Market Master Plan. These plans chart the future direction of the financial system and capital market, respectively, for a ten-year period, 2001-2010.

20.04 During the IMP3 period, with greater liberalisation, more new services products will be introduced, such as innovative tourism products and outsourcing of business and professional services through shared service providers. Existing service providers will be encouraged to improve their production and delivery approaches through the infusion and adoption of knowledge, technologies and ICT-based systems. Enterprises will be encouraged to collaborate, merge or acquire other entities to gain access to organisational, management and business skills, and technologies and greater markets internationally. Such initiatives will also contribute towards integrating the services sector into the international supply and distribution networks.

20.05 This Chapter covers:

- the development and contribution of the overall services sector and six of the selected services sub-sectors during the IMP2 period, including share to the Gross Domestic Product (GDP) and trade;

- challenges faced by the selected sub-sectors, including opening up of the markets and the need to upgrade the human resource capabilities; and

- strategies and policies to address the challenges and further develop the sub-sectors, including enhancing the competitiveness of the sub-sectors through progressive liberalisation and promoting the exports of services.

SECTION II DEVELOPMENTS AND CONTRIBUTION OF THE SERVICES SECTOR

(a) Developments During the Second Industrial Master Plan

(i) Share of Gross Domestic Product

20.06 During the IMP2 period, the main contributors of the services sector to GDP were finance, insurance, real estate and business services; wholesale and retail, hotels and restaurants; and transport, storage and communication (Table 20.1). Together, these services contributed more than 60 per cent of the value-added in the services sector in 2005. In 1996, the non-Government services sector (finance, insurance, real estate and business services; wholesale and retail, hotels and restaurants; transport, storage and communication; electricity, gas and water; construction and other services), contributed RM89.6 billion, or 48.9 per cent, of the GDP. In 2005, the contribution of the non-Government services sector expanded to RM139.5 billion, accounting for 53.2 per cent of the GDP. Prior to the Asian financial crisis, the non-Government services sector registered growth of 10.6 per cent in 1996 and 10.1 per cent in 1997. Following the financial crisis, the sector recorded negative growth in 1998, largely as a result of the contraction of the construction sub-sector until 1999. Between 2000 and 2005, the sector grew at a lower rate of 5.9 per cent per annum. During the same period, the contribution of Government services to the GDP increased from RM12 billion, or 6.5 per cent, of the GDP in 1996 to RM19.8 billion (7.6 per cent) in 2005.

TABLE 20.1

SHARE OF THE SERVICES SUB-SECTORS IN REAL GROSS DOMESTIC PRODUCT

Sub-sectors	*1996*		*2005*	
	(RM billion)	*Share (%)*	*(RM billion)*	*Share (%)*
Total	**101.6**	**55.4**	**159.3**	**60.8**
Finance, insurance, real estate and business services	20.2	11.0	39.6	15.1
Wholesale and retail, hotels and restaurants	27.3	14.9	38.4	14.7
Transport, storage and communication	13.2	7.2	23.2	8.8
Other sevices[1]	13.8	7.5	20.3	7.8
Government services	12.0	6.5	19.8	7.6
Electricity, gas and water	6.4	3.5	10.9	4.1
Construction	8.6	4.7	7.1	2.7

Note: [1] Include community, social and personal services, private non-profit services to households and domestic services at households

Source: Department of Statistics

(ii) Share of Employment

20.07 The contribution of the sector to total employment increased from 55.6 per cent in 1996 to 58 per cent in 2005. Within the sector, wholesale and retail trade, hotels and restaurants remained the major source of employment. In 2005, this sub-sector contributed 30.5 per cent of the total workforce in the sector (Table 20.2).

TABLE 20.2

SHARE OF EMPLOYMENT IN THE SERVICES SUB-SECTORS TO TOTAL EMPLOYMENT

Sub-sectors	*1996*		*2005*	
	Persons ('000)	*Share (%)*	*Persons ('000)*	*Share (%)*
Total	**4,686.0**	**55.6**	**6,314.3**	**58.0**
Wholesale and retail, hotels and restaurants	1,365.2	16.2	1,927.2	17.7
Other services	747.8	8.9	1,118.2	10.3
Government services	904.1	10.7	1,052.8	9.7
Construction	796.0	9.5	759.6	7.0
Finance, insurance, real estate and business services	391.8	4.7	732.3	6.7
Transport, storage and communication	409.8	4.9	631.2	5.8
Electricity, gas and water	71.3	0.8	93.0	0.8

Source: Economic Planning Unit

(iii) Trade in Services

20.08 During the period 1996-2005, the export of non-Government services expanded at an average rate of 9.4 per cent per annum from RM38.4 billion in 1996 to RM71.8 billion in 2005 (Table 20.3):

- the travel component was the largest export earner, increasing from RM11.3 billion in 1996 to RM32.4 billion in 2005. Tourists and excursionists to Malaysia were the largest contributors to travel exports, accounting for more than 95 per cent of the total travel receipts;
- transportation exports also increased from RM8.4 billion in 1996 to RM16.2 billion in 2005, the largest component being sea and air freight services; and
- other services which contributed to export receipts were other business services (merchanting and other trade, operational leasing services and miscellaneous business services), construction services, communication services, computer and information services, and insurance services.

TABLE 20.3

EXPORTS OF NON-GOVERNMENT SERVICES

Sub-Sector	1996	2000	2005
	(RM million)		
Total	**38,393.0**	**52,483.2**	**71,774.5**
Travel	**11,264.2**	**19,042.9**	**32,354.6**
Tourism	11,264.2	18,766.9	31,950.3
Education	n.a[1]	276.0	393.1
Medical treatment	n.a	n.a	11.2
Transportation	**8,413.4**	**10,646.1**	**16,168.8**
Seafreight and other	4,194.4	6,205.6	8,158.4
Air	4,219.0	4,440.5	8,010.4
Freight and other	1,061.5	1,166.3	1,529.8
Passenger	3,157.5	3,274.2	6,480.7
Other services	**18,715.4**	**22,794.2**	**23,251.1**
Other business services	n.a.	6,050.3	8,906.9
Miscellaneous business services	n.a.	5,715.0	7,081.9
Operational leasing services	n.a.	699.3	1,353.8
Merchanting and other trade (net)	n.a.	-364.0	471.2
Construction/installation services	n.a.	1,195.0	3,025.0
Communication/telecommunications/ postal/courier services	n.a.	687.0	2,360.1
Computer and information services	n.a.	310.0	1,625.8
Insurance services	n.a.	592.9	1,037.5
Financial services	n.a.	608.0	227.1
Personal/cultural/recreational/audiovisual services	n.a.	125.0	212.2
Royalties and licence fees	n.a.	69.0	102.8
Other services	n.a.	13,157.0	5,753.7

Note: [1] Not available

Sources: Department of Statistics, *Bank Negara Malaysia,* Tourism Malaysia and National Carriers

20.09 During the period 1996-2005, imports of non-Government services grew at an average rate of 7.9 per cent per annum, from RM45.1 billion in 1996 to RM81.7 billion in 2005 (Table 20.4):

- imports by the transportation sub-sector increased more than two-fold, from RM14.9 billion in 1996 to RM31.9 billion in 2005. Within the transportation segment, freight transportation (both sea and air) constituted the largest import component;

- total imports of the travel component also doubled, from RM6.5 billion in 1996 to RM14.2 billion in 2005, reflecting the increasing trend of Malaysians travelling abroad; and

- other important services components imported included business services, including operational leasing and miscellaneous businesses, royalties and licence fees, construction, communication and insurance.

TABLE 20.4

IMPORTS OF NON-GOVERNMENT SERVICES

Sub-Sector	*1996*	*2000*	*2005*
	(RM million)		
Total	**45,109.6**	**63,090.9**	**81,673.8**
Travel	**6,462.5**	**7,885.5**	**14,236.8**
Tourism	4,268.5	5,880.5	10,580.5
Education	2,194.0	2,005.0	3,599.2
Medical treatment	n.a[1]	n.a	57.1
Transportation	**14,892.0**	**22,382.1**	**31,875.8**
Seafreight and other	12,312.0	19,482.4	28,147.7
Air	2,579.9	2,899.7	3,728.1
Freight and other	1,413.9	1,120.7	1,349.2
Passenger	1,166.0	1,779.0	2,378.9
Other services	**23,755.1**	**32,823.3**	**35,561.2**
Other business services	n.a.	8,784.3	13,543.8
Miscellaneous business services	n.a.	8,033.0	11,006.5
Operational leasing services	n.a.	751.3	2,537.3
Royalties and licence fees	n.a.	2,075.0	4,550.6
Construction/installation services	n.a.	4,145.0	4,040.9
Communication/telecommunications/ postal/courier services	n.a.	878.0	2,578.2
Insurance services	n.a.	1,097.0	1,934.0
Computer and information services	n.a.	765.0	1,407.8
Personal/cultural/recreational/ audiovisual services	n.a.	266.0	694.4
Financial services	n.a.	666.0	445.4
Commission and other charges on Federal Government loans	n.a.	43.0	0.0
Other services	n.a.	14,104.0	6,366.1

Note: [1] Not available

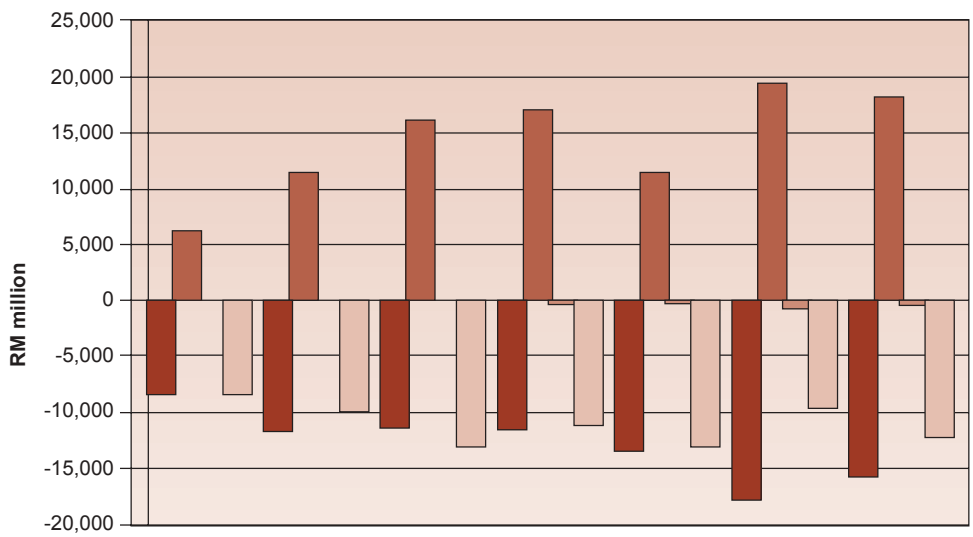
Sources: Department of Statistics, *Bank Negara Malaysia,* Tourism Malaysia and National Carriers

20.10 In terms of trade balance, during the IMP2 period, Malaysia continued to record a deficit in the non-Government services account, which amounted to RM6.7 billion in 1996 and widened to RM8.1 billion in 2004. Nevertheless, the negative balance was reduced by almost half in 2004, as a result of the recovery of the travel services sub-sector, compared with 2003. In 2005, the deficit widened to RM9.9 billion (Chart 20.1). An analysis of the trade in services account indicates:

- imports of transportation services, particularly freight services, contribute substantially to the overall deficit in the services account;
- the travel services segment assumes a significant role in reducing the deficit in the services account; and
- other segments in the services account which are beginning to indicate potential for exports in the long run include other business services, such as communication services, computer and information services, construction services, operational leasing services and miscellaneous business services, insurance services and education services.

CHART 20.1

SERVICES ACCOUNT (NET)



	1999	2000	2001	2002	2003	2004	2005
Non-Government Services							
1. Transportation	-8,464	-11,736	-11,352	-11,572	-13,486	-17,783	-15,707
2. Travel	6,135	11,158	16,148	17,102	11,523	19,398	18,117
3. Other Services	-8,395	-10,030	-13,187	-11,242	-13,011	-9,675	-12,311
Government Services	23	-62	25	-284	-327	-721	-350
Total	**-10,701**	**-10,670**	**-8,366**	**-5,996**	**-15,300**	**-8,780**	**-10,249**

Year

Sources: Economic Planning Unit and Department of Statistics

(iv) Comparison of Contribution of the Services Sector in Selected Countries

20.11 The services sector assumes an important role in countries such as the United States of America (USA), Singapore, Hong Kong, Thailand and Ireland. Its importance is reflected in its:

- contribution to the GDP

  In 2004, the share of the services sector to the GDP for Hong Kong, at 91.8 per cent, the USA (80.4 per cent) and Singapore (70.1 per cent), was larger than that for Malaysia (60.3 per cent). The contribution of the services sector to the GDP for Thailand, at 49.9 per cent, and Ireland (44.6 per cent) was lower than that for Malaysia. The sector registered an annual growth of between 5.1 per cent and 7.8 per cent for most of the selected countries, except for Ireland, which recorded a lower growth rate of 3.8 per cent (Table 20.5); and

- share of employment

  In 2004, the contribution of the services sector to total employment was high in most of the selected countries. The sector accounted for 94.5 per cent of the total employment in Hong Kong, 79.2 per cent in Singapore and 79 per cent in the USA.

This pattern suggests that as a country develops, the services sector assumes an increasingly important role in the economy.

TABLE 20.5

CONTRIBUTION OF THE SERVICES SECTOR TO GROSS DOMESTIC PRODUCT IN SELECTED COUNTRIES, 2004

	USA	*Hong Kong*	*Singapore*	*Ireland*	*Thailand*	*Malaysia*
Share to GDP						
Services (%)	80.4	91.8	70.1	44.6	49.9	60.3
Manufacturing (%)	12.7	3.7	25.1	40.8	38.7	31.6
Primary sector (%)	2.2	0.1	0.1	4.0	11.4	15.4
GDP growth rate (%)	4.4	8.1	8.4	4.9	6.1	7.1
Services sector growth rate (%)	5.1	7.8	6.4	3.8	6.5	6.4
Share of services sector to total employment (%)	79.0	94.5	79.2	65.0	43.1	57.8

Sources: USA: Bureau of Economic Analysis and Bureau of Labor Statistics; Singapore: Economic Survey of Singapore; Hong Kong: Central Statistics, Hong Kong; Thailand: National Economic and Social Development Board; Ireland: Central Statistics Office, Ireland; Malaysia: Economic Report 2004/2005 and *Bank Negara* Report 2004

(b) Sectoral Linkages

(i) Contribution to the Overall Economy

20.12 Inter-sectoral linkages between the services sector and the rest of the economy, as well as intra-sectoral linkages among the different services sub-sectors, together form a network of activities within the economy, from which productive value chains develop. Focus will be given on strengthening these links to add value to the Malaysian economy. Services which are offered, delivered and consumed in diverse ways through various channels of communication will feature more importantly during the IMP3 period. These linkages can be derived from Input-Output Tables, which explain the forward and backward connections between producers and consumers of services.

20.13 Based on the Input-Output Tables of 1991 and 2000, main users of services output were producers, which used them for intermediate purpose. Such intermediate demand represented 31.1 per cent of the services output in 1991 and 33.3 per cent in 2000. Private final consumption was the second largest user of the services output, absorbing 20.8 per cent in 1991 and 22 per cent in 2000. Among the services sub-sectors, intermediate demand was highest for business services, accounting for 82.3 per cent of their output in 1991. Water, electricity and gas, and wholesale and retail trade services registered high intermediate demand, constituting 80.9 per cent, 78 per cent and 73.2 per cent of their output in 2000, respectively.

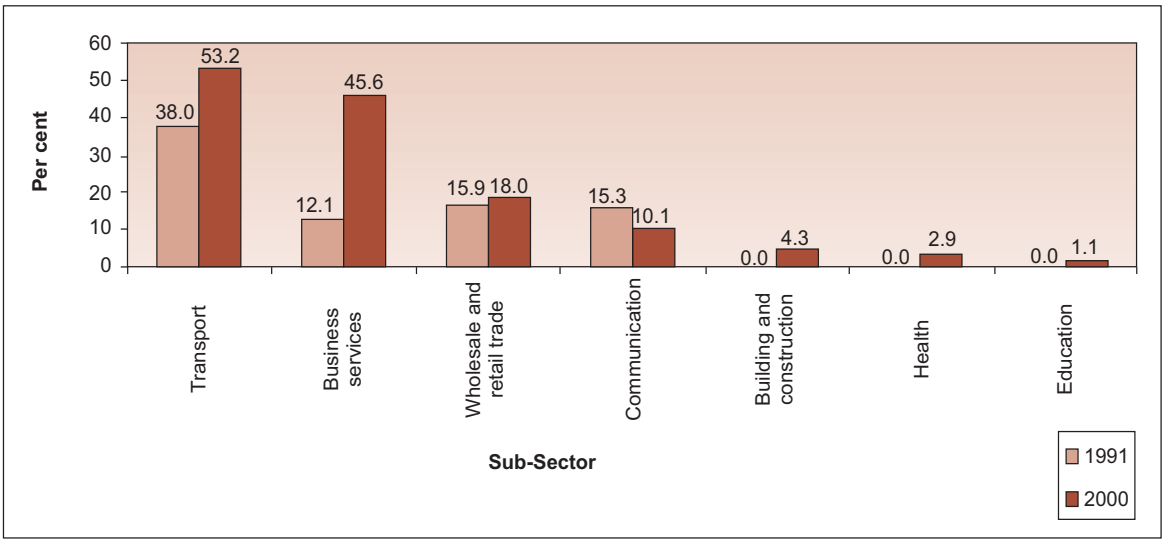
20.14 Exports of the services sector lagged those of the manufacturing and primary sectors. External demand for services increased from 8.5 per cent in 1991 to 14.4 per cent in 2000. The services exported included:

- transport services, which registered the highest percentage in exports, at 38 per cent in 1991 and 53.2 per cent in 2000;
- business services, which recorded a significant increase in exports, from 12.1 per cent in 1991 to 45.6 per cent in 2000;
- wholesale and retail trade services, with exports amounting to 15.9 per cent in 1991 and 18 per cent in 2000; and
- communication services, which exported 15.3 per cent of their output in 1991 and 10.1 per cent in 2000.

Building and construction, health services and education services sub-sectors did not export their output in 1991. Exports were registered in 2000, at 4.3 per cent, 2.9 per cent and 1.1 per cent, respectively (Chart 20.2).

CHART 20.2

EXPORTS OF SELECTED SERVICES SUB-SECTORS (1991, 2000)



Source: 1991 and 2000 Input-Output Tables, Department of Statistics

20.15 During the IMP3 period, exports of services are expected to grow through all four modes of trade, namely, cross border trade, consumption abroad, commercial presence and movement of natural persons (Box 20.1). Nevertheless, the bulk of the services output will continue to meet the needs of domestic consumption.

(ii) Share of Domestic and Imported Inputs in Services Production

20.16 Intermediate demand consumed the largest share of imported services in 1991, at 86.7 per cent, and 2000 (88.2 per cent). During the same period, the proportion of imported services used by private final consumption declined from 13.2 per cent in 1991 to 8.5 per cent in 2000. The Input-Output Tables also indicated that the share of imported inputs in the production of services almost doubled, from 18.8 per cent in 1991 to 35.8 per cent in 2000. Correspondingly, the share of domestic inputs declined from 81.2 per cent to 64.2 per cent. For some services sub-sectors, such as insurance, private non-profit services, radio and television, and other financial services, their share of imported inputs declined, while their share of domestic inputs expanded.

20.17 In general, the Input-Output analysis indicates that:

- the imported component of the services inputs has increased;

- the capacity of domestic inputs has grown for five sub-sectors, namely, electricity and gas, insurance and other financial services, private non-profit services, radio and television, and commercial services;

- in tandem with social and economic advancement, there have been further developments in education, health, utilities, public administration and infrastructure; and

- the bulk of the services activities which contribute to economic growth are expected to be connected to activities within the services sector itself, as well as to the manufacturing, agriculture and mining industries.

Box 20.1

FOUR MODES OF THE SERVICES TRADE

Under the World Trade Organisation (WTO) General Agreement on Trade in Services (GATS) and the ASEAN Framework Agreement on Services (AFAS), committed services sub-sectors are classified, based on the Central Product Classification (CPC) and four modes of the services trade:

Mode 1 - Cross Border Trade

Refers to the supply of services by service producers of one country to purchasers in another country, but where there is no movement of the service supplier or purchaser across borders. The advancement of technology has made this possible, for example, through the Internet (e-trading), pipelines for oil and gas, and services embodied in goods, such as books or recording media.

Mode 2 - Consumption Abroad

Refers to the supply of services in the territory of one country to the service consumer of another country. It involves the purchaser travelling to the other country in which the service is produced. Examples include tourism and education services.

Mode 3 - Commercial Presence

Refers to the supply of services by a service producer of one country through the commercial presence in the territory of another country. This mode includes foreign direct investments (FDIs) in services.

Mode 4 - Movement of Natural Persons

Refers to the supply of service by a service personnel who travels to another country to provide the service. This includes services provided by expatriates, business and professional services abroad and services of foreign workers.

(iii) Forward Linkages

20.18 Forward linkages indicate the importance of an industry or sector as a supplier of services as inputs to other industries or sectors. They also reflect the potential 'forward' multiplier effects of the services industry to the economy. Analysis of the forward linkages indicates:

- during 1991 and 2000, intra-sectoral linkages, that is, linkages within and among the services sector, had been strongest. This was followed

by inter-sectoral linkages with the secondary (manufacturing) sector. The lowest forward linkages were observed with the primary (agriculture and mining) sector (Chart 20.3);

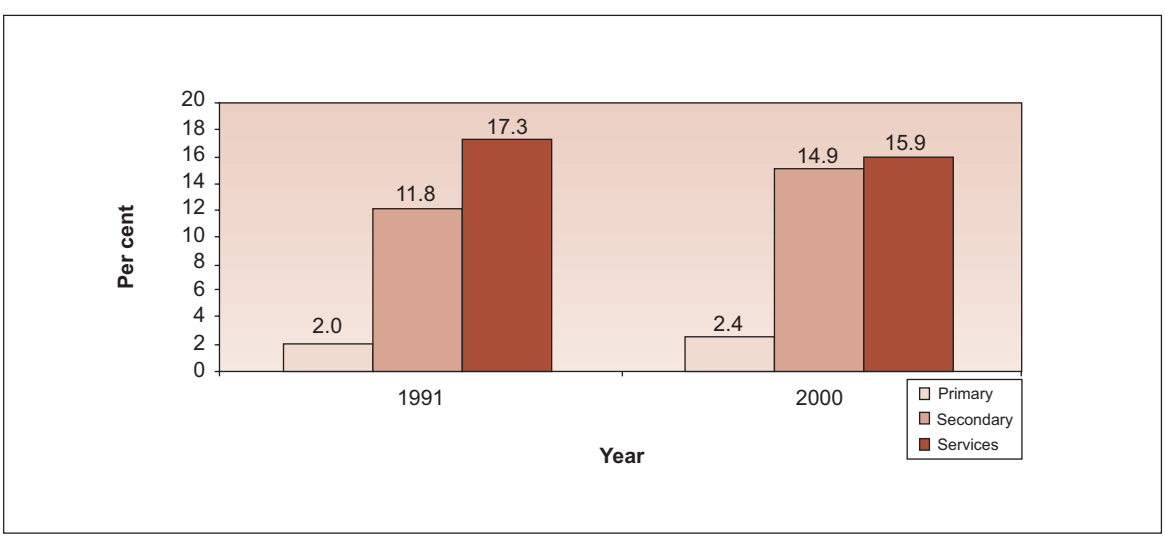
- forward linkages with the manufacturing sector increased during the two years, indicating the rising importance of services inputs for manufacturing processes. These linkages are expected to strengthen, with the further promotion of manufacturing-related services. Enhancing the efficiency and competitiveness of the services output will, therefore, have greater multiplier effects on the future performance of other economic activities, including manufacturing;

- in 2000, the wholesale and retail trade sub-sector registered the strongest forward inter-sectoral linkages with the manufacturing sector, where 57.6 per cent of its total output was used by the sector. Electricity and gas recorded the strongest forward inter-linkages with the secondary sector, where 33.9 per cent of their total output was used by manufacturing industries in 1991. Business and professional services registered the strongest forward inter-linkages with the primary sector, where 13.4 per cent of their total output was used by the sector in 2000; and

- in terms of forward intra-sectoral linkages, the real estate services sub-sector registered the strongest links, where 64.2 per cent of its total output was used by the services sector in 1991 and 70.5 per cent in 2000.

CHART 20.3

FORWARD LINKAGES OF THE SERVICES SECTOR



Source: 1991 and 2000 Input-Output Tables, Department of Statistics

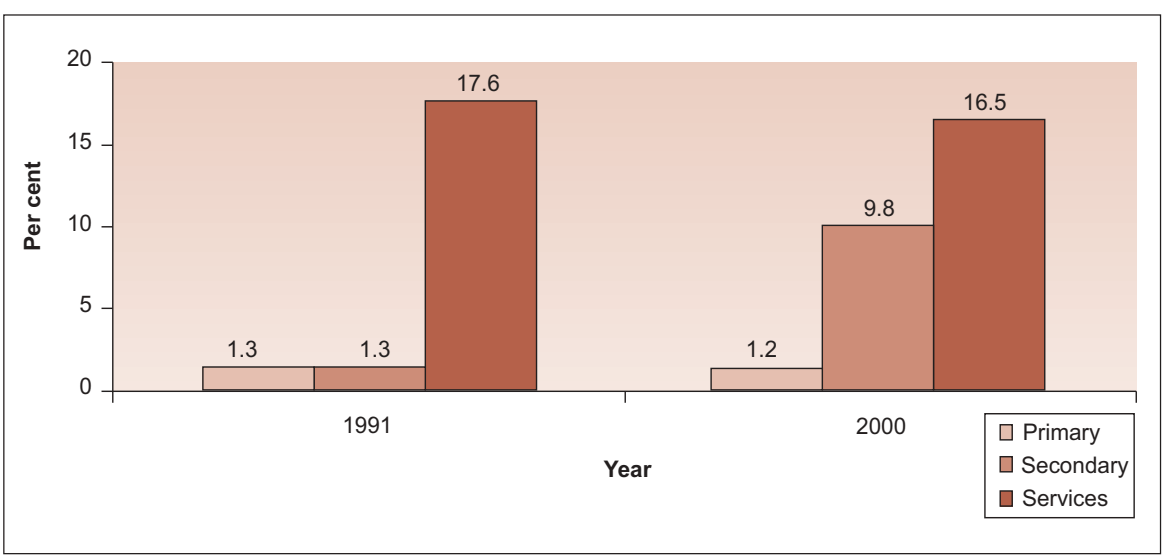
(iv) Backward Linkages

20.19 Backward linkages measure the importance of an industry or sector as a purchaser of inputs (goods and services) from other industries or sectors. They also indicate the potential of the purchaser industry or sector for indirect 'backward' multiplier effects to the economy. The Input-Output Tables indicated that:

- the services sector registered the strongest backward linkages within the services sector itself during 1991 and 2000. The backward inter-sectoral linkages between the services sector and the secondary or manufacturing sector increased significantly from 1.3 per cent in 1991 to 9.8 per cent in 2000, but remained negligible with the primary sector (Chart 20.4);
- backward linkages of the defence services sub-sector with the secondary sector were recorded at 15.3 per cent in 2000. The hotels and restaurants services sub-sector registered the strongest backward linkages with the primary sector, at 10 per cent in 2000; and
- the strongest backward intra-sectoral linkages in 1991 were in the insurance sub-sector, in which 38.2 per cent of its total inputs were obtained from within the services sector itself. However, in 2000, the strongest intra-sectoral linkages were in the radio and television sub-sector, at 76.6 per cent.

CHART 20.4

BACKWARD LINKAGES OF THE SERVICES SECTOR



Source: 1991 and 2000 Input-Output Tables, Department of Statistics

(v) Backward and Forward Linkages for the Targeted Services Sub-Sectors

20.20 Backward and forward linkages of the targeted services sub-sectors with the primary, secondary and services sectors are indicated in Charts 20.5 and 20.6. A high concentration of linkages took place between these sub-sectors. Based on the analysis of the Input-Output Tables for 1991 and 2000, indications on the future direction of the services sector include:

- the country gradually becoming a service oriented economy; and
- with appropriate policy measures, inter-sectoral linkages can be further strengthened, providing growth potential for services to support the secondary and primary sectors.

20.21 Inter-sectoral and intra-sectoral forward and backward linkages are expected to undergo changes during the IMP3 period. The shift in demand and supply conditions of a service-based economy will drive structural changes. The production and supply value chains will operate through key economic linkages or networks. These networks will comprise business producers, buyers, suppliers, traders, regulators and Government agencies within and outside the country. These services activities are expected to facilitate trade and investments in goods and services.

(c) Malaysia's Commitments under the International Services Agreements

20.22 Malaysia subscribes to the principle of progressive liberalisation in the services sector, as part of the overall development strategy. An increasing number of the services sub-sectors have been liberalised over the years, both autonomously, as well as through commitments at the international level. The commitments include those under GATS and AFAS. In addition, Malaysia is negotiating a number of bilateral trade agreements, which include a services liberalisation component.

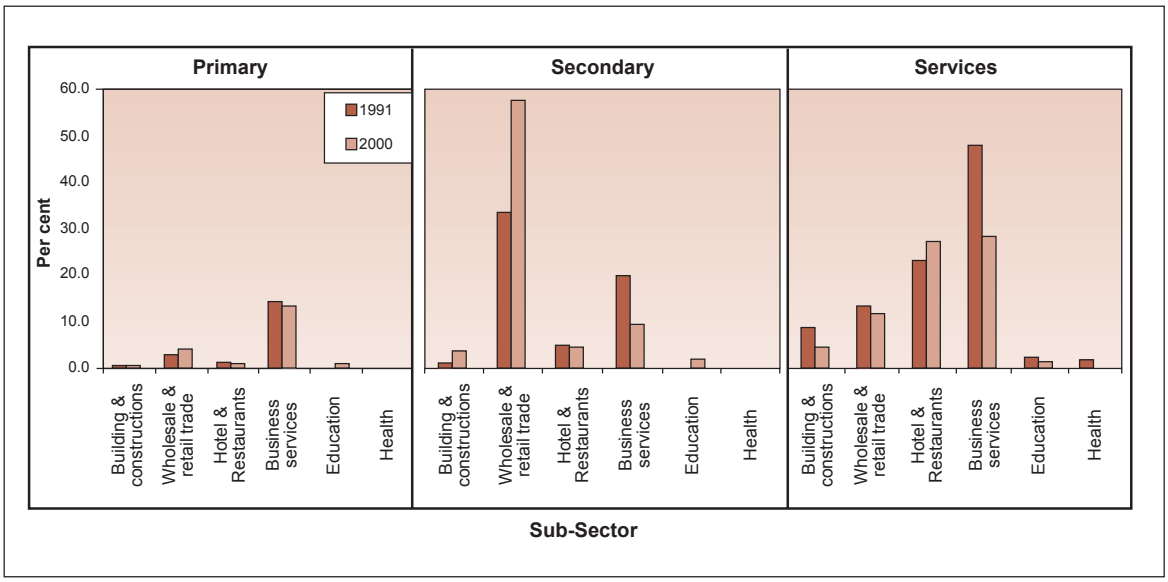
(i) Commitments under the WTO

20.23 Malaysia's existing initial commitments in the services sector under the WTO were the result of negotiations in the Uruguay Round. The commitments under the market access and national treatment provisions are subject to certain conditions or limitations or reservations in the four modes of supply. These include:

- limitations on foreign equity ownership (generally 30 per cent);
- requirement of foreign service suppliers to establish commercial presence through joint-ventures with local firms; and
- limitations on the number of foreign personnel allowed to provide the services.

CHART 20.5

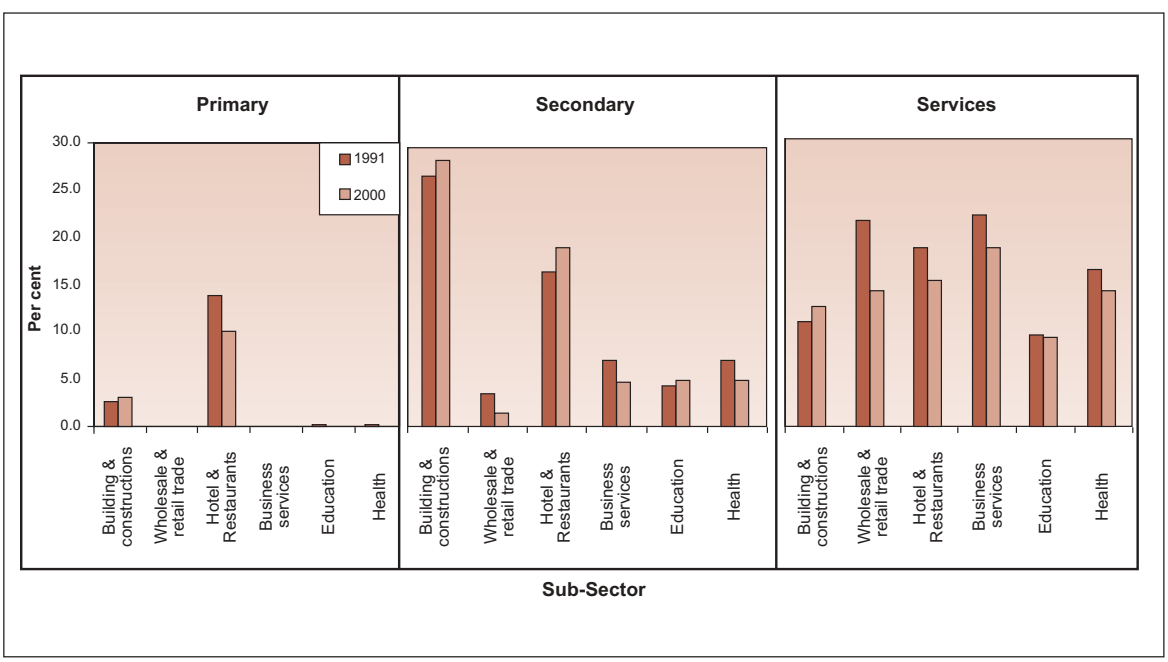
FORWARD LINKAGES OF THE TARGETED SERVICES SUB-SECTORS



Source: 1991 and 2000 Input-Output Tables, Department of Statistics

CHART 20.6

BACKWARD LINKAGES OF THE TARGETED SERVICES SUB-SECTORS



Source: 1991 and 2000 Input-Output Tables, Department of Statistics

20.24 The services sub-sectors offered to foreign service providers under the GATS are:

- business services (legal; accounting, auditing and book-keeping; taxation; architectural; engineering; medical speciality; computer and related services; research and development (R&D); advertising; management consulting; services incidental to agriculture and fishing, and manufacturing; technical testing and analysis; student placement; market research and public opinion polling; translation and interpretation; convention and exhibition management; landscaping; and operational headquarters services);
- communication services (telecommunications and audiovisual services);
- construction and related engineering services;
- financial services;
- health related social services (hospital services);
- tourism and travel related services (hotels, tourist resorts and restaurants, travel agencies and tour operators);
- recreational, cultural and sporting services (other entertainment and sports events management services);
- transportation services (international maritime transportation, maritime agency services, and vessel salvage and re-floating services, except on inland waters); and
- skills training services.

(ii) Commitments under the ASEAN Framework Agreement on Services

20.25 Under the AFAS, Malaysia had made commitments to liberalise the services sector through expanding and deepening the GATS commitments, covering all modes of supply for common sectors and sub-sectors. The common sectors and sub-sectors include business services (accounting, auditing and book-keeping, computer and related services, engineering services, architectural services, landscape architectural services); telecommunications; maritime freight forwarding services; theme parks (tourism services sub-sector); construction services, leasing or rental of construction machinery and equipment; hotels, travel agencies and tour operators; and wholesale and retail trade. There will be benefits from the further liberalisation of the services sector under the GATS and AFAS. Increasing foreign participation in the sector will facilitate the development of the domestic industry. Benefits to be derived include transfer of technology, enhancement of knowledge and access into foreign markets.

SECTION III BUSINESS AND PROFESSIONAL SERVICES

20.26 Business and professional services in the IMP3 comprise:

Business Services

- shared services or outsourcing and offshoring of business activities, which include services such as back office operations, call or contact centres, ICT support or data centres and operational headquarters (OHQs); and
- regional establishments, such as representative and regional offices.

Professional Services

- In order to practise, accredited professional service providers will need to become members of a body or association which governs the profession. Professional services include accounting, book-keeping and auditing; tax consultancy; legal; architectural; engineering and other technical services; and
- non-accredited professional service providers, for whom membership with a governing body is not mandatory and not a pre-requisite in order to practise. These include R&D, advertising, market research, management consultancy, and environmental and energy services.

Some of the core activities of business and professional services under AFAS, such as shared services and non-accredited professional services (including R&D and integrated market support services), are promoted under the Promotion of Investments Act, 1986 and Income Tax Act, 1967.

(a) Present Status

20.27 The contribution of business and professional services to the GDP has been estimated from statistics under the category of finance, insurance, real estate and business services. Their contribution to the GDP increased from RM20.2 billion or 11 per cent in 1996 to RM39.6 billion (15.1 per cent) in 2005. Under professional services, the accredited professional services registered a lower GDP contribution from 1.7 per cent in 1996 to 1 per cent in 2002. During the same period, advertising services, under non-accredited professional services, also registered a marginally lower contribution to the GDP from 0.11 per cent to 0.08 per cent (Table 20.6). During the same period, employment grew at an average annual rate of 7 per cent to 732,300 persons in 2005.

(b) Industry Structure

20.28 The sub-sector is one of the fastest growing sub-sectors. Its contribution towards industrial development gained in importance during the IMP2 period.

The types of services provided and the delivery methods have undergone changes, largely driven by advancements in technology, in particular, ICT.

TABLE 20.6

CONTRIBUTIONS OF SELECTED BUSINESS AND PROFESSIONAL SERVICES

	Accredited Professional Services[1]		*Advertising Services*	
	1996	*2002*	*1996*	*2002*
Share of GDP (%)	1.67	0.98	0.11	0.08
Share of employment (%)	0.93	0.87	0.05	0.04

Note: [1] Include legal services, accounting services, architectural consultancy, drafting consultancy, engineering consultancy and surveying services

Sources: National Product and Expenditure Accounts 1987-2003; Labour Force Survey Reports 1996-2000 and 2002; Census of Professional and Institutional Establishments 2000; and Economic Census Malaysia – Selected Services 2001: Department of Statistics

(i) Business Services

Shared Services and Outsourcing

20.29 The growth of shared services and business process outsourcing in recent years has been driven by major factors, such as the orientation of companies in focusing on their core competencies, growing availability of competitive outsourcing service providers, and automation and codification of best practices, as well as the liberalisation of investment regime relating to FDIs. According to the World Investment Report 2004, the offshore outsourcing of business processes is expected to grow from US$1.3 billion in 2002 to US$24 billion in 2007. Common activities outsourced include information technology (IT), accounting and legal services, maintenance, market research, human resource, consultancy services and marketing related activities.

20.30 For two consecutive years (2004 and 2005), the AT Kearney's Global Services Location Index (previously known as the Offshore Location Attractiveness Index) ranked Malaysia as the third most attractive business location for offshoring activities, behind India and the People's Republic of China. Malaysia's favourable performance was attributed to, among others:

- its continued investments in modern infrastructure in Multimedia Super Corridor of Malaysia (MSC Malaysia);
- enhancement in incentives to make them more attractive for companies to locate in Malaysia; and

- measures on the liberalisation of employment and upgrading of English language and technical skills among the workforce.

20.31 As at 31 December 2005, a total of 1,421 companies were granted MSC status. Of these, 1,033 were majority Malaysian-owned, 349 majority foreign-owned and 39 equally owned by Malaysian and foreign interests. The MSC Malaysia focuses on capturing offshore shared services projects, where customers are primarily located outside Malaysia. By the end of 2010, Multimedia Development Corporation (MDeC) aims to create 100,000 jobs in high value shared service outsourcing in the MSC Malaysia. By 2020, the number of jobs to be created is projected to grow to 600,000.

20.32 As at December 2005, a total of 106 OHQs have been approved by the Malaysian Industrial Development Authority (MIDA) for establishment in Malaysia. Of these, 82 have started operation. These companies are located outside the MSC Malaysia and engaged in providing business services, including outsourcing, R&D, back room operations and other qualifying business services, to their groups of related companies within and outside Malaysia.

20.33 Based on a survey conducted in 2005 on companies operating in Malaysia, which outsourced value creation activities, common advantages which they derived from outsourcing included:

- easy access to specialised services and technology;
- enhanced productivity;
- familiarity of local conditions;
- more efficient delivery of services;
- greater accountability in costing and cost saving;
- improved supply chain management; and
- ability to turn fixed costs into variable costs.

Respondent companies expressed their intention to continue to outsource their business services in Malaysia in the future.

Regional Establishments

20.34 Regional establishments provide intermediate service inputs to the operations of multinational corporations (MNCs) and their affiliates globally. As at December 2005, a total of 552 regional offices and 1,252 representative offices had been approved. These offices provide feedback to their parent companies on the opportunities for business in Malaysia and the region in the medium to long terms. These regional establishments do not undertake any commercial transactions and are primarily engaged in data collection and fact finding.

(ii) Professional Services

Accredited Professional Services

20.35 During the period 1996-2003, the number of establishments in legal, accounting, architectural, drafting, engineering and surveying consultancy services increased from 4,808 in 1996 to 6,961 in 2003. The gross output of these services increased from RM4.5 billion in 1996 to RM6.1 billion in 2003. During the period, employment in these establishments increased from 78,465 persons in 1996 to 88,285 in 2003. Engineering consultancy and legal services formed the major segments, accounting for 58 per cent of the gross output in 2003. These two services were also the major sources of employment, absorbing 55 per cent of the total employment in accredited professional services in 2003 (Table 20.7).

TABLE 20.7

ACCREDITED PROFESSIONAL SERVICES - NUMBER OF ESTABLISHMENTS, OUTPUT AND EMPLOYMENT

	No. of Establishments		*Gross Output (RM '000)*		*Employment (Persons)*	
	1996	*2003*	*1996*	*2003*	*1996*	*2003*
Total	**4,808**	**6,961**	**4,542,828**	**6,088,401**	**78,465**	**88,285**
Engineering consultancy	505	718	1,440,968	1,963,305	16,568	15,903
Legal	2,078	3,108	1,144,209	1,588,545	25,979	32,288
Accounting	985	1,383	634,466	999,999	15,816	19,225
Surveying	498	690	627,470	767,419	11,563	11,007
Architectural consultancy	578	914	682,887	752,717	8,063	9,367
Drafting consultancy	164	148	12,828	16,416	476	495

Source: Census of Professional Services (Private Sector), 2004, Department of Statistics

20.36 The value-added contribution of the accredited professional services decreased by 4.7 per cent, from RM4.2 billion in 1996 to RM4 billion in 2003. This was largely due to the weak performance of the construction industry, which affected its related services (architectural and drafting consultancy, engineering and surveying services). In contrast, during the period, accounting and legal services registered increases in value-added of 32.7 per cent and 12 per cent, respectively (Table 20.8).

TABLE 20.8

CONTRIBUTION OF THE ACCREDITED PROFESSIONAL SERVICES TO THE GROSS DOMESTIC PRODUCT

	Value-Added (RM million)		*Value-Added as Percentage of GDP (%)*	
	1996	*2003*	*1996*	*2003*
Total	**4,237**	**4,038**	**1.7**	**1.7**
Legal	1,062	1,189	0.4	0.5
Engineering consultancy	1,349	1,146	0.5	0.5
Accounting	597	792	0.2	0.3
Architectural consultancy	638	460	0.3	0.2
Surveying consultancy	579	441	0.2	0.2
Drafting consultancy	12	10	neg.[1]	neg.

Note: [1]Negligible
Sources: Census of Professional Services (Private Sector), 2004,
National Product and Expenditure Accounts, 1996-2003, Department of Statistics

(iii) Non-Accredited Professional Services

Market Research Services

20.37 Market research services recorded double digit growth during the IMP2 period. Industry sources indicated:

- in 2004, market research services recorded an estimated annual gross revenue of RM200 million, of which 50 per cent were contributed by foreign companies operating in Malaysia;
- an increasing number of companies outsourced their market research requirement to independent companies to gather information on market intelligence, consumer preferences and brand loyalty; and
- the majority of the firms in the market were foreign-owned, while smaller local companies compete in niche areas.

The market research services are expected to grow further, as more businesses become aware of the importance of market intelligence.

Management Consultancy Services

20.38 Management consultancy services comprise services related to IT, financial management, market and feasibility studies, strategic planning, business process

re-engineering, change and risk management, and other advisory services. The services are expected to grow, in view of the increasing pace and complexity of new ventures and the sophistication in business models and work processes. The demand for other types of consultancy services, such as energy and environmental consultancy services and technical testing, is also expected to increase. The provision of energy consultancy services is a relatively new business in Malaysia. There is, therefore, potential for the growth and development of these services among local service providers.

***Advertising* Services**

20.39 The total number of establishments in advertising services increased from 143 in 1996 to 212 in 2003. During the period 1996-2003, the share of value-added of advertising services to the GDP was at 0.1 per cent. Gross output per employee increased from RM436,306 in 1996 to RM560,018 in 2003. The lower employment in the advertising services, from 4,079 persons in 1996 to 3,855 in 2003, contributed to an improvement in productivity, as reflected by an increase in value-added per employee, from RM65,900 in 1996 to RM86,700 in 2003. Competition in these services was more towards concentration and between local and large international agencies.

Research and Development Services

20.40 R&D services are directly utilised as inputs for key manufacturing processes to enhance the efficiency, productivity and innovativeness of firms. The services cut across industries. Their importance varies by industry and the stage of the product lifecycle. In view of their importance, many firms have established in-house R&D units, which serve internal and intra-company needs. Independent R&D companies provide R&D consultancy services to third party companies. These activities are promoted under the Promotion of Investments Act, 1986 and Income Tax Act, 1967.

Energy Services

20.41 Energy sources, including petroleum, natural gas, coal, renewable energy, and primary and secondary electricity sectors, each provides a specific market for energy services. These energy services are required at each stage of the energy chain, from the location of the potential energy source to its distribution to the final consumer.

20.42 There are 12 firms involved in the upstream exploration and development activities for oil and gas, including Petronas Carigali, the only Malaysian-owned company. The upstream stage of exploration, which is highly specialised, is closely related to the construction and fabrication industry. The exploration

and development activities for oil and gas have created backward linkages, with the setting up of companies to service the construction of oil rigs, offshore platforms and pipelines for use in the oil and gas industry.

Environmental Services

20.43 Environmental services include equipment (such as for water supply and delivery, treatment of waste water, waste handling, air pollution control and laboratory testing), services (such as engineering design, construction and management of utilities, waste collection and processing, and legal and consultancy services) and resources (such as sale of water, recovered materials and renewable energy) relating to the environment.

20.44 Environmental services are provided to the Federal Government, local authorities and manufacturing companies which need to comply with environmental requirements. The emerging trend in these services is the growth potential associated not only with the compliance to rules and regulations, both at the national and international levels, but also their expanding capacity as a source of technological innovation, competitive advantage and benchmarking with international service standards. Privatisation of these services has expanded the role of the private sector in the delivery of the environmental services.

20.45 Presently, the following environmental services are eligible for incentives under the Promotion of Investments Act, 1986:

- storage, treatment and disposal of toxic and hazardous wastes;
- energy conservation;
- waste recycling activities; and
- use of renewable energy resources.

As at 2005, a total of 97 companies were granted incentives, involving investments of RM2 billion. Of the total, 52 companies had started operations.

(c) Growth Prospects

20.46 The market for accredited professional services is largely domestic, with an insignificant level of exports. In view of liberalisation, there will be increasing competition from foreign firms. Malaysian accredited professional service providers will need to be prepared for competition, once the market is liberalised. With the implementation of the ASEAN Free Trade Area (AFTA), the market for accredited professional services will expand beyond Malaysia. Domestic service providers are likely to compete with foreign firms. The mutual recognition arrangements (MRAs), which are being negotiated, will be a step closer to encourage competition within the ASEAN region.

20.47 The future development and growth of non-accredited professional services differ by the type of services:

- management consultancy services are envisaged to have favourable growth prospects, as the business environment has become more competitive and complex;

- environment services will become more important, especially in the longer term, when third generation environment services (services which will assist companies in pursuing resource efficiency, high productivity and increased competitiveness) assume a greater role in determining the competitiveness of firms through cleaner and more efficient production technology;

- the potential for R&D services will become greater, as industries focus on product and process developments and innovations, as well as expand into downstream activities; and

- strategic planning for energy services is important for Malaysia, as the energy requirement is positively correlated with economic development. In this respect, there is a need to develop and promote energy services to become efficient and competitive. Through backward and forward linkages, PETRONAS assumes the key role in stimulating the energy services to be self-sufficient, at least in certain service areas.

SECTION IV DISTRIBUTIVE TRADE SERVICES

20.48 The distributive trade services sub-sector comprises wholesaling, retailing, franchising, direct selling, catering and restaurants. It also includes commission agents or representatives, including those of international trading companies, as well as distributors of motor vehicles and other consumer durable goods. Apart from undertaking distribution, some of these distributors perform other important tasks, including repair and maintenance services of goods.

20.49 The sub-sector has undergone structural changes during the IMP2 period, which are evident in the format and modes of delivery of the services, as well as new types of distribution outlets. Notable changes are those related to the greater number of huge malls and shopping complexes, hypermarkets and speciality stores. The entry of foreign retailers, for example, operators of hypermarkets, further changed the profile of the sub-sector. These operators have integrated the wholesale and retail functions. The dynamics within this sub-sector have created new activities and services, which contributed to the development of more comprehensive and innovative supply chain activities, resulting in greater international networking and outsourcing.

(a) Present Status

20.50 Main features of the sub-sector were:

- 284,171 establishments in 2001;
- average annual growth of 4 per cent, with the contribution to the GDP increasing from RM23.9 billion in 1996 to RM33.1 billion in 2005;
- increase in total sales from RM159.6 billion in 2000 to RM205.6 billion in 2005;
- largest revenue generators were wholesale services, which contributed 46.2 per cent and 70.2 per cent of the total revenues in 2001 and 2005, respectively;
- contribution of 28.8 per cent by retail trade to the total revenues in 2001, followed by distribution of motor vehicles (19.6 per cent);
- generation of employment of 1.3 million workers in 2005, compared with 1.1 million in 2000. Retail trade services contributed the highest share of total employment in the sub-sector;
- growth in productivity, in terms of value added per employee, at an average annual rate of 0.4 per cent. Productivity per worker was highest in wholesale trade services. Retail trade and restaurants, which employed a greater number of less skilled workers, recorded lower productivity;
- wholesale trade services registered the largest share (50 per cent) in investments in fixed assets, valued at RM13.3 billion in 2001(Table 20.9);
- to promote Malaysia as a regional and global trading centre, the Government started promoting international procurement centres (IPCs) in 1996 and regional distribution centres (RDCs) in 2003. As at December 2005, a total of 177 IPCs and ten RDCs had been approved. Total annual sales turnover of the IPCs and RDCs in 2005 was estimated at RM59.1 billion; and
- during the IMP2 period, the sub-sector developed linkages with transport and communication, agriculture, manufacturing and tourism. The sub-sector also recorded increased linkages with the financial sector, as a result of the rising trend in cashless transactions.

(b) Investments

20.51 Based on the Census of Distributive Trade 2002, the total fixed assets of the distributive trade services in 2001 were valued at RM26 billion. During the

period 2003-2005, the Ministry of Domestic Trade and Consumer Affairs approved 758 projects in distributive trade, with total investments of RM2.5 billion. Of the total investments, 56.5 per cent were foreign-owned. Investments in hypermarkets contributed RM1.4 billion, or 56 per cent, of the total investments.

TABLE 20.9

PROFILE OF THE DISTRIBUTIVE TRADE SERVICES SUB-SECTOR, 2001

Activity	*Establishments*		*Number of Workers*		*Productivity per Worker*	*Fixed Assets*		*Revenue*	
	Number	*Share (%)*	*('000)*	*Share (%)*	*(RM '000)*	*(RM million)*	*Share (%)*	*(RM million)*	*Share (%)*
Total	**284,171**	**100.0**	**1,172**	**100.0**	**22.2**	**26,031**	**100.0**	**248,680**	**100.0**
Wholesale	16,386	5.8	180	15.3	61.7	13,258	50.9	114,992	46.2
Retail	153,660	54.1	512	43.7	15.6	7,693	29.6	71,654	28.8
Motor vehicles	31,800	11.2	148	12.6	28.8	3,166	12.2	48,862	19.6
Restaurants	82,325	29.0	332	28.3	8.1	1,914	7.4	13,172	5.3

Source: Census of Distributive Trade 2002, Department of Statistics

20.52 Since the late 1990's, as a result of policy liberalisation, the sub-sector had attracted foreign participation, mainly in the larger hypermarkets, superstores, departmental stores and speciality stores. The foreign operators are larger and driven by innovations and application of ICT. They adopt modern methods of operations and management strategies. In addition, they enjoy economies of scale and scope, and receive support from their foreign networks, which provide a source of competitive advantage.

(c) Industry Structure

(i) Wholesale Trade

20.53 The wholesale trade has undergone structural transformation, characterised by rising productivity and concentration into larger businesses by foreign-owned firms:

- although the total number of establishments declined from 22,940 in 1993 to 16,386 in 2001, their contribution to revenues increased from RM101.6 billion to RM115 billion;
- productivity per worker also increased from RM55,700 in 1993 to RM61,700 in 2001; and
- in 2005, wholesale establishments contributed RM144.3 billion of the sales turnover in the distributive trade sub-sector.

20.54 In terms of management capabilities and performance, although 98.4 per cent of the total establishments were Malaysian-owned, the foreign-owned firms were larger in size and were more advanced relatively, in terms of management approaches, operational systems, technology and productivity. In terms of revenue generation, the largest activity of the wholesale trade was in non-agriculture intermediate products, at 36.5 per cent, followed by agriculture produce, covering fruits and vegetables, livestock and poultry, food, and beverages and tobacco (26.8 per cent), and household goods (18.9 per cent).

(ii) Retail Trade

20.55 The retail trade business mainly comprises specialised retail outlets and non-specialised retailers. In 2001, out of the total 153,660 retail establishments (other than motor vehicles and restaurants), 41.9 per cent were involved in specialised stores, followed by non-specialised stores (33.1 per cent), such as provision stores, supermarkets, superstores, hypermarkets, convenience stores and mini markets. As at 2001, 99.7 per cent of the retail establishments were Malaysian-owned. Main features of the retail trade business are:

- specialised retail outlets form the majority of the establishments in the retail trade business. In 2001, they constituted 66.8 per cent of the total number of establishments of 153,660 and generated 71.4 per cent of the total revenues of RM71.7 billion in retail trade; and

- the non-specialised retailers are becoming increasingly visible, as reflected in the number of large hypermarket chain outlets and the sales revenues of provision stores. Although the number of departmental stores increased only marginally from 29 in 2000 to 33 in 2005, their total sales increased from RM638 million in 2000 to RM883 million in 2005. With the exception of mini-markets and provision stores, non-specialised retail outlets recorded declines in productivity.

20.56 Other types of retail trade business are franchising and direct selling. Increasingly, the retail trade business is transacted through e-commerce. The main features and development of these businesses are:

- the number of franchisors increased from 90 in 2000 to 204 in 2005. In terms of franchisees, the number increased at an average annual rate of 3.7 per cent, from 2,159 in 2000 to 2,584 in 2005. The franchisees were mainly involved in the distribution of household, food and automotive products;

- the number of direct selling licences registered a decline, from 772 in 1996 to 385 in 2001. From 2002 onwards, direct selling activities recorded an expansion, with the number of licences issued in 2005 totalling 569. The sales turnover from direct selling activities increased from RM4.5

billion in 2000 to RM5.3 billion in 2005. Direct selling activities were mainly in the distribution of locally manufactured products, such as herbal and other health supplements, handicraft, cosmetics, food products and footwear; and

- e-commerce expanded at an average annual rate of 81.8 per cent, from RM11.1 billion in 2003 to RM36.7 billion in 2005. This was largely attributed to the rise in e-commerce transactions in the business-to-business category during the period, from RM7.7 billion to RM29.3 billion, while the business-to-consumer category increased from RM3.4 billion to RM7.4 billion during the same period. In terms of businesses, more banks, bookshops, ticketing agents and cinemas offered their services through on-line transactions.

(d) Growth Prospects

20.57 The sub-sector is expected to register an average annual growth of 6.8 per cent during the period 2006-2010. Higher disposable incomes, rising urbanisation and changes in lifestyles among the population are expected to stimulate the growth in this sub-sector. Due to changes in demography, consumer behaviour and technology, the sub-sector is expected to undergo structural changes, which will have an impact on its future development, especially the traditional forms of businesses. The expected changes include:

- consolidation and integration of businesses to reap greater economies of scale;

- extension of linkages along the value chain; and

- promotion of new concepts in retailing and consumerism.

SECTION V CONSTRUCTION SERVICES

20.58 There are two categories of construction services:

- general construction works, comprising building and civil engineering construction; and

- specialist trade or works, consisting of, among others, mechanical works, electrical and air-conditioning works, and other specialist trade or works, such as plumbing, sewerage and sanitary works; painting works; carpentry, tiling and flooring works; and glass works.

(a) Present Status

20.59 The trend in the performance of the construction sub-sector in the last two decades was reflective of the country's economic conditions. The sub-sector registered rapid expansion when the economy was buoyant and a contraction when the economy underwent a slowdown. Prior to the financial crisis in 1997, the sub-sector was growing faster than the overall GDP growth, driven by strong demand for properties and substantial investments in public infrastructure. At its peak performance in 1997, the sub-sector registered value-added of RM9.5 billion, representing 4.8 per cent of the GDP. In 1998, following the financial crisis, the sub-sector contracted by 24 per cent. Subsequently, the sub-sector recorded a gradual recovery. Nevertheless, its contribution to the overall GDP decreased from 4.7 per cent in 1996 to 2.7 per cent in 2005.

20.60 An increasing number of Malaysian construction firms have undertaken construction activities in overseas markets, such as India, West Asia and South Africa. As at 2005, the Construction Industry Development Board (CIDB) had facilitated 76 Malaysian construction companies in undertaking a total of 316 projects, worth RM17.6 billion, in these overseas markets.

(b) Industry Structure

(i) Gross Output

20.61 The gross output of the construction services was substantially contributed by a few large construction firms, with an output capacity of more than RM100 million each. In 2002, these firms numbered 44 and contributed 24 per cent of the total value of gross output. In comparison, 3,447 construction companies recorded output capacity of less than RM10 million each, and 837 companies, between RM10 million and RM100 million (Table 20.10).

TABLE 20.10

PROFILE OF THE CONSTRUCTION SERVICES SUB-SECTOR, 2002

Output Capacity (RM million)	*Establishments*		*Gross Output*	
	Number	*Share (%)*	*(RM billion)*	*Share (%)*
Total	**4,328**	**100.0**	**41.7**	**100.0**
Less than 10	3,447	79.6	10.4	24.9
10 – 100	837	19.3	21.3	51.1
More than 100	44	1.1	10.0	24.0

Note: The survey covered only companies with value of work exceeding RM500,000
Source: Survey of Construction Industry 2002, Department of Statistics

20.62 Construction services are characterised by distinct market segments between the private and public sectors. Medium to high-cost residential housing and non-residential buildings are largely undertaken by the private sector. Low-cost housing, public amenities and infrastructure works are mainly undertaken by the Government. In 2002, of the total value of RM41.7 billion of construction works undertaken, 65.9 per cent were by the private sector. Civil engineering works recorded the highest contribution to gross output, at 38.4 per cent, followed by residential construction (23.7 per cent), non-residential construction (22.3 per cent) and special trades (15.6 per cent).

(ii) Value-Added and Employment

20.63 Value-added generated by the sub-sector grew steadily from RM4.4 billion in 1990 to RM14.8 billion in 2002. During the same period, salaries and wages increased from RM2.6 billion to RM9.1 billion, while the productivity of the sub-sector increased from RM14,361 to RM32,370 (Table 20.11). In 2005, the sub-sector employed a total of 759,600 persons, absorbing 7 per cent of the total workforce of the economy of 10.9 million.

TABLE 20.11

PERFORMANCE OF THE CONSTRUCTION SERVICES SUB-SECTOR

Year	*Gross Output*	*Costs of Inputs*	*Value-Added*	*Employment*	*Productivity*	*Salaries and Wages*
	(RM billion)			*(Persons)*	*(RM)*	*(RM billion)*
1990	11.9	7.6	4.4	305,547	14,361	2.6
1996	44.6	27.5	17.2	627,369	27,381	10.1
2002	41.7	27.0	14.8	455,663	32,370	9.1

Source: Survey of Construction Industry 2002, Department of Statistics

(c) Growth Prospects

20.64 Greater liberalisation of international trade will result in increased competition between domestic and foreign firms in Malaysia's construction sub-sector. The smaller general contractors are expected to merge into larger entities, with improved managerial and technical capabilities, to compete internationally. The Government has introduced a number of measures to encourage cooperation among construction service providers in bidding for projects in emerging markets, such as India, the People's Republic of China and West Asia. The measures include encouraging:

- mergers of smaller construction firms to increase their tendering capacity; and

- construction service providers to shift to cluster-based bidding strategy, which encompasses related services, such as architectural, engineering and financial, in bidding for larger projects.

SECTION VI EDUCATION AND TRAINING SERVICES

20.65 The education and training services sub-sector is an important supplier of qualified and trained workforce for industries and services. The sub-sector covers private higher education (college and university education, and commercial and other technical education) and adult and other vocational education (post-secondary non-tertiary education, tertiary education and skills training). The provision of education services has been traditionally undertaken by the Government. With liberalisation of the sub-sector in the mid-1990's, there is an increasing number of private higher learning and training institutions. Public funded institutions for education and training services include universities, teacher training colleges, polytechnics and colleges, and vocational institutions, while the private sector is involved in universities and colleges, and commercial and other technical institutions.

(a) Present Status

20.66 During the period 2003-2005, a total of 287 private educational establishments were approved by the Ministry of Higher Education, involving total investments of RM273 million. These establishments were largely Malaysian-owned (89.4 per cent), with an employment potential of 2,395 persons. The sub-sector is undergoing developments, involving several modes of trade:

- cross border trade (Mode 1) is growing in importance, as foreign institutions operate through e-learning to attract international students;

- investments or commercial presence (Mode 3), in the form of franchised programmes, for example, the setting up of branch campuses by foreign universities, as a form of business collaboration, is also a significant development; and

- on movement of natural persons (Mode 4), there is an increasing trend on the employment of foreign experts and professionals as lecturers, resource persons, trainers and speakers for conferences, workshops and seminars, on a short term or long term basis.

20.67 A survey, conducted in early 2005, revealed that:

- the most common types of education and training services in demand were short courses to enhance knowledge and upgrade skills on new technologies, methods, processes and technical standards, as well as updates on Government policies and local regulations;

- the main reasons for obtaining education and training services were to acquire specialised knowledge and have access to technology, as well as save cost through outsourcing of the education and training requirement;
- users preferred education and training service providers which possessed specialised knowledge, were strong in scientific or technical expertise and were capable of supplying high quality services at competitive prices; and
- revenues of the majority of the providers of education and training services were mainly from domestic sources. Training on business and management skills contributed the largest proportion of the revenues.

(b) Industry Structure

20.68 The liberalisation in the provision of education has facilitated private sector participation in education and training services. During the 1990's, local private universities and branch campuses of foreign universities and private colleges were established, with the latter conducting all modules of foreign degree programmes locally. A number of the providers of education and training services have gained international recognition. As at December 2005, three colleges have become public listed companies and been recognised as international education providers. Some of the internal courses of the private higher education institutions have also been accredited by internationally renowned universities.

(i) Private Education Institutions

20.69 Presently, there are 16 private universities, of which 11 are Malaysian-owned and five, branch campuses of foreign universities. In addition, there are 11 university colleges operating in the country. These institutions award bachelor degrees and higher qualifications, mainly in business, applied sciences, IT, engineering and medical disciplines. The presence of branch campuses of foreign universities from Australia and the United Kingdom (UK) provides additional choices in education and training for Malaysians. These establishments also contribute in enhancing private education services by attracting international students, who wish to pursue qualifications from prestigious universities of developed countries, to study in Malaysia. With internationally recognised qualifications, as well as relatively lower fees, education in these institutions is attractive and accessible to both Malaysian and international students.

20.70 Main features of private non-university status colleges and institutions are:

- growth in their number, from 354 in 1996 to a peak of 632 in 2000. They consolidated to 532 in 2005. These institutions vary, in terms of capacities, and facilities and programmes offered;
- some of them provide diploma and certificate courses for professional qualifications and franchised degree programmes of foreign universities.

They also conduct examinations, on behalf of professional bodies in Malaysia, such as Malaysian Institute of Accountancy, Institution of Engineers Malaysia, Institute of Bankers Malaysia and *Majlis Latihan Vokasional Kebangsaan* (MLVK); and

- presently, there are 26 private colleges which have been accredited by universities from the UK, Australia and France to conduct full degree programmes in Malaysia.

20.71 Enrolment in private higher education institutions increased from 50,840 students in 1995 to 341,310 in 2005. Of this, 38.5 per cent were in diploma courses, 32.4 per cent, in degree courses and 27.8 per cent, in certificate courses. In 2005, a total of 41,312 foreign students were enrolled in higher education institutions. The majority of the foreign students were from East Asia and the Pacific, followed by ASEAN, West Asia and Africa. In terms of the fields of studies, they were mainly in business and administration, arts, design and music.

(ii) Technical Education and Vocational Training

20.72 There are numerous private technical education and vocational training providers. These providers assume an important role in providing affordable courses to meet the demand in niche areas. The number of private technical education and vocational training providers accredited by MLVK increased from 316 in 2000 to 1,330 in 2005. The output of these training institutions increased from 8,302 students in 1995 to 33,111 in 2005.

(iii) Commercial and Professional Education

20.73 Specialised industrial, commercial and professional training and continuous professional education are provided by various professional bodies, trade associations and training organisations. These organisations focus on education and training in specialised skills and competencies, required by the profession or trade. They include the Federation of Malaysian Manufacturers Institute of Manufacturing, Malaysian Institute of Certified Public Accountants, Institution of Engineers Malaysia, Institute of Architects Malaysia and Malaysian Institute of Management.

(c) Growth Prospects

20.74 Major factors which will drive the future demand for education and training services include:

- **Demographic trends**

  Assuming a growth rate of population of 1.6 per cent per annum, it is estimated that the number of Malaysians of tertiary going age (17-23) will be 4 million by 2010 and 4.3 million by 2020;

- **Demand for education and training**

  Factors which will influence the demand for education and training services include the growth in personal incomes, increased awareness of lifelong learning to sustain employability and the demand for internationally recognised qualifications; and

- **New forms of learning**

  With the introduction of new forms of learning, such as e-learning, greater internet usage and adoption of e-commerce and its outsourcing options, the demand for the new forms of learning will increase the need for education and training services.

20.75 Advantages which Malaysia offers in the efforts to make the country a centre of excellence for education and training, and meet the increasing demand for education and training services by foreign students, include:

- competitive cost of education;
- urban living environment, which meets high living standards for foreign students;
- social-cultural advantage - being a multi-ethnic and multi-religious society, Malaysia appeals to countries which have similar social and religious characteristics (such as Indonesia, the People's Republic of China and West Asia); and
- political and economic stability.

SECTION VII HEALTH SERVICES

20.76 Health services cover the provision of healthcare services (such as hospital services and medical and dental services), social work services (for example, nursing homes), human health activities and veterinary services. The value chain of the health services sub-sector includes the manufacture, provision and distribution of pharmaceutical products, medical equipment and devices, health insurance, R&D, and education and training of medical personnel.

(a) Present Status

20.77 According to a study conducted in 2003 by the National Economic Action Council, the value-added of health services amounted to RM2.5 billion in 2000, constituting 1.2 per cent of the GDP. Public healthcare accounted for 60 per cent of the value-added and private healthcare, 40 per cent. During the period 1990-2000, private healthcare services grew at an average annual rate of 8 per cent, higher than the growth of public healthcare services, at 5.4 per cent. This was due to the liberalisation of the Government policy on healthcare services and a greater demand for such services by the higher

income group. In 1999, gross output in current prices of the private healthcare services (excluding allied health and nursing care, and social work services) was estimated at RM2.9 billion. This was largely contributed by private hospitals, including maternity homes, at 52.7 per cent, followed by medical services (41.7 per cent), dental services (5.2 per cent) and veterinary services (0.5 per cent).

(b) Industry Structure

20.78 Main features of the private healthcare services include:

- medical services constituted the bulk (2,688 establishments or 71.4 per cent) of the total number of establishments of 3,763, followed by dental services (20.5 per cent), hospitals (6 per cent) and veterinary services (2.1 per cent) (Table 20.12);
- there are two large private healthcare service providers. Together, they account for 24 per cent of the total number of beds in private hospitals. There are also six medium-sized private hospitals, with an average number of 286 beds per hospital, and 15 other smaller private hospitals, with less than 200 beds each;
- the private hospitals were concentrated in urban areas, in particular, Selangor and Federal Territory. In 2004, of the total private hospital beds in Malaysia, 44.9 per cent were in Selangor and Federal Territory, followed by Pulau Pinang (18.5 per cent), Johor (7.6 per cent), Perak (7.4 per cent) and Melaka (7.2 per cent). This indicated that private hospitals catered for the needs of the higher income group of the urban population, including expatriates; and
- medical services accounted for 48.8 per cent of the total employment, followed by hospitals (43.1 per cent).

TABLE 20.12

PROFILE OF THE PRIVATE HEALTHCARE SERVICES, 2001

	Number of Establishments	*Share (%)*	*Number of Workers*	*Share (%)*
Total	**3,763**	**100.0**	**43,437**	**100.0**
Medical services	2,688	71.4	21,223	48.8
Hospitals	224	6.0	18,709	43.1
Dental services	773	20.5	3,281	7.6
Veterinary services	78	2.1	224	0.5

Source: National Economic Action Council Report, 2003

20.79 While private hospitals comprised 62 per cent of the total number of hospitals, they accounted for only 22 per cent of the number of beds, reflecting their smaller size, compared with Government hospitals. However, private hospitals had a higher ratio of doctors to beds (10:19), compared with Government hospitals (10:40) (Table 20.13). During the period 2003 - 2005, a total of 25 private hospitals were approved by the Ministry of Health, involving total investments of RM89 million. All the establishments are wholly Malaysian-owned, with a potential employment of 745 persons.

TABLE 20.13

KEY INDICATORS OF THE HEALTHCARE SUB-SECTOR, 2004

	Public	*Private*	*Total*
No. of hospitals	131	218	349
No. of beds	37,280	10,542	47,822
Doctors	9,410	8,836	18,246
Doctors - beds ratio	10:40	10:19	10:26
Beds - population ratio	1:686	1:2,427	1:535
Dentists	1,111	1,439	2,550
Nurses	30,002	10,218	40,220

Source: Health Facts 2004, Ministry of Health

20.80 In comparison with selected countries, health services in Malaysia have yet to realise their full potential. This is reflected in terms of the lower contribution of healthcare expenditures to the GDP and the lower ratio of physicians per 100,000 population (Table 20.14).

TABLE 20.14

COMPARISON OF HEALTH SERVICES IN SELECTED COUNTRIES

Indicator	*Malaysia*	*Singapore*	*Rep. of Korea*	*Thailand*	*USA*	*UK*
Gross national income per capita, 2003 (US$)	3,880	21,230	12,030	2,190	37,870	28,320
Health expenditures, 2002 (% of GDP)	3.8	4.3	5.0	4.4	14.6	7.7
Population, 2003 (million)	24.8	4.3	47.9	62.0	290.8	59.3
Physicians, 2003 (per 100,000)	68.0	140.0	180.0	30.0	279.0	164.0
Life expectancy at birth, 2003 (years)	72.0	80.0	76.0	70.0	77.0	79.0
Infant mortality rate, 2001 (per 1,000 live births)	8.0	5.0	3.0	27.0	7.0	6.0

Sources: World Bank 2004, World Health Report 2005 and Human Development Report 2004

(c) Growth Prospects

20.81 The cost of healthcare in Malaysia is relatively lower, compared with many developed countries. With the formulation of appropriate policies and promotion, Malaysia has the potential to attract patients from high cost countries, as well as countries where the required healthcare facilities are lacking. Other major factors which will drive the future demand for healthcare services include:

- rising national income levels, which will allow for greater expenditures on the development of healthcare services;
- rising income levels, which will influence the demand for private and public healthcare services, including more sophisticated healthcare services and elective treatment;
- a more educated population, which will increase the consumer awareness on healthcare services and the demand for healthcare professionals;
- the availability and greater adoption of health insurance scheme, which will change the mode of payment and relieve part of the burden on public healthcare financing; and
- increasing demand for healthcare services by foreigners, as a result of the promotion on health tourism.

20.82 Healthcare service providers are increasingly utilising technology-based management systems and operations. Areas of such applications include:

- up-to-date IT services, which enable the outsourcing of IT support, covering activities such as help desk, network management and record keeping on patients;
- developing more outpatient services, such as home healthcare and ambulatory surgery centres, and clinics. These new services will be computerised for greater efficiency; and
- focus on specialised medical treatment through telemedicine, which offers new ways for physicians to exchange information, as well as provides remote monitoring of healthcare.

SECTION VIII TOURISM SERVICES

20.83 Tourism services comprise hotels, resorts, lodgings, tour services, travel agencies, restaurant and catering services, and transport companies. The scope of tourism services has progressed from supplying services on mass products and markets to more innovative tourism packages. These include eco-tourism, agro-tourism, edu-tourism, health tourism, sports tourism and

event organisation (meetings, incentives, conferences and exhibitions). Further growth is expected in these new niche markets, which include long and medium haul markets.

(a) Present Status

20.84 The tourism services sub-sector is a significant contributor to Malaysia's foreign exchange earnings. The sub-sector is the second largest source of foreign exchange earnings, after the manufacturing sector. For the period 1996-2005, the total tourist receipts increased by an average annual growth of 12.9 per cent, from RM11.3 billion in 1996 to RM32 billion in 2005. Per capita tourist expenditures expanded at an average rate of 4.4 per cent, from RM1,444 in 1996 to RM1,890 in 2005. The main components of the tourist expenditures were accommodation, shopping, and food and beverages.

20.85 During the period, the number of tourist arrivals increased from 7.1 million to 16.4 million, registering an average annual growth of 8.1 per cent. ASEAN continued to account for more than 70 per cent of the total tourist arrivals. Within ASEAN, Singapore and Thailand accounted for more than 60 per cent of the tourist arrivals. Tourist arrivals from West Asia increased from 31,371 in 1996 to 164,000 in 2005. The average length of stay of tourists increased from 5.4 nights in 1996 to 7.2 nights in 2005.

20.86 The sub-sector is also a major contributor to employment, providing 451,000 employment opportunities in 2005. The major source of employment was in the hotels and other lodging services, with employment steadily increasing by more than two-fold, from 39,000 persons in 1995 to 91,156 in 2005. It is projected that by 2010, a total of 520,700 direct employment opportunities will be created in the sub-sector.

(b) Industry Structure

(i) Hotels and Lodgings

20.87 In 2005, there were 2,256 hotels and other lodging places. Within the hotel segment, 4 and 5-star hotels accounted for 19 per cent of the total number of hotels, while 2-star and 3-star hotels comprised 36 per cent. The total number of hotel rooms grew from 94,744 in 1995 to 170,873 in 2005 and is projected to further increase to 247,008 by 2010. Of the hotels rated by the Ministry of Tourism, Kuala Lumpur has the highest proportion of luxury hotels, followed by Penang and Selangor. Sarawak has the highest number of budget hotels, followed by Sabah and Kuala Lumpur. For the period 2003-2005, a total of 85 hotels and tourism projects were approved by the Ministry of Tourism, involving total investments of RM4.9 billion, of which 36.7 per cent were from foreign sources. These projects are expected to provide potential direct employment for 7,296 persons.

20.88 During the IMP2 period, a total of 360 hotel projects were granted tax incentives, of which 309 projects involved the establishment of new hotels and 51 projects were expansion, refurbishment or modernisation of existing hotels. During the period, a total of 30 tourist projects, including both indoor and outdoor theme parks and safaris, were granted tax incentives. As a measure to encourage more domestic tourism, a total of 180 budget hotels (those rated 3-star and below) were granted tax incentives. Of the total investments of RM20.9 billion, RM18.4 billion, or 80 per cent, were for the establishment of new hotels.

(ii) Specialised Tourism Products and Services

20.89 Specialised tourism projects cover indoor and outdoor theme parks, safaris, agricultural parks and recreational camps. As at 2004, there were 19 specialised tourism projects in strategic locations, such as Genting Highlands, Fraser's Hill, Cameron Highlands and national parks. In addition, there are service providers in the tourism related services segment, for example, convention and exhibition centres, which is an important source of growth for the sub-sector, due to its capacity to attract high spending business travellers. In 2005, a total of 3,230 international conventions were organised in Malaysia, with foreign delegate arrivals of 775,286, an increase of 63.7 per cent from 473,486 arrivals in 2001. These international events generated about RM3 billion of tourist receipts from foreign business travellers in 2005.

20.90 To enhance the appeal of Malaysia as a tourist destination, efforts were continued to leverage upon the country's traditional advantages by promoting the country's cultural and natural heritage. Among specialised tourism products and services promoted included:

- meetings, incentives, conferences and exhibitions tourism;
- sports and recreational tourism;
- thematic events;
- eco-tourism;
- health tourism;
- education tourism; and
- agro-tourism.

(iii) Travel Agencies and Tour Operators

20.91 In tandem with the growth in hotels and other lodging places, the number of travel and tour establishments had increased from 744 in 1990 to 2,383 in 2005. There are also 6,000 registered tour guides in Malaysia. In 2005, a total of 20,610 licences were issued to tour coach and car rental operators.

(c) Growth Prospects

20.92 The future direction and prospects of the sub-sector largely depend upon the continued attractiveness of Malaysia as tourist and business destinations and the effectiveness of the various initiatives and programmes in promoting tourism. Tourist arrivals in Malaysia are expected to reach 24.6 million by 2020, while tourist receipts are expected to reach RM59.4 billion.

(i) International Tourism

20.93 According to the World Tourism Organisation, international arrivals worldwide are expected to reach 1 billion by 2010. International trade in tourism services largely takes place among developed countries, and is mainly intra-regional in nature. Geographical proximity to target markets is one of the most important factors in the export of tourism services. Nevertheless, the cheaper cost of air travel (for example, through chartered flights and low cost carriers), especially to and from long-haul markets, has facilitated the development of new markets away from developed countries. Therefore, air access becomes an important driving force behind the development of international tourism.

20.94 Tour packages catering for specific niche markets have become increasingly important options, because such packages encourage the flow of high value tourists. Therefore, innovative tourism product packages, such as eco-tourism; health tourism; edu-tourism; agro-tourism; and meetings, incentives, conferences and exhibitions tourism; will become increasingly important to increase the number of inbound tourists and their length of stay, as well as tourist receipts. This will necessitate further investments in both luxury and budget hotels, and lodging places to promote these packages. The provision of such hotels and lodging places will also encourage travel agencies, tour operators and airline companies to develop and provide these packages.

(ii) Domestic Tourism

20.95 Domestic tourism will continue to be an important component of the country's tourism services sub-sector, to complement the growth of inbound tourists. The number of domestic tourism trips increased by 30.1 per cent, from 12.3 million in 2000 to 16 million in 2005. Similarly, domestic hotel guests more than doubled, from 13.6 million to 29 million. The introduction of low cost carrier was a major factor in the growth of domestic tourism. In addition, the implementation of the five-day work week contributed to the increase of domestic tourists. Emphasis will continue to be given to the promotion of domestic tourism, including enhancing existing facilities, making promotional materials readily available to domestic tourists and promoting tourism as a regular activity.

SECTION IX INSTITUTIONAL SUPPORT

(a) Ministry of International Trade and Industry and its Agencies

20.96 Beginning 2004, the Ministry of International Trade and Industry (MITI) and its agencies, namely, Malaysian Industrial Development Authority (MIDA), Malaysia External Trade Development Corporation (MATRADE), Small and Medium Industries Development Corporation (SMIDEC) and National Productivity Corporation (NPC), have been given the responsibility to promote investments and exports of services, in coordination with other relevant ministries and agencies, trade organisations and industry associations.

(i) Malaysian Industrial Development Authority

20.97 MIDA has been given the task to become the single window for the promotion of investments and facilitation of the development of selected services sub-sectors in Malaysia. Major aspects of MIDA's responsibilities include:

- being the first point of contact for investors for information on the services sector in Malaysia;
- identifying and promoting specific services activities;
- evaluating applications for tax incentives for the promoted services activities;
- making available relevant guidebooks for selected services activities;
- coordinating the promotion of identified activities, and providing assistance to investors in the implementation of their projects;
- collating statistics on investments in the services sector; and
- recommending policies and incentives for the identified services activities.

20.98 In line with the Government's decision that MITI coordinates the work with other relevant ministries and agencies to report on statistics on investments for all economic sectors, MIDA has been given the task to develop a comprehensive database on investments in all sectors, including the services sector. MIDA, in cooperation with 18 ministries and 24 agencies, had compiled statistics on private investments approved in new and existing establishments in all sectors of the economy for 2003 to 2005. To promote investments in the identified services activities and disseminate up-to-date information to the business community, MIDA had published two guidebooks, namely, Guidebook on Key Services Supporting the Manufacturing Sector and Guidebook on Business and Professional Services, in 2005 and 2006, respectively. These guidebooks contain relevant information, in terms of present policies, procedures, incentives and facilities for the identified services activities and contact points of the relevant Government ministries and agencies involved.

(ii) Malaysia External Trade Development Corporation

20.99 MATRADE, in consultation with National Professional Services Export Council (NAPSEC) and other relevant agencies and professional bodies, promotes the export of services, such as:

- construction and related services, including engineering and architecture;
- healthcare services;
- IT services, including software development;
- telecommunications;
- franchising services;
- oil and gas services;
- environmental services;
- port management; and
- power generation.

20.100 MATRADE facilitates the expansion of exports of services, including professional services, through measures such as:

- developing export strategies and implementing promotion programmes, such as participation in relevant international trade fairs, specialised marketing missions, and trade and investment missions;
- administering the Export Services Fund to support Malaysian professional service providers in their export efforts;
- establishing business linkages, and monitoring and disseminating market intelligence and information among its network of offices overseas;
- compiling database and directories on export-ready Malaysian professional service providers; and
- facilitating exports through developing database on market access issues and regulations affecting the export of professional services, and mutual recognition agreements (MRAs).

(iii) Small and Medium Industries Development Corporation

20.101 SMIDEC has expanded its scope and financial assistance programmes to include the services sector. The extension of the assistance programmes to SMEs in the sector is for capacity building, especially in the areas of training and skills development, adoption of ICT and human resource development (HRD). Through the Grant for Enhancing Marketing Skills, SMEs in the

sector are encouraged to train their employees in marketing skills through short-term courses in areas such as marketing strategies and planning, pricing, distribution, branding, merchandising and customer services. To encourage companies to adopt ICT, the Soft Loan Scheme for ICT Adoption has been expanded to cover the purchase of softwares and hardware related to the services sector:

- enterprise resource planning;
- tracking system for the haulage industry;
- automated store management system and inventory management system in warehousing and forwarding;
- point of sales and customer relations management for the distributive trade; and
- computer hardware and other peripherals.

20.102 In respect of HRD, companies in the sector are assisted to:

- undertake courses for certification in skills required by the industry;
- train existing trainers attached with regulatory bodies at international institutions on new courses required by the services-related associations; and
- undertake compulsory examinations, for example, examination by the Customs Department for freight forwarders.

(iv) National Productivity Corporation

20.103 NPC undertakes programmes towards enhancing the productivity of the services sector through a number of initiatives on total factor productivity (TFP). Among the programmes are:

- undertaking research activities on the present level of productivity, quality and competitiveness of selected services sub-sectors to provide information and data for policy planning and formulation towards higher productivity and quality;
- enhancing the development of human resources and organisational competitiveness through training and systems development in quality systems, productivity and quality management and performance measurement systems; and
- nurturing productivity and quality culture to enhance creativity and innovation, and promoting the sharing of information on organisational excellence and best practices.

(b) Institutional Support for the Sub-Sectors

(i) Business and Professional Services

20.104 Presently, business services and non-accredited professional services are subject to minimum Government regulations. The sub-sector is open to both local and foreign interests, except where they relate to public health, safety and morals. In respect of accredited professional services, they are governed by 22 professional bodies, which include:

- Malaysia Institute of Accountants, a statutory body under the Ministry of Finance, which imposes mandatory membership on all certified public accountants. It controls and monitors the registration and development of the profession;

- Bar Council, a statutory body which implements and monitors the policy set by the Government on legal services. Each advocate and solicitor, who holds a valid Practising Certificate, is automatically a member of the Bar Council;

- Board of Engineers, a statutory body under the Ministry of Works, which registers and licenses the engineering profession. The private sector, led by the Institute of Engineers and Association of Consulting Engineers Malaysia, monitors the engineering practices of their members; and

- Board of Architects, a statutory body under the Ministry of Works, which registers and licenses architects. All Malaysian architects need to register with the board to practise.

20.105 To assist in the promotion of the export of the professional services, the Government has established NAPSEC and the Professional Services Development Corporation (PSDC). NAPSEC contributes in the formulation and review of national export strategies and promotion programmes, while the PSDC assists in the capacity and capability building of Malaysian professional service providers.

(ii) Distributive Trade Services

20.106 Local companies undertaking distributive trade activities, except hypermarkets, do not require approval from the Ministry of Domestic Trade and Consumer Affairs. However, all proposals involving foreign participation require licensing by the ministry, under the Guidelines on Foreign Participation in the Distributive Trade Services. The guidelines stipulate that foreign investors intending to set up hypermarkets, superstores, departmental stores, speciality stores and other distributive trade, including expansion, will need to comply with the minimum capital investment requirement of between RM1 million to RM50 million, with minimum Bumiputera equity of 30 per cent.

20.107 Franchise businesses are governed by the Franchise Act, 1998. A franchisor will need to register its franchise with the Registrar of Franchises under the Ministry of Entrepreneur and Cooperative Development. Foreign investors, intending to set up franchise businesses, are allowed to hold up to a maximum of 70 per cent of the equity, with the balance of 30 per cent to be allocated to Bumiputera interests.

20.108 Direct selling businesses, which cover multi-level, single-level and mail order businesses, are governed by the Direct Selling Act, 1993 under the Ministry of Domestic Trade and Consumer Affairs. Intending operators are subject to a minimum capital requirement and equity conditions.

(iii) Construction Services

20.109 The Ministry of Works is responsible for the development of projects in the public sector, including the privatisation of road and highway construction and maintenance. The ministry also assists Bumiputera entrepreneurs and is involved in the upgrading of the skills of workers in the construction sub-sector.

20.110 CIDB, a statutory body under the ministry, is responsible for promoting the development and expansion of the construction services sub-sector. Apart from its advisory functions, CIDB is also responsible for promoting the export of construction services, encouraging the standardisation and improvement of construction techniques and materials, promoting quality assurance and coordinating the training needs of the sub-sector. CIDB, with the collaboration of the industry stakeholders, has formulated the Construction Industry Master Plan, 2006-2015, which will position the industry to be more resilient and robust to face future challenges, both in the domestic and foreign markets.

20.111 The CIDB Act, 1994 requires persons or companies, intending to undertake any construction activities, to register with CIDB. In addition, contractors who wish to undertake construction work in the public sector, need to register with *Pusat Khidmat Kontraktor* under the Ministry of Entrepreneur and Cooperative Development. Enforcement of laws related to safety, standards and environment falls within different jurisdictions and authorities. The responsibility of ensuring that construction projects do not adversely affect local surrounding areas and the environment rests with the respective local authorities. Compliance with health and safety rules at the workplace is under the jurisdiction of the Ministry of Human Resources, while compliance with structural and building standards is under the jurisdiction of the Ministry of Works.

(iv) Education and Training Services

20.112 The Ministry of Higher Education was established in March 2004, with the responsibility of planning on the development and formulation of policies and

programmes on higher education in both the public and private sectors. Institutions involved in higher education, such as universities, polytechnics and community colleges, as well as the National Accreditation Board (LAN) and the National Higher Education Fund Corporation, are regulated by the ministry. In 2003, the Private Higher Educational Institutions Act, 1996 was amended to provide for the establishment and upgrading of private universities, university colleges and branch campuses of foreign universities. Under the Act:

- the establishment and operation of private higher educational institutions require the approval of the Ministry of Higher Education;
- the type of courses to be offered will be approved by LAN, before the issuance of registration by the ministry; and
- private higher education institutions of international status are allowed to hold up to 49 per cent foreign equity, while 51 per cent are to be allocated to Malaysian interests, including 30 per cent to Bumiputera interests.

20.113 In December 2005, the Malaysian Qualification Framework was developed to provide a platform for quality assessment in higher education and a reference point for standards in programmes and qualifications. In respect of incentives, presently, companies providing industrial technical and vocational training are eligible for Investment Tax Allowance of 100 per cent for 10 years. This allowance can be offset against 70 per cent of the statutory income for each year of assessment.

(v) Health Services

20.114 Private hospitals, including nursing homes and maternity homes, are under the purview of the Ministry of Health. These private health institutions are governed by the Private Hospital Act, 1971. Applications to establish private hospitals are processed by the Department of Health of the respective states. They are also required to comply with the Private Hospital Regulations, 1973 in undertaking their activities. Foreign participation is allowed, subject to present equity guidelines.

(vi) Tourism Services

20.115 The Ministry of Tourism regulates the overall development of the tourism and tourism related services sub-sector, through the Tourism Industry Act, 1992, Malaysia Tourism Promotion Board Act, 1992, and related rules and regulations. In addition, tourism services in Sabah and Sarawak are regulated by the Sabah Tourism Corporation Enactment, 1981, and Sarawak Tourism Board Ordinance, 1994. Tourism service providers, such as hotel owners and operators, restaurants, travel agencies, tour operators and tour guides services, are

governed by these acts and regulations. Generally, there are no restrictions on inbound travellers, coming as tourists and business persons to the country.

20.116 For the establishment of specialised tourism projects and the expansion of 4-star to 5-star hotels, 100 per cent foreign equity is allowed for the first five years. From the sixth year of operation, foreign equity allowable will be 51 per cent, while Bumiputera equity of 30 per cent will be required. Specialised tourism projects granted incentives are required to incur capital expenditures of at least RM10 million. Companies granted incentives to establish 1-star to 3-star hotels are required to have at least 70 per cent equity being held by Malaysians, including 30 per cent by Bumiputera interests.

SECTION X CHALLENGES

GENERAL CHALLENGES

(a) Outsourcing

20.117 Global developments point towards convergence between manufacturing and services. Services are increasingly being embodied in manufactured goods. Developments in ICT have contributed to the restructuring of both the manufacturing and services industries.

20.118 Companies have, over the years, increased their reliance on specialised externally supplied expertise for a wide range of services, such as legal, accounting, computing, human resource management, maintenance, advertising and marketing. Firms resort to outsourcing to:

- focus on their core competencies;
- reduce costs;
- exploit economies of using specialised external expertise; and
- improve performance through access to a wider range of knowledge-based skills and technologies, better management and work practices and better use of capital.

The Malaysian services sector will need to enhance its level of competitiveness to benefit from these outsourcing opportunities and be able to compete with foreign service providers.

(b) Coordinated Development and Promotion

20.119 A more coordinated development and promotional approach will be required to support the further development of the services sector as a major source

of growth. Coordination will need to involve the relevant ministries and agencies responsible for the developmental, promotional and regulatory aspects of the services sub-sectors.

(c) Competitiveness through Progressive Liberalisation

20.120 Generally, Malaysian-owned service providers are less competitive, compared with international companies or MNCs. Areas which require further improvements include knowledge and skills upgrading, enhancement in the application of ICT and other technologies and capacity building to respond to new market requirements. Although Malaysia has maintained its position as the third most attractive business location for offshoring activities in 2004 and 2005, in the short and medium terms, there will be stronger competition from other lower cost countries. As Malaysia moves towards providing high value-added services, greater competition is also expected from other developed countries. In view of the extensive linkages of the services sector to the rest of the economy and its potential contribution to growth, the pace of development of the sector needs to be accelerated and its competitiveness enhanced. This can be achieved through progressive liberalisation.

(d) Opening Up of Market

20.121 Presently, negotiations on market opening of the services sector are being undertaken under the GATS, AFAS and FTAs. Further liberalisation of the sector will need to take into account the following considerations:

- Malaysia's commitments under AFAS. Roadmaps with specific schedules of liberalisation commitments, involving all sub-sectors and modes of supply, need to be developed to achieve the objective of the free flow of services within the ASEAN region by 2015;

- domestic firms need to seek new markets and new foreign alliances or adopt market entry strategies in a deliberate and proactive manner, while raising their competitiveness in various ways; and

- financial support provided to foreign service providers from their home countries may affect the competitive position of domestic firms, when tendering for domestic projects. Such financial assistance include low cost funds, R&D grants and loans, and administrative support.

While trade liberalisation can encourage Malaysian firms to be efficient and competitive, progressive and selective liberalisation, with conditionalities, may be necessary to enable Malaysian firms to build their capacities, competencies and capabilities to be able to compete with foreign firms.

(e) Business Opportunities through Mutual Recognition Arrangements

20.122 Efforts on MRAs will need to be intensified, on a bilateral and regional basis, to facilitate local service providers in establishing offshore operations in areas such as business and professional services, construction and tourism services. The MRAs will enable and facilitate the movement of Malaysian professionals, skilled labour and talents into ASEAN and other countries.

(f) Effective Private Sector Institutional Support

20.123 Although there are more than 50 associations and professional bodies representing the services sector, generally, they lack resources to support the future development of the sector and are unable to form an effective representation of their interests to the Government and in international negotiations. For the sector to assume a bigger role in economic development, there is a need for an umbrella body to represent the interests of the sector effectively. In developed countries, services industry operators, including professional bodies, have established an organisation, called Coalition of Services Industries, to represent their interests to their governments.

(g) Data Limitations

20.124 There is a need for current and relevant data on services, required for planning, to be collated. The non-availability of such data is largely due to the following factors:

- the sector being defined in varying contexts, such as commodity, product or output;
- only selected major services are surveyed regularly by the Department of Statistics, and the data collected are not readily available, except on request;
- different approaches used in the industry and output coverage of the National Accounts, including the BOP, have made comparison and analysis difficult;
- the sectoral or product breakdown in the Central Product Classification, used in international negotiations, is more detailed, in comparison with the classification presently used in the statistics on the BOP, approvals on FDIs and surveys on production indices. As a result, the statistics on the services trade are under-estimated, because of the lack of data, with respect to the four modes of the supply of services; and
- available statistics on the six sub-sectors of services, including 'Other Services', are too broad-based.

20.125 Presently, planners, policy formulators and implementors are constrained by problems relating to definitions, methodology, comparability and consistency

of information and data. Accurate, consistent and comprehensive data on the sector are important in the formulation and implementation of strategies and policies for the further development of the sector.

SPECIFIC CHALLENGES FOR THE SUB-SECTORS

(a) Business and Professional Services

(i) Exports and Outward Investments

20.126 The business and professional services sub-sector, which includes accredited and non-accredited professional services, is diverse, with varying capacities and capabilities. A large number of the accredited professional services have been content with relying on the domestic market. For example, ownership in some accredited professional services is exclusively local, and firms rarely venture abroad. In view of the limited domestic market, Malaysian firms will need to expand their operations abroad to sustain their growth and development. An avenue for Malaysian service providers to obtain information on business opportunities worldwide is by registering with international organisations. Such information will assist the providers in assessing their capabilities and improving their competitiveness in entering international bids. Presently, there is a lack of interest among Malaysian service providers to register with international organisations.

20.127 Globalisation and liberalisation, through bilateral and multilateral trade agreements, pose a challenge, as well as create opportunities, to Malaysian business and professional services providers. Business and professional services which are considered export-ready, need to be encouraged to export their services or undertake outward investments, through joint ventures or strategic alliances. To increase their presence in the regional and global marketplace, they also need to consider consolidations, through mergers and acquisitions (M&As).

(ii) International Certification and Accreditation

20.128 International standards and certifications are important to facilitate the professional service providers in gaining international recognition and exporting their services. Malaysian professional service providers will need to acquire such standards and certifications.

(b) Distributive Trade

(i) Competition with Foreign Distributors

20.129 The present guidelines on foreign participation in the distributive trade services are intended to safeguard the interest of small and medium local distributors, especially retailers, who are unable to compete with large firms. A study conducted in 2004 to assess the impact of foreign hypermarkets indicated

that small retailers, with limited resources, were at a disadvantage, as they were unable to compete on price, quality or product assortment, which were important factors to consumers in their store patronage decision. Therefore, the major challenge for small retailers is to restructure and be innovative in their business approach. There is a need to promote the growth of local service providers in the distributive trade, for example, through partnerships and strategic collaborations, which will facilitate the entry of the local service providers into foreign markets. There is also a need for initiatives to enable smaller retailers to co-exist with the larger establishments.

(ii) Changing Pattern of the Distributive Trade

20.130 In view of the changing structures of the distributive trade services sub-sector, efforts are required to assist the local distributors to adjust to the changes. Data compilation and research on various aspects of the distributive trade are necessary for the continued development of the sub-sector. There is a need to foster closer linkages with manufacturing and other economic activities.

(iii) Linkages with Global Supply Chains

20.131 The globalisation of trade and investment activities has led to the establishment of manufacturing systems, where sections of production activities along the value chain are located in different countries. To benefit from this process, Malaysian companies will need to be involved in the global supply chains in the distributive trade services sub-sector. Hence, there will be a need to formulate strategies and measures to improve the competitiveness of Malaysian-owned service providers to be part of the global supply chains.

(iv) E-Commerce in the Distributive Trade

20.132 Wholesalers, retailers and other key operators in the distributive trade will need to enhance their capacities, in particular, through increasing the utilisation of ICT. In this respect, there is a need for greater participation of the service providers in programmes which have been initiated, such as the RosettaNet and Central Item Registry Project (to store common information on products in a central database).

(c) Construction Services

(i) Methods and Practices

Multi-Layered Sub-Contracting

20.133 The prevalent practice in the construction sub-sector is multi-layered sub-contracting. However, this practice may have reduced the share of business and profitability of some contractors, as well as the quality of the output and services rendered.

Labour-Intensive Construction Methods

20.134 The sub-sector lacks standardisation of the designs and materials and other labour-saving construction methods used. There is a need for a major rationalisation of the standards within the sub-sector. The overall focus on costs has affected the adoption of technology in the sub-sector. Cost and budget constraints, together with the availability of low cost foreign labour, have compelled some contractors in the sub-sector to opt for standard architectural designs of lower quality and labour-intensive construction methods. This has hampered productivity and quality improvements in the long run. There is a need to further promote and encourage the use of the Industrial Building Systems, a construction process which utilises techniques, products, components or building systems, involving prefabricated components and on-site installation. Presently, capital expenditures on the purchase of moulds used in the production of Industrial Building Systems components, are eligible for Accelerated Capital Allowance for a period of three years.

(ii) Low Entry Barrier

20.135 Low barrier to entry has created excess capacity in the sub-sector, particularly among Grade One contractors, with bidding capacity of not more than RM200,000. Presently, of the 71,503 contractors registered with the CIDB, 58 per cent are Grade One contractors. There is a need to restructure the entry level requirements and the registration system of contractors to encourage the creation of larger contractors, which will promote greater efficiency in the sub-sector.

(iii) Provision of Total Solutions

20.136 Malaysian construction companies have not been able to provide total solutions (including financing package and equipment), when competing for overseas projects. To be able to compete with foreign firms in tendering for both domestic and foreign projects, there is a need to enhance value-added in the support activities, such as building materials, tooling, heavy equipment and machinery. There is also a need to complement the support services, with the provision of a comprehensive financial package, to strengthen the bargaining position of Malaysian bidders.

(d) Education and Training Services

(i) Supply of Critical Skills

20.137 To produce the required human resources in sufficient quantity and quality to support the growth areas in the IMP3 for the manufacturing and services sectors, private higher education institutions will need to be encouraged to participate in developing the critical skills required by industry. The areas include software engineering, biomedicine, chemical engineering and international marketing.

(ii) Skilled and Technical Trainers

20.138 While the Government had established training institutions for skilled and technical trainers, there is still a shortage of technical trainers in key areas required by industry. Greater private sector participation is required to produce the skilled and technical trainers. In the medium to long terms, Malaysia will need to develop and increase R&D activities to meet industry requirements and promote the country as a regional centre of educational excellence in research. Hence, there is a need for private higher education institutions to strengthen and widen their linkages with reputable foreign universities and research institutions. There is also a need to simplify immigration requirements and procedures to facilitate the employment of foreign trainers to support Malaysia's move to become a regional centre for education and research.

(iii) Capabilities in Science and Technology

20.139 The research and innovation capabilities of local institutions of higher learning need to be strengthened to facilitate the nurturing of an innovative society, with greater capabilities in science and technology. Collaboration in research between private higher education institutions and industries, which is presently lacking, needs to be intensified.

(iv) Recognition of Domestic Qualifications

20.140 International recognition of local qualifications is an important quality benchmark in the education services sub-sector. Presently, many degree qualifications awarded by local educational institutions are not recognised internationally. Similarly, not all professional courses are recognised by international professional bodies. Therefore, there is a need to seek internationally recognised accreditations for a greater number of the local qualifications.

(v) Competitiveness to Attract International Students

20.141 There is considerable potential in increasing the number of foreign students in the private higher educational institutions. Malaysia is facing competition from neighbouring countries to attract foreign students. Apart from seeking international accreditations, there is a need to focus on continuous upgrading of the quality and standards of the education services and intensify measures on information dissemination, publicity and promotion. An appropriate branding for Malaysian higher education services is needed for image building.

20.142 There is a need to address areas of concern by foreign students, such as welfare, social support services and counselling. There is also a need to improve and streamline immigration rules and procedures to facilitate the entry of foreign students. A coordinated approach needs to be undertaken between Government agencies and agents of education institutions to facilitate the entry of foreign students.

(e) Health Services

(i) Shortage of Medical Professionals

20.143 There is a shortage of medical professionals in the health and allied health profession. The shortage will need to be addressed, since it affects the quality of the service delivery in the sub-sector. Short-term measures have been undertaken to allow the recruitment of foreign doctors and encourage foreign-based Malaysian doctors to return to Malaysia under the 'Brain-Gain' programme, as well as grant permission to Government doctors to provide part time services to private hospitals.

(ii) Establishment of Foreign Firms

20.144 Presently, there are restrictions on the establishment of foreign firms in the health sub-sector. Nevertheless, the expansion of the private health segment has been accompanied by the partial opening of the market to foreign firms, with a view to reducing costs, relieving the burden of the public sector, introducing new technologies and promoting the export of health services.

(iii) Data Collection

20.145 Information and data on private sector participation in the entire value chain of the health services sub-sector are inadequate. There is a need to address this constraint, through the collation of comprehensive information and data on private healthcare services on a regular basis.

(f) Tourism Services

(i) Dependency on Short-Haul Tourists

20.146 ASEAN countries accounted for 76.8 per cent of the total tourist arrivals in 2005. There is a need to intensify the promotion of Malaysia as a tourist destination in niche markets, such as the People's Republic of China, Japan, Australia, the UK, Taiwan, India and West Asia, in the short term, and Europe and the USA, in the medium term.

(ii) High Value Tourism

20.147 Malaysia will need to diversify from the mass tourism market towards more targeted high-value tourism. Malaysia has comparative advantages in promoting agro-tourism; eco-tourism; health-tourism; edu-tourism; and meetings, incentives, conferences and exhibitions tourism. Malaysia also implements 'Malaysia My Second Home' programme as a tourism product, to attract foreign citizens to stay longer in Malaysia. The comparative advantages will need to be translated into attractive tourism packages targeted at developed countries, such as Australia and the European Union (EU), and emerging economies, such as the People's Republic of China, ASEAN countries and West Asia.

20.148 The tourism packages will need to be complemented by comprehensive end-to-end services. For example, in the case of health tourism, the end-to-end package will include visa and travel arrangements, accommodation for patients and family members, and recuperation and home care facilities. Similar end-to-end packages will need to be extended to other tourism products, such as edu-tourism; sports tourism; and meetings, incentives, conferences and exhibitions tourism. Presently, the country possesses tourism facilities of international quality. To enable the use of the facilities to be optimised over a long period, there is a need to enhance the maintenance culture and professionalism among the operators of tourism projects and service providers.

(iii) Foreign Investments and International Networks

20.149 Foreign ownership of tourism related businesses, which is presently allowed up to 49 per cent, has, to some extent, limited Malaysia's participation in the international tourism chain. The requirement has also resulted in a low level of foreign participation in the sub-sector. There is a need to review the requirement to encourage greater involvement of international tourism service providers in the sub-sector and enhance Malaysia's participation in the international tourism chain.

SECTION XI STRATEGIES AND POLICIES

TARGETS

20.150 In the IMP3, the services sector is expected to assume a major role in driving the growth of the economy. Separate targets have been set for the non-Government and construction components of the sector:

Growth

- non-Government services are targeted to grow at an average annual rate of 7.5 per cent; and
- construction services, at 5.7 per cent;

Contribution to the GDP

- non-Government services are expected to contribute 59.7 per cent to the GDP by 2020; and
- construction services, 2.5 per cent; and

Investments

- non-Government services are targeted to attract investments amounting to RM45.8 billion per annum; and
- construction services, RM12.6 billion (Table 20.15).

TABLE 20.15

INVESTMENT AND TRADE TARGETS FOR NON-GOVERNMENT AND CONSTRUCTION SERVICES

Investments/Trade	*2006-2010*	*2011-2015*	*2016-2020*	*2006-2020*
	(RM billion[1])			
Total private investments	**137.0**	**270.9**	**469.2**	**877.1**
Non-Government services	92.6	210.7	384.4	687.7
Construction	44.4	60.2	84.8	189.4
Total average annual private investments	**27.4**	**54.1**	**93.9**	**58.4**
Non-Government services	18.5	42.1	76.9	45.8
Construction	8.9	12.0	17.0	12.6
Total net services trade at end period	**-4.6**	**42.7**	**129.2**	**129.2**
Exports	118.7	210.8	349.9	349.9
Imports	123.3	168.1	220.7	220.7

Note: [1] In current prices
Source: Ministry of International Trade and Industry

STRATEGIC THRUSTS

20.151 To create an efficient and competitive services sector and accelerate its growth, five overall strategic thrusts have been set:

(1) enhancing the competitiveness, productivity and efficiency of the service providers;

(2) developing the capacities and capabilities of the targeted sub-sectors;

(3) positioning Malaysia to be a regional centre for selected services, namely, distribution, tourism, education, health, and identified business and professional services;

(4) creating a more conducive business environment for investments and exports of services; and

(5) strengthening the institutional support in the development and promotion of the identified sub-sectors.

20.152 The strategic thrusts will guide the overall direction and development of the services sector and the targeted sub-sectors. Elaboration of the first three thrusts will be covered in the targeted sub-sectors. Thrusts four and five are applicable for the entire sector. With the formulation and implementation of the policy initiatives and measures, Malaysia is expected to benefit from the impact of investments and exports of services. The deficit in the BOP for invisibles is expected to be reduced, through the greater utilisation of domestic services and further increase in the export of services.

POLICY MEASURES APPLICABLE FOR THE ENTIRE SECTOR

(1) CREATING A MORE CONDUCIVE BUSINESS ENVIRONMENT

(a) Enhancing the Access to Financing

20.153 The Government will consider providing the financial support to assist Malaysian companies in undertaking services-related ventures abroad. Closer cooperation and collaboration between the financial institutions and service providers will be encouraged. To enhance the access of the sector to financing, two funds have been established under the Ninth Malaysia Plan (RMK-9), 2006-2010, namely the Export Services Fund and Services Development Fund for SMEs. Banking institutions will be encouraged to collaborate with the Export-Import Bank of Malaysia Berhad (EXIM Bank) to complement the facilities provided by the bank.

(b) Strengthen Private Sector Representation

20.154 To promote the growth of the sector, the Government will encourage private sector associations and professional bodies to set up an umbrella body, with representatives from the various associations of the sector. Main functions of the umbrella body include:

- promoting the development of a more efficient and 'service friendly' environment;
- providing a focal point for liaison with the Government;
- making recommendations or submissions on behalf of members;
- contributing towards the development of bilateral, regional and multilateral rules for trade in services; and
- establishing and developing links with counterpart organisations.

(2) STRENGTHENING THE INSTITUTIONAL SUPPORT

(a) Coordinated Development Programmes

20.155 The Government will establish the Services Industry Development Council. The council will comprise representatives from relevant ministries and agencies, industry representatives and members of the academia. The council will be responsible for:

- providing leadership in the overall development of the sector, as well as the coordination and implementation of policies and programmes, covering areas such as liberalisation initiatives, institutional support, infrastructure, and rules and regulations;

- monitoring the implementation of programmes and activities of the respective ministries, State Governments and authorities involved in the development and promotion of the sector; and
- ensuring that the development of the sector is in line with the overall strategic thrusts of the IMP3.

20.156 Programmes of the council will include:

Services development

The focus will be on developing, reviewing and improving:

- the regulatory framework and processes, based on the overall objectives and priorities of the sector;
- coordination between agencies, especially for the different services sub-sectors;
- focal points within the private sector, which will be involved in the targeted services activities; and
- investment plans, including support and promotion needed for capacity building.

Services institutions

The focus will include enhancing:

- existing training institutions to improve knowledge and skills in the sector; and
- the capacity to undertake data collection and analysis, and R&D, including the development of technologies and innovations.

Services infrastructure

Infrastructure requirements of the services sub-sectors will be identified, planned and provided for to supplement the existing infrastructure. Areas of focus include:

- examining the adequacy and efficiency of the existing infrastructure, including telecommunications networks and other facilities and their connectivities, to ensure high standards of service delivery;
- providing adequate physical infrastructure, for example, transportation; and
- improving the standard of facilities and their maintenance in public, tourist and recreation places in the country, taking into consideration the special needs of users, such as the disabled, aged and infants.

Liberalisation of trade in services

The following approaches will be adopted:

- sub-sectors which are competitive will be targeted for liberalisation and the scope, coverage and timeframes for liberalisation will be drawn up; and

- progressive liberalisation will be considered in other sub-sectors to enhance their competitiveness.

(b) Expanding the Role of the Ministry of International Trade and Industry and its Agencies

20.157 MITI has been given the responsibility to develop and promote the services sub-sectors which are presently not under the purview of any regulatory ministry and agency. The formulation of strategies, policies and programmes for the development and promotion of the sub-sectors will involve MITI and its agencies (MIDA, MATRADE, SMIDEC and NPC), together with other relevant ministries and agencies. The institutional capacity of MITI and its agencies will be enhanced to enable the organisations to undertake the expanded role effectively.

20.158 MIDA will intensify its efforts to attract investments, including FDIs, into the targeted services sub-sectors. It will reorganise its structure to undertake this additional responsibility. The reorganisation will include:

- expanding the relevant divisions to promote investments in the new growth areas;

- extending the scope of 'hand-holding' activities to cover the services sector;

- coordinating with the relevant ministries and agencies, as well as private sector associations, in the development and promotion of services;

- improving the statistical collection in the services sector, in collaboration with the Department of Statistics and the relevant ministries and agencies; and

- disseminating information, for example, by publishing guidebooks for the targeted services activities.

20.159 MATRADE will increase its resources and enhance its capacity to facilitate the expansion of Malaysian service providers overseas through:

- setting up a division to focus on the promotion of the export of services;

- enhancing the knowledge and competencies of its personnel. In addition, it will recruit marketing experts in specific service sub-sectors for selected MATRADE offices overseas; and

- opening new offices in strategic locations, particularly in the new and emerging markets.

MIDA and MATRADE, in collaboration with other relevant agencies and the private sector, will undertake studies on the competitiveness of the targeted sub-sectors, as well as identify cross border trade and outward investment opportunities.

20.160 SMIDEC will introduce measures to promote the greater growth and contribution of SMEs in the targeted sub-sectors, including:

- strengthening the technical expertise of SMEs in the targeted sub-sectors. The existing training programmes for SMEs will be improved to focus on required skills, such as managerial, technical, pricing, packaging and merchandising;

- encouraging SMEs to participate in the integrated logistics supply chains. In this respect, SMEs will be encouraged to adopt greater utilisation of ICT to increase their levels of productivity and efficiency in the supply chains; and

- developing programmes to encourage professionals to become entrepreneurs in their own fields.

20.161 NPC will expand its capacities and capabilities to implement initiatives on TFP to enable a wider outreach to the services sector and meet the needs of a knowledge-based society. The initiatives include:

- enhancing the human capital and nurturing a culture of innovation and creativity in the new growth areas; and

- developing global best practices through competitive benchmarking and promoting the adoption of international standards and best practices in the services sector.

(c) Improving Database

20.162 Comprehensive data on services are required for the formulation of policies and programmes to further develop the services sector. The data include trends, structure and contribution of the services sector to the economy. Measures which will be carried out by the Department of Statistics include:

- adopting a standard approach to the concepts on services, in particular, statistical terminology, for all Government publications, in line with the commitments under the GATS and AFAS for trade statistics, as well as the international classification of services output;

- undertaking regular censuses on overall services activities and surveys at the enterprise level for both domestic and externally traded services activities;

- adopting a standard approach in collecting and reporting the statistics for all services sub-sectors, with consistent disaggregation of the services components; and

- developing measurements and indices for different key areas, such as services production and service prices.

POLICY MEASURES FOR THE SUB-SECTORS

(1) BUSINESS AND PROFESSIONAL SERVICES

(i) Promoting Shared Services Outsourcing

20.163 A more conducive business environment will be created to promote business process outsourcing and offshoring, including the adoption of leading technologies and ICT. The provision of incentives will be considered for shared services, such as call centres and contact centres, and selected high value services, such as research, design and development, human resource management, IT services and market research.

(ii) Promoting Trade and Outward Investments

20.164 Targeted business and professional services in the sub-sector which have the capacities and capabilities to engage in regional trade, will be encouraged to export their services to regional and niche markets, such as ASEAN, the People's Republic of China and West Asia. The targeted services include:

- accounting, engineering, architectural and specialised legal services within the accredited professional services; and

- advertising, management and IT consulting, environmental consultancy services, and oil and gas services within the non-accredited professional services.

Trade promotion, facilitation measures and other support will be provided to promote cross border trade and outward investments in these services. To facilitate market access for the targeted professional services, MRAs will be initiated through bilateral and regional arrangements.

(iii) Enhancing Service Delivery

20.165 In view of the increased competition from foreign firms, measures will be undertaken to enhance the service delivery of the targeted business and professional services. The measures include:

- enhancing the efficiency of the service providers through accreditation and upgrading of knowledge and skills;
- establishing service centres, which, apart from enhancing the service delivery, will also facilitate the promotion of networking among firms, as well as assist in providing the technical support and know-how; and
- adopting a more coordinated approach by the existing professional bodies in developing the services of their members, in preparation for expansion to overseas markets.

(2) DISTRIBUTIVE TRADE SERVICES

20.166 Given the social change, urbanisation and the evolving lifestyles of the population, structural changes are expected in the distributive trade services. Efforts will be undertaken to further develop the sub-sector in areas such as:

- strengthening the modes of distribution to enhance the efficiency, productivity and competitiveness of the sub-sector;
- accelerating the growth of e-commerce to support the modernisation and expansion of the sub-sector;
- expanding the scope and scale of the domestic service providers; and
- enhancing the existing regulatory framework to promote the development of the sub-sector.

(i) Distributive Trade Master Plan

20.167 A Distributive Trade Master Plan is being formulated, which will take into consideration the development objectives and targets of the IMP3. This is to ensure that the plan will create greater inter-sectoral linkages between the distributive trade and the rest of the economy. The plan will contain strategies and measures, among others, to promote FDIs and cross border trade, as well as upgrade the activities of the domestic service providers in the sub-sector.

(ii) Promoting the Export of Franchising

20.168 There is potential for homegrown franchise businesses to expand overseas. MATRADE, in collaboration with the Ministry of Entrepreneur and Cooperative

Development and the Malaysian Franchise Association, will support the growth and expansion of franchising, through hosting international franchise trade fairs and promotion missions.

(iii) Providing Support for Small and Medium Enterprises

20.169 The Government will introduce policies and programmes to assist SMEs in the distributive trade in enhancing productivity, skills and technical capabilities, and acquiring management knowledge and new operational methods. Programmes will be introduced to build networks between large and small enterprises, as well as foreign and local enterprises in the distributive trade, so that the local enterprises will be able to gain from technology transfers and enhanced productivity. Measures to promote SMEs to become larger entities and be more competitive will be introduced, including encouraging consolidation, through mergers, acquisitions and joint ventures.

(iv) Enhancing Total Factor Productivity

20.170 To be more productivity driven, increase in the demand intensity for distributive trade services will be encouraged. Initiatives to be undertaken include:

- encouraging the sub-sector to become more customer-oriented through customer relations management;
- providing assistance for local franchised products and services;
- enhancing the professionalism of the workforce through training and retraining;
- adopting marketing strategies, such as developing Malaysian brand names and undertaking promotion overseas;
- encouraging the sub-sector to integrate and consolidate their businesses, through new retailing and consumerism concepts, to reap economies of scale and rationalise costs; and
- promoting the greater utilisation of ICT in business transactions in areas such as procurement, advertising, ticketing and shopping, for example, the application of bar coding in the service supply chains.

(v) Enhancing the Regulatory Framework

20.171 To sustain the growth of the sub-sector, efforts will be undertaken to improve the existing regulatory framework to create a more conducive institutional environment for healthy competition and fair trade practices. A Fair Trade Practices Law will be introduced and implemented in stages. In addition, a

Malaysian Competition Network will be formed to provide a platform for deliberations among the public and private sectors in the formulation of strategies under the Fair Trade Practices Law.

(3) CONSTRUCTION SERVICES

(i) Improving the Regulatory Framework

20.172 The construction sub-sector will be nurtured with greater professionalism to generate high quality output and services. To encourage high value-added construction works, a more stringent registration requirement will be introduced. The CIDB will become an integrated centre for the registration and renewal of licences of contractors. To improve the performance of contractors, a comprehensive performance rating system will be introduced to cover key areas such as quality, safety and health, environment and financial strength. The present public sector procurement mechanism will be enhanced to incorporate best practices, including adopting pre-qualification of potential bidders and a more open and transparent tendering system.

(ii) Promoting Collaboration and Joint Ventures

20.173 Construction service providers will be encouraged to collaborate or form joint ventures to create stronger and more resilient contractors and be able to position themselves to compete in both the domestic and foreign markets. Malaysian contractors bidding for large projects will be encouraged to shift from the present approach of individual bidding towards providing a total package, including a cluster-based bidding strategy. This strategy requires collaboration among Malaysian construction firms with providers of complementary skills and expertise, including professional services, and financial backing and resources, to bid for large projects. A special unit has been set up in the Prime Minister's Department to coordinate and support the development of the total package approach. This will be undertaken, in collaboration with the CIDB, PSDC, NAPSEC and MATRADE.

(iii) Increasing Mechanisation and Modularisation of Construction Activities

20.174 To generate more cost effective construction projects and lessen the dependence on labour, the utilisation of the Industrial Building Systems will be intensified. The Government has approved the Industrial Building Systems Road Map, 2003-2010, which contains measures to promote the adoption of the Industrial Building Systems and modular coordination, including:

- encouraging the development of the required workforce;
- continuing to develop materials (components and machines); and
- continuing to enhance management processes and methods.

In the IMP3, measures to be undertaken by the Government include:

- granting green-lane approval for building plans utilising the Industrial Building Systems and modular coordination; and

- emphasising on R&D activities related to the Industrial Building Systems and modular coordination, for example, the development of materials, including components and machines.

(iv) Enhancing Total Factor Productivity

20.175 Productivity of the sub-sector will be further enhanced by increasing the contribution of TFP growth in the sub-sector. Measures include undertaking:

- better management of construction practices;

- sustainable construction practices for safer and cleaner construction sites;

- continuous and systematic quality control through compliance to standards and international requirements; and

- quality enhancement of the workforce and development of industrial expertise, through technical training, continual professional development and on-the-job training.

20.176 Quality assurance of the construction projects will be promoted through the greater use of prefabricated materials and application of construction practices utilising high technology. Modern design and manufacturing methods, involving ICT and the usage of computer-aided design (CAD) and computer-aided manufacturing (CAM), will be widely applied.

(4) EDUCATION AND TRAINING SERVICES

(i) Enhancing the Business Environment

20.177 A review of existing policies, regulations and rules on the establishment and operation of private education and training institutions will be undertaken. This will include reviewing the equity conditions and streamlining the approval procedures for the establishment of the institutions. Procedures, and their implementation, on the entry and re-entry of students, and the entry, employment and re-entry of expatriates and their spouses, will be further simplified. Existing processes on registration and approvals will be streamlined to improve the efficiency and quality of the Government delivery system relating to the establishment and operation of private education and training institutions.

(ii) Enhancing the Quality and Standards of Education

20.178 Malaysian Qualification Agency, to be established by the end of 2006, will further strengthen the national educational standards. The setting up of the agency will involve the merging of the functions of LAN and the quality assurance division of the Ministry of Higher Education. The merged entity will establish a unified quality assurance system, including the benchmarking of institutions of higher education with international standards and regular audit on quality to nurture competition. A qualification framework will be implemented to ensure that programmes, curricula, teaching and learning facilities, and student support facilities are of international standards.

(iii) Promoting the Export of Education Services

20.179 To realise the target of attracting 100,000 foreign students at all levels by 2010, a more coordinated approach in the promotion and marketing efforts overseas will be undertaken, which includes the establishment of a dedicated agency to promote the export of higher education. Assistance will be provided to the private sector in their efforts to promote and attract the students, including supporting their investments.

(iv) Increasing the Training Capacities

20.180 To complement the Government's efforts, private education and training institutions will be encouraged to conduct training for their trainers. To address a possible shortage of trainers in the short term, the recruitment of foreign trainers in important areas will be allowed. In the long term, the entry of foreign trainers will be progressively liberalised. Procedures, and their implementation, on the employment of foreign trainers will be further simplified.

(v) Promoting Investments in the Education and Training Services

20.181 Assistance will be provided to promote:

- the establishment of specialised private training centres for various services sub-sectors, including those for personnel training; and
- new investments and the expansion of existing branch campuses of foreign universities and colleges in Malaysia.

(vi) Enhancing Total Factor Productivity

20.182 The growth of education and training services will contribute towards creating a knowledge-driven economy. Measures will be undertaken to enhance the quality of education and training through:

- improving the quality of the academic staff through upgrading their academic levels, as well as undertaking staff development programmes, to enhance their knowledge, skills and professionalism;

- expanding the education and training infrastructure and integrating ICT into the delivery systems for education, training and continuous learning;

- promoting Malaysia as a regional centre of excellence in education and training through smart public-private sector partnership; and

- networking with renowned international institutions and benchmarking against international standards.

(5) HEALTH SERVICES

(i) Promoting the Growth Areas

20.183 The promotion of the targeted health services will be intensified:

High-end services

- high-end curative services in centres of excellence, such as cardiothoracic services (angioplasty and bypass surgeries), cancer management services, neurological services, liver diseases, dental implant services, and endocrinal and eye disorders; and

- health tourism, which combines various aspects of leisure and wellness, such as medical screening, cosmetic surgery and health spa resorts, promoting reflexology, aromatherapy, and facial and skin enhancement, as well as traditional healing and complementary medicine;

Healthcare support services

- hospital support services, such as biomedical engineering maintenance, facility engineering maintenance, cleansing, linen and laundry, and clinical waste management services;

- healthcare informatics, such as electronic medical records, hospital information management systems, decision support systems and tele-consultation; and

- ancillary services, such as specialised clinical laboratory and diagnostic imaging services;

Management of healthcare services

- design and construction of health facilities, including hospitals, clinics and medical laboratories;

- management of hospitals, managed care organisations, and other health facilities and services; and

- specialised management services in areas such as planning, designing, commissioning and managing of healthcare facilities, including hospitals, in targeted markets overseas, such as ASEAN, South Asia and West Asia; and

Health related training programmes

- advanced training, including post-graduate courses, post-basic and short-term courses offered by local or foreign training institutions and professional bodies based in Malaysia; and

- nursing education and paramedic training, which is presently available in training schools in some hospitals.

(ii) Enhancing the Development and Promotion of Healthcare Services

20.184 The Health Industry Section in the Ministry of Health, established at the end of 2005, will provide greater focus on and assume a more effective role in the development and promotion of the healthcare sub-sector. The unit will serve as a communication channel between Government and the healthcare service providers. It will be the focal point to assist the service providers to address challenges, such as meeting international standards, adhering to local and international regulations, and promoting healthcare products and services. Programmes to be undertaken by the ministry include the development and promotion of other health related services, such as health tourism, health informatics, medical education, hospital support services and health facilities management. In collaboration with MIDA, it will also review and formulate incentives and other areas of support to attract more investments in the development of the sub-sector.

(iii) Liberalising the Equity Policy in the Sub-Sector

20.185 To enhance the competitiveness of the sub-sector, greater foreign participation and investments in the sub-sector will be encouraged. The Government will progressively liberalise the equity requirements of segments of the sub-sector which are ready for competition.

(iv) Human Capital Development

20.186 Presently, there is a substantial outflow of funds from the country for the training of medical personnel, including doctors, nurses and pharmacists. A comprehensive plan on HRD for the health services will be formulated by the Ministry of Health, which will be aimed at providing an adequate supply of health and medical personnel within the country.

(v) Upgrading Private Hospitals

20.187 To encourage the utilisation of the latest equipment and technology at private hospitals and enhance the attractiveness of Malaysia's health tourism programme, incentives will be considered for investments in the latest medical equipment and technology, as well as obtaining accreditation from international bodies.

(vi) Enhancing Total Factor Productivity

20.188 Strategies for enhancing TFP in the healthcare services include:

- intensifying the use of tele-medicine, covering services in tele-radiology, tele-cardiology, tele-dermatology and tele-pathology. These services assist in saving time and costs, and minimising inconvenience in travelling for patients;
- updating IT facilities and equipment, which will increase the productivity level of healthcare personnel and assist in reducing waiting time for patients. Training will be provided to enable the personnel to utilise the new technologies effectively;
- obtaining accreditation on international standards for hospital facilities and services, to enhance the quality of the services and image of the health service providers, to facilitate them to compete with other hospitals in the region; and
- promoting investments in human capital, through education and training, including post-graduate courses for doctors, nurses, and paramedic and other health-related personnel.

(6) TOURISM SERVICES

20.189 To realise the optimal potential of tourism services as an important source of growth, in terms of foreign exchange earnings, entrepreneur development and employment generation, efforts will be focused on the development, promotion and marketing of innovative tourism products and services. Assistance will be continued to expand and upgrade domestic tourism services. In addition, efforts will be undertaken to provide greater comfort, safety and well-being of tourists.

(i) Enhancing High Value Tourism Products and Services

20.190 Malaysia will focus on niche and high value tourism products, such as leisure, sports and business related activities, and targeted markets to attract

long stay and high spending tourists. Measures to enhance high value tourism products and services include:

- encouraging the development and marketing of niche thematic or activity based products, such as eco-tourism, agro-tourism, cultural and heritage tourism and other specialised tourism products;
- diversifying into high value business related tourism products, such as meetings, incentives, conferences and exhibitions tourism; edu-tourism and health tourism. The Government will collaborate with the private sector in hosting major conferences, seminars and exhibitions to attract high volume and quality business travellers to Malaysia;
- encouraging the diversification to niche markets, including West Asia and the EU, and emerging markets, such as India and the People's Republic of China;
- setting key performance indicators for each of the tourism products; and
- supporting and promoting R&D efforts.

(ii) Creating a Liberal and Conducive Business Environment

20.191 The present equity policy in the tourism and travel related services sub-sector will be reviewed, to attract foreign expertise in developing and implementing the tourism packages. Greater foreign participation will enhance efficiency and productivity, and provide access to international tourism markets. The Government will undertake a comprehensive review of, among others, the present incentive package for hotel and tourism projects. The review will include the scope of activities, incentives (type and eligibility criteria) and equity structure.

(iii) Enhancing Total Factor Productivity

20.192 To attract more tourists to Malaysia, visa requirements will be simplified and tourism services will be further enhanced through initiatives in TFP. A greater demand for tourism services will be encouraged to optimise the present tourism infrastructure, facilities and resources through new tour packages, such as eco-tourism, agro-tourism, health-tourism and home-stay programmes. More focused marketing strategies, for example, e-tourism, which is targeted at both short-haul and long-haul markets, will be adopted to further promote the sub-sector. Promotion efforts to be undertaken include making available accurate and timely information on tourism products and services. More multi-skilled employees will be made available, who are able to communicate effectively, provide current and relevant information, are innovative and creative, and able to enhance the service delivery. Tourism-related personnel, including tour guides and operators of facilities, will also be mobilised to provide more comprehensive and integrated tourism products and services.

Chapter 21

DEVELOPMENT OF THE *HALAL* INDUSTRY

DEVELOPMENT OF THE *HALAL* INDUSTRY

SECTION I OVERVIEW

21.01 Among the objectives of the Third Industrial Master Plan (IMP3), 2006-2020, is to make Malaysia the global *halal* hub for the production and trade in *halal* goods and services. Malaysia has the edge in the development of the *halal* industry, as it is a modern Islamic country with an open economy and a well developed physical and institutional infrastructure, capable of supporting initiatives and programmes to develop and promote the industry. There is great potential for developing and promoting the *halal* products and services for the global market:

- the Muslim population is about 1.6 billion and spread across the world. It is estimated that by 2010, the global Muslim population will be approximately 3 billion;
- *halal* products and services are also gaining increasing acceptability among non-Muslims; and
- the global market value for trade in *halal* food and non-food products is estimated at US$2.1 trillion annually. This market has created interest among food producing countries, both Muslim and non-Muslim.

The growing interest in the potential of the market has hastened the move towards the development of global standards, as well as expanded the coverage of standards to include activities, such as logistics and packaging.

21.02 This Chapter covers:

- an assessment of the size of the global and regional markets, as well as major market developments, for *halal* products and services, including increasing competition from countries in the Asia Pacific and the development of international *halal* standards;
- development of Malaysia's *halal* products and services industry, including initiatives in strengthening the institutional support, and market development and promotion;
- challenges in the development of *halal* products and services, including shortage of raw materials, development of *halal*-compliant services and the need for greater coordination among the relevant ministries and agencies; and
- strategies and policies for the development of the industry, including measures to address the increasing competition from countries in the region and strengthen the institutional and human resource capacity.

SECTION II MARKET SIZE AND MAJOR MARKET DEVELOPMENTS FOR *HALAL* PRODUCTS AND SERVICES

21.03 The *halal* industry covers:

- food;
- non-food products, including pharmaceuticals, health products, medical devices, cosmetics and toiletries; and
- services, including logistics, packaging, branding and marketing, printed and electronic media, and travel and tourism.

(a) Size of the *Halal* Market

21.04 Information and statistics on the status of the *halal* industry are not readily available. Until recently, *halal* products and services have not been viewed as a market in its own right. For example, *halal* meat was considered simply a part of the meat industry, and not as part of the entire *halal* supply chain, from cattle farming to meat processing, packaging and logistics. This has placed a limitation on determining the extent of the global and regional markets for *halal* products and services.

Global Halal Market

21.05 Estimates have been made on the size of the global market for *halal* products and services. On foods, it is estimated that the global market value for *halal* foods is about US$547 billion a year (Table 21.1). If non-food products, such as health products, cosmetics and toiletries, as well as hotel and catering services, are also taken into consideration, the global market value for both food and non-food *halal* products is estimated at US$2.1 trillion annually. The present trend in consumer demand for *halal* products and services is expected to continue, in tandem with the increasing size of the Muslim population in the world. With regard to investments in the *halal* industry, it is estimated that the value of the wealth of the Muslim countries, which has been invested and is continuously seeking investments, is approximately between US$800 billion and US$1 trillion.

Regional Halal Market

(i) Asia

21.06 Asia, in particular, Indonesia, Pakistan, India, the People's Republic of China, Singapore, Brunei, Thailand and West Asia, with a collective Muslim population of approximately 1 billion, is a prime target market for *halal* goods and services. Within this region, there is also a fast developing *halal* food production industry being positioned to supply this lucrative market. South East Asia is becoming an important and competitive regional market for *halal* products, in view of its vast consumer market, fast developing *halal* food production and progress on *halal* certification.

TABLE 21.1

ESTIMATED ANNUAL MARKET SIZE FOR *HALAL* FOODS, 2005

Continent/ Country	*Total Population (million)*	*Muslim Population (million)*	*Food Expenditure (US$ per capita)*	*Market size (US$ million)*
Total	**6,475.4**	**1,565.3**	**n.a[1]**	**547,409**
Asia	3,921.0	1,043.7	350	365,299
Indonesia	221.9	195.3	347	67,769
West Asia	213.9	195.3	572	111,712
People's Republic of China	1,311.1	39.2	156	6,115
Malaysia	26.1	15.4	381	5,867
Thailand	65.0	5.9	371	2,189
India	1,103.6	154.5	n.a.	n.a.
Pakistan	162.4	157.5	n.a.	n.a.
Bangladesh	144.2	127.3	n.a.	n.a.
Others	672.8	153.3	n.a.	n.a.
Africa	906.0	461.8	200	92,360
Europe	727.4	51.2	1,500	76,800
North America	329.0	6.6	1,750	11,550
South America	559.0	1.6	500	800
Oceania	33.0	0.4	1,500	600

Note: [1] Not available

Source: Various sources

21.07 West Asia, with consumers having high disposable incomes, makes it a potential market for not only *halal* products but also services, particularly travel and tourism. Tourism packages have been developed which cater to the needs of the West Asian tourists. With limited domestic agriculture, the expanding local food production industry throughout the sub-region is largely built on imported raw materials. While the *halal* market in the sub-region has been primarily based on meat products, there is considerable room for expansion in the areas of non-meat, ready-cooked meal solutions, dairy products, baked goods, and cosmetics and toiletries. Limitations in the development of the *halal* industry in the sub-region include:

- lack of focus on developing domestic production in foods, since the economic development of many of the countries has been oil-driven; and

- limited or absence of infrastructure for domestic *halal* certification. Most *halal* products are imported. While certification is mandatory, in general, any recognised *halal* certificate is acceptable.

(ii) Europe

21.08 Europe, including Eastern Europe, has a Muslim population of about 51.2 million and has a spending power of about 30 billion Euros annually. Major retail chains view *halal* products as part of their business expansion plans, and source a range of *halal*-certified products to fill new *halal* sections of their outlets. Major retail chains in the United Kingdom (UK) have an increasingly influential role in the *halal* industry. In some of these stores, 40 per cent of their customers are Muslim, who require more *halal* products, both food and non-food, with a wider product offering. A report on the UK *halal* market, published recently by the UK Government, revealed that:

- the Asian population in the UK is growing at 15 times the national average;
- by 2011, about 50 per cent of all London boroughs will have an ethnic majority population;
- retail sales of *halal* meat are valued at £400 million;
- the majority of Muslim consumers utilise large supermarket chains for their main grocery shopping, indicating a vast retail opportunity for the large chains; and
- 51 per cent of the Local Education Authorities presently require *halal* meat.

(iii) The United States of America

21.09 With a population of 6 million Muslims, the *halal* food industry in the United States of America (USA) is substantial and is estimated to be growing at a faster pace than the market for *kosher* products. The Islamic Food and Nutrition Council of America (IFANCA) assumes a key role in this market.

(b) Major Market Developments

(i) Increasing Global Competition

21.10 Countries in the Asia Pacific, particularly Thailand, the Philippines, Brunei, Singapore, the People's Republic of China and Australia, are capitalising upon the growing *halal* market. This is reflected by various initiatives being undertaken

in this field by the countries concerned, including trade and investment promotion, strengthening of the institutional mechanisms for the development and promotion of *halal* certification, research and development (R&D) and capacity building. New market entrants, for example, the Republic of Korea, are beginning to develop their own export industry of *halal* foods. Countries which have been involved in the industry earlier, including the European Union (EU) and the USA, are emerging as viable suppliers of *halal* products.

(ii) Halal Certification

21.11 Countries in various parts of the world, as well as major food producers and exporters, are undertaking initiatives to capitalise upon the growth potential of the global market for *halal* products and services. They have not only focused on the production and supply of *halal* goods and services, but also *halal* certification. Muslim majority countries without *halal* certification procedures are undertaking measures to introduce them. Brunei, Pakistan, Turkey and Bangladesh are working on the development of *halal* certification procedures and agencies. *Halal* certification is also being pursued in non-Muslim countries, such as Thailand and Singapore. In addition, Muslim organisations, for example, IFANCA, are also involved in *halal* certification. These organisations capitalise upon their business linkages with large manufacturing companies to enhance the acceptance of their certification methods and procedures.

21.12 Countries in Asia are consolidating and strengthening their institutional mechanisms for the development and promotion of *halal* foods. Thailand has created the Institute for Halal Food Standard of Thailand to develop and monitor *halal* food production in the country. The Philippines has established the Mindanao Halal Service Center for training workers, prior to their deployment to testing facilities and factories producing *halal* foods. In Singapore, *Majlis Ugama Islam Singapura* is working with its counterparts in West Asia to gain mutual recognition status for its certified products.

(iii) Standards

21.13 Development of international *halal* standards is likely to become a major focus in the *halal* market during the next five years. Just as the development and implementation of standards assumed a major role within the computer industry, a similar effect in the *halal* industry can be anticipated. Presently, countries such as Turkey, Pakistan, Bangladesh, India, former Soviet Republics, the People's Republic of China, parts of West Asia and much of Africa, operate without any official *halal* standards. The development and promotion of international *halal* standards will facilitate potential producers and exporters in gaining control over such markets.

(iv) Emerging Sub-Sectors

Logistics

21.14 The *halal* industry involves 'farm-to-table' operations. This has led to the development of new links within the value chain, most notably in the area of logistics. Ports, shipping and freight forwarding, and warehousing and handling facilities are emerging as lucrative areas in the global *halal* market. As these facilities and services are already in operation and only need to be made *halal*-compliant, the growth of such facilities and services is likely to be rapid. For example, Port of Rotterdam will announce its new *Halal* DistriPark, intended to be the gateway to the lucrative European *halal* market. Other ports, such as Port of Tanjung Pelepas (PTP) and Westports in Malaysia, and Port of Marseilles, have also expressed interest in providing such facilities and services.

Travel and Tourism

21.15 There is potential in travel and tourism, including hotels and restaurants. Muslim tourists, particularly those from West Asia, are increasingly discerning and require access to more sophisticated holiday destinations and *halal* dining. In 2005, tourist arrivals from West Asia to Malaysia reached 47,646. While these arrivals accounted for only 0.1 per cent of the total arrivals, they accounted for 0.3 per cent of the total receipts.

(v) Increasing Demand for Product Diversity

21.16 Greater mobility and increased migration of the Muslim communities has contributed to the increased demand for a wider range of *halal* products. Muslim communities overseas want, and expect to acquire, foods and services according to their religious tenets, thus the requirement for *halal* compliance has become more prevalent. In addition, changing demographic tastes, for example, between one generation and the next, have had a significant impact on the *halal* market. While an older generation would have been content with *halal* meat, a younger generation expects to have a full range of *halal* fare and product offerings.

SECTION III DEVELOPMENT OF MALAYSIA'S *HALAL* PRODUCTS AND SERVICES INDUSTRY

21.17 Malaysia has unique advantages in developing and promoting the *halal* products and services industry:

- it is viewed as a progressive Islamic and business-friendly country by both Muslim and non-Muslim world communities;

- it has established a firm industrial base and is progressing towards a higher level of industrialisation;
- it is strategically located within the Asia Pacific region, with potential benefits from the presence of major areas of production and consumption; and
- it has created a conducive operating environment, in particular, necessary policies and an efficient institutional infrastructure, to support the development of the industry.

(a) Investments

21.18 During the period 1996-2005, total approved investments in the food and selected non-food industries (medical devices, cosmetics and toiletries, and pharmaceuticals) amounted to RM10.2 billion. Of the total investments, foreign investments constituted RM5.2 billion and domestic investments, RM5 billion (Table 21.2).

TABLE 21.2

INVESTMENTS IN THE FOOD AND SELECTED NON-FOOD INDUSTRIES

Industry	*1996-2000*	*2001-2005*	*1996-2005*
	(RM million)		
Total investments	**3,023.3**	**7,204.9**	**10,228.3**
Foreign	1,653.6	3,550.8	5,204.4
Domestic	1,369.7	3,654.1	5,023.9
Food			
Sub-total investments	2,043.2	3,197.6	5,240.7
Foreign	1,162.1	1,345.0	2,507.1
Domestic	881.1	1,852.6	2,733.6
Medical devices			
Sub-total investments	746.5	2,807.6	3,554.1
Foreign	424.3	1,845.9	2,270.2
Domestic	322.2	961.7	1,283.9
Cosmetics and toiletries			
Sub-total investments	138.1	288.1	426.3
Foreign	33.8	143.0	176.8
Domestic	104.3	145.1	249.5
Pharmaceuticals			
Sub-total investments	95.7	911.2	1,006.9
Foreign	33.5	216.9	250.4
Domestic	62.2	694.3	756.5

Source : Malaysian Industrial Development Authority

(b) Exports

21.19 Data on Malaysia's exports of processed food are used as an estimate of Malaysia's exports of *halal* foods (Table 21.3). During the period 1996-2005, Malaysia's exports of processed foods grew at an average annual rate of 10.8 per cent, from RM2.3 billion in 1996 to RM6.5 billion in 2005. Main export destinations were Singapore, Indonesia, the USA, Japan and Thailand. In 2005, these five markets absorbed 44 per cent of Malaysia's total exports of processed foods:

- Singapore, RM 1.1 billion (16.3 per cent);
- Indonesia, RM613.4 million (9.4 per cent);
- the USA, RM580.4 million (8.9 per cent);
- Japan, RM314.1 million (4.8 per cent); and
- Thailand, RM309.8 million (4.7 per cent).

In the non-food category, exports of medical devices and pharmaceuticals grew at average annual rates of 8 per cent and 10.6 per cent, respectively. In 2005, exports of medical devices amounted to RM5.3 billion and pharmaceuticals, RM494.3 million.

TABLE 21.3

MALAYSIA'S EXPORTS OF PROCESSED FOODS TO TOP TEN COUNTRIES

	1996		*2000*		*2005*		*1996-2005*	
	Exports	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*	*Exports*	*Imports*
	(RM million)						*Average Annual Growth (%)*	
Total	**2,333.4**	**3,524.8**	**3,408.4**	**4,344.4**	**6,529.9**	**6,353.6**	**10.8**	**7.1**
Singapore	564.1	92.3	791.2	126.1	1,064.9	287.4	7.1	13.4
Indonesia	72.8	100.2	320.3	219.1	613.4	265.3	22.5	10.1
USA	167.4	303.4	231.8	283.0	580.4	482.8	13.4	7.4
Japan	152.9	37.0	85.3	43.2	314.1	27.8	6.4	-4.3
Thailand	43.5	505.1	141.7	422.2	309.8	879.1	26.6	7.6
Australia	113.3	867.0	149.7	1,245.5	296.1	1,324.2	9.3	4.3
Hong Kong	286.5	23.2	230.1	44.2	249.7	21.7	-1.4	2.8
Philippines	74.7	25.9	111.5	43.5	236.0	154.9	15.5	18.9
Netherlands	113.1	119.9	113.4	152.5	223.8	338.7	7.8	13.5
Taiwan	88.7	55.0	109.8	42.4	166.2	44.9	6.2	-5.4

Source: Ministry of International Trade and Industry

(c) Imports

21.20 Imports of processed foods grew at an average annual rate of 7.1 per cent, from RM3.5 billion in 1996 to RM6.4 billion in 2005. Main sources of imports in 2005 were Australia, valued at RM1.3 billion, or 20.8 per cent, of the total imports of processed foods, Thailand (RM879.1 million, 13.8 per cent) and the USA (RM482.8 million, 7.6 per cent).

(d) Institutional Support

Incentives

21.21 Malaysian companies, including small and medium enterprises (SMEs), are eligible for a wide range of incentives to support their efforts to gain access to the *halal* market. The incentives include:

- grants for business planning and development, product and process improvements, productivity and quality improvements and certification, market development and brand promotion;

- a special grant for the development and promotion of *halal* products;

- Investment Tax Allowance of 100 per cent on qualifying capital expenditures for five years for companies which produce *halal* foods; and

- double tax deduction on expenditures for obtaining *halal* certification and accreditation.

Standards

21.22 The MS1500:2004 Standard for the Production, Preparation, Handling and Storage of Halal Food was developed by the Department of Standards Malaysia and gazetted in July 2004. This standard complies with international standards, such as Good Manufacturing Practice (GMP) and Good Hygiene Practice (GHP). As an ISO-compliant standard, MS1500:2004 has significant potential. It can serve as the global *halal* standard and provide Malaysia with a competitive edge. If it is expanded to cover the whole value chain and marketed effectively, it can assume an important role in the move towards global standards for the *halal* market.

Certification

21.23 *Jabatan Kemajuan Islam Malaysia* (JAKIM) and *Jabatan Agama Islam Negeri* collaborate in the issuance of *halal* certificates to enterprises and businesses which comply with the *halal* standards requirements.

Market Development and Promotion

21.24 Presently, various agencies, such as the Malaysia External Trade Development Corporation (MATRADE), Small and Medium Industries Development Corporation (SMIDEC) and Federal Agricultural Marketing Authority (FAMA), provide market development programmes to promote Malaysia's *halal* products and services, as well as the Malaysian Halal Standard. The programmes:

- facilitate the participation of Malaysian companies in selected international exhibitions and trade missions;
- assist SMEs in marketing their products to large hypermarkets; and
- provide business matching services between foreign buyers and Malaysian suppliers of *halal* products.

Specialised marketing missions and incoming trade missions are also organised under the programmes. In addition, the Government supports efforts by the private sector in promoting the industry. Examples are:

- Malaysia International Halal Showcase (MIHAS); and
- World Halal Forum, an international platform which brings together relevant experts from around the world for deliberations on *halal*-related knowledge and practices.

SECTION IV CHALLENGES

21.25 Challenges for Malaysia in becoming the global *halal* hub are:

- increasing competition from countries in the region;
- supply of raw materials;
- expanding the product range to meet consumer demand;
- developing *halal*-compliant services;
- leveraging upon the Malaysian Halal Standard to differentiate Malaysia's *halal* products;
- creating awareness on Malaysia as the centre for *halal* products and services;
- meeting increasing consumer demand for product quality assurance and food safety;
- harmonising the certification process;

- coordinating multiple agencies involved in the development and promotion of the industry; and

- enhancing the institutional and human resource capacity of organisations involved in the development and promotion of *halal* products and services.

(a) Increasing Regional Competition

21.26 The competition for *halal* products and services is intense in South East Asia and West Asia, as suppliers seek to gain access to the *halal* markets of these countries. Within ASEAN, there is also a fast developing *halal* food production industry, seeking to supply these markets. It is also in these markets that the developments on *halal* certification are taking place. The combination of a vast consumer market and a fast developing *halal* food production and certification industry, makes the South East Asian and West Asian markets among the more important and competitive markets. The challenge for Malaysia is to ensure that it remains competitive and is able to capitalise upon the advantages that it has, in terms of standards and a well developed manufacturing infrastructure.

(b) Supply of Raw Materials

21.27 A challenge for the development of Malaysia's *halal* industry is the lack of *halal* raw materials, particularly meat. More than 70 per cent of the raw materials for the food processing industry are imported. In 2005, the value of the total imports of raw materials for food processing amounted to about RM15 billion, mainly from Australia, Thailand, India, Indonesia and the People's Republic of China. Malaysian companies need to explore business arrangements which will ensure access to the supply of raw materials. On its part, the Government will need to provide strong institutional support to facilitate outward investments. Regular consultations need to be undertaken between Malaysia's certification agency and major suppliers of *halal* raw materials to ensure compliance with the Malaysian Halal Standard.

(c) Expanding the Product Range to Meet Consumer Demand

21.28 To take advantage of the increasing awareness and growing popularity of *halal* products, food and non-food producers need to expand their product range to accommodate changing demographic tastes and demand. This will involve investing in product development and research, as well as acquiring new processes to improve efficiency and productivity, and being innovative in product promotion and presentation.

(d) Development of *Halal* Compliant Services

21.29 A growing *halal* products industry will need to be complemented with *halal* compliant services, such as logistics, including dedicated cold-chain and

warehousing facilities, and packaging materials for *halal* products. The challenge is to undertake a systemic approach to the development of such services, involving all relevant parties, including suppliers of inputs, such as raw materials and packaging materials, logistics and testing facilities, and manufacturers.

(e) Leveraging upon the Malaysian Halal Standard to Differentiate Malaysia's *Halal* Products

21.30 Given the diversity and lack of governing standards in the *halal* market, advantage can be derived from the ability to differentiate Malaysia's products and services from those of the competition. Having already developed the MS1500:2004 Halal Standard, Malaysia has an edge in the increasingly competitive *halal* market. For the private sector, the challenge lies in its ability to use and leverage upon the Malaysian Standard to project the distinction of its products, in terms of quality and service. For the Government, the challenge is for the further refinement of the standard and its promotion to gain industry and market acceptance on a global scale.

(f) Awareness on Malaysia as a Centre for *Halal* Products and Services

21.31 Although Malaysia is ahead of the competition in the development of a *halal* standard, in general, there is still a lack of association of Malaysia with *halal* products and services. More efforts need to be undertaken to promote the Malaysian Halal Standard as a Malaysian brand.

(g) Product Quality Assurance and Food Safety

21.32 Hygiene and safety factors are increasingly important in the development of the food industry. Incidents of food poisoning, for example, by *salmonella* and *e-coli*, have made the issue on food safety a major market concern. In this respect, there is considerable potential to promote *halal* foods as being safety-compliant, since they undergo one of the safest methods of production. The challenge for Malaysian food manufacturers, particularly SMEs, is to ensure compliance with other safety standards, such as Hazard Analysis and Critical Control Point (HACCP), GMP and GHP.

(h) Harmonisation of the Certification Process

21.33 Malaysia's competitors are progressing towards promoting their own *halal* certifications. Malaysia had been ahead of the competitors in the region in this area. However, there is a lack of harmonisation of the processes and procedures for the issuance of *halal* certificates. The challenge for Malaysia is the harmonisation of the processes and procedures for inspection and certification between the Federal and State agencies.

(i) Coordinating Multiple Agencies in the Development and Promotion of the *Halal* Industry

21.34 Presently, a number of ministries and agencies, at the Federal and State levels, are involved in the development and promotion of the industry. Given the intense competition in the *halal* market and to achieve better utilisation of resources, there is a need for more coordination and collaboration among the agencies involved in the development and promotion efforts.

(j) Institutional and Human Resource Capacity

21.35 A comprehensive approach to the development and promotion of *halal* products and services requires a balance of knowledge and expertise of Islamic tenets and food science, biochemistry and microbiology, as well as business and management. In this regard, there is a need for the Government agencies involved in the development and promotion of *halal* products and services to collaborate and share resources and expertise, including in the areas of:

- human resource development (HRD);
- research and development (R&D);
- product development; and
- clinical and testing facilities.

SECTION V STRATEGIES AND POLICIES

STRATEGIC THRUSTS

21.36 Efforts will be undertaken to develop Malaysia as the global *halal* hub. Malaysia will be the base of operations for the industry. It is envisaged that by 2008, Malaysia will be the centre for:

- the production and distribution of *halal* products;
- *halal* service providers;
- reference on the Halal Standard; and
- R&D on *halal* matters.

Eleven strategic thrusts have been set for the development and promotion of Malaysia as the global *halal* hub:

(1) enhancing the awareness on Malaysia as the centre for *halal* products and services;

(2) managing the increasing competition from countries in the region;

(3) leveraging upon outward investments to gain access to raw materials and enhance competitiveness;

(4) enhancing R&D in product and process developments and leveraging upon latest technological developments to expand the product range;

(5) developing *halal*-compliant services;

(6) utilising and leveraging upon Malaysian Halal Standard to differentiate Malaysia's *halal* products;

(7) ensuring product quality and food safety;

(8) undertaking systemic development of *halal* parks;

(9) harmonising the *halal* certification process;

(10) enhancing the coordination among agencies involved in the development and promotion of the industry; and

(11) strengthening the institutional capacity of organisations involved in the development and promotion of *halal* products and services.

(1) ENHANCING THE AWARENESS ON MALAYSIA AS THE CENTRE FOR *HALAL* PRODUCTS AND SERVICES

21.37 Competitive advantage can be derived from brand association. Measures to create the image which will link '*halal*' with Malaysia include:

- developing and utilising a 'country of origin' labelling campaign for Malaysia's *halal* products. All aspects of the initiatives for the development of the *halal* hub under this new branding strategy will be coordinated, including using the *halal* logo and continuously making the association of Malaysia with *halal* products and services in all promotions and trade exhibitions overseas;

- developing a comprehensive campaign for the *halal* industry, similar to the 'Malaysia Truly Asia' initiative for tourism. The campaign for *halal* products will leverage upon the theme of 'Malaysia, the Taste of Asia';

- positioning Malaysia as the reference centre for trade and investment promotion of *halal* products and services by designating Malaysia International Halal Showcase (MIHAS) as the international annual platform for *halal* trade;

- developing Malaysia as the centre for discourse and deliberations on issues related to *halal* products and services. Relevant experts from around the world will be brought together to make Malaysia the focus

for *halal*-related knowledge and information. Towards this objective, the World Halal Forum will be made the annual international platform for such discourse; and

- supporting the development of *halal*-related content for the print and electronic media.

In the Ninth Malaysia Plan (RMK-9), 2006-2010, Malaysia will be developed as a centre for the certification of *halal* products and the JAKIM certification will be promoted worldwide.

(2) MANAGING INCREASING REGIONAL COMPETITION

21.38 As the competition for *halal* products and services intensifies, measures will be undertaken to enable Malaysia to remain competitive and capitalise upon the edge that it has, in terms of standard and a well developed manufacturing infrastructure. Measures to enhance the country's competitive advantage include:

- facilitating greater collaboration among countries in the region, capitalising upon complementarities and economies of scale. This includes using the network established through the growth triangles, such as Indonesia - Malaysia - Thailand Growth Triangle (IMT-GT) and Brunei-Indonesia-Malaysia-Philippines East Asia Growth Area (BIMP-EAGA) regions, to encourage joint ventures and collaborations;
- developing contract manufacturing capabilities to enable small and medium producers of *halal* products to be integrated into the global supply chain. This includes equipping the producers to become suppliers of *halal* products to major hypermarket chains; and
- building a database on the domestic and international *halal* industry. The availability of comprehensive and up-to-date information on producers and suppliers of *halal* products and services will facilitate planning and assist the private sector to establish market leadership.

21.39 Competition will also be managed through enhancing the export promotion of Malaysian *halal* food and non-food products. Measures include:

- MATRADE collaborating with Tourism Malaysia to develop specific programmes to promote Malaysian *halal* food products overseas. Collaboration will also be encouraged with hotels and providers of food services;
- encouraging Malaysian companies to establish strategic partnerships with companies overseas which have strong marketing networks to distribute Malaysian *halal* food and non-food products to regional and global markets;

- encouraging Malaysian companies to acquire known brands in markets overseas, through strategic partnerships, mergers and acquisitions;
- enhancing MATRADE's capabilities in gathering market intelligence for new and emerging markets; and
- encouraging Malaysian *halal* food and non-food companies which have acquired marketing capabilities, to expand their operations in identified markets, including the establishment of Malaysian *halal* food outlets overseas.

(3) LEVERAGING UPON OUTWARD INVESTMENTS TO GAIN ACCESS TO RAW MATERIALS AND ENHANCE COMPETITIVENESS

21.40 Measures to overcome the constraint of the lack of raw materials and, to some extent, the non-compliance to the Malaysian Halal Standard by overseas suppliers include:

- encouraging strategic joint ventures between Malaysian and overseas companies, including those involved in cattle and sheep farming, as well as food and non-food production;
- assisting in the identification of areas for collaborative ventures and synergistic ties for Malaysian manufacturers of *halal* products venturing overseas; and
- encouraging more financial institutions to support the initiatives of Malaysian-owned companies, especially SMEs, which undertake new investments overseas.

(4) ENHANCING RESEARCH AND DEVELOPMENT AND LEVERAGING UPON TECHNOLOGICAL DEVELOPMENTS

21.41 To benefit from the growing *halal* market, the industry will be encouraged to achieve a higher level of innovation in product and process developments in both the food and non-food industries to improve export performance in the long term. This will involve:

- enhancing collaborations in R&D among research institutes in *halal* product development and improvements; and
- assisting SMEs involved in *halal* food and non-food production, in acquiring the necessary technological capabilities to upgrade their manufacturing processes, as well as enhance product development and improvements.

21.42 Food and non-food manufacturers will be encouraged to:

- undertake research, on their own or in collaboration with research institutes, in product development, to keep pace with changing consumer tastes and preferences;

- work with public research institutes to commercialise findings in R&D; and

- leverage upon emerging technologies, such as biotechnology and nanotechnology, and enhance local capabilities in these areas, to develop new products and improve the technology in food and non-food processing.

Technologies which will be enhanced include *halal*-compliant food preservation and packaging technologies, incorporating food safety and sanitation practices.

(5) DEVELOPING *HALAL*-COMPLIANT SERVICES

21.43 The development of *halal*-compliant services is integral to the development of the *halal* products industry. Services for development include handling, storage, shipping, airfreight, warehousing, road transport and container requirements in the logistics industry. Methods will be identified to prevent the contamination of *halal* products with non-*halal* items during transportation and distribution. Measures to achieve this include:

- greater collaboration with the relevant service providers to facilitate the development and promotion of *halal*-compliant services; and

- providing support to ports and companies which develop *halal*-compliant logistics.

21.44 In addition to the logistics services of handling, warehousing, cold storage, packaging and transportation, other services which can leverage upon the *halal* market include travel and tourism. By promoting Malaysia as a tourist destination with attractions and facilities which meet the expectations and requirements of Muslims, the number of tourists from West Asia and other Muslim countries can be increased. Measures to be undertaken include:

- using events, such as food festivals, cultural shows and Islamic fashion and music events, as a basis for promoting and branding Malaysia as a tourist destination which appeals to Muslim travellers; and

- reinforcing the *halal* image by increasing the number of *halal* certified restaurants, kitchens and food outlets in the country.

(6) USING AND LEVERAGING UPON MALAYSIA'S *HALAL* STANDARD TO DIFFERENTIATE MALAYSIA'S *HALAL* PRODUCTS

21.45 Presently, there is no single reference point for a *halal* standard, which is globally accepted as the industry standard. In this respect, Malaysia has taken the lead, in already having developed the MS1500:2004 Standard. It is thus important that Malaysian producers of *halal* products leverage upon this standard to differentiate their products from those of competitors. Measures will be undertaken to develop and promote the Malaysian Halal Standard, including gaining international recognition and acceptance. These include:

- the involvement of industry leaders on an on-going basis to assist in the development and promotion of the standard, in the same way that standards of International Organization for Standardization (ISO) are continually being developed and updated;
- leveraging upon Malaysia's role in the Organisation of the Islamic Conference (OIC) to promote the acceptance of the standard among member countries;
- enhancing the institutional capacity, including human and physical resources, in the efforts to gain greater international recognition and acceptance of the *halal* standard; and
- continuing to seek acceptance of the standard by relevant international accreditation bodies through mutual recognition arrangements, either through direct consultations or as part of Malaysia's bilateral and regional free trade agreements (FTAs).

(7) ENSURING PRODUCT QUALITY AND FOOD SAFETY

21.46 Standards conformance is important for industrial efficiency, productivity and competitiveness. The MS1500:2004 Standard is already an inclusive standard, which incorporates *halal*, HACCP, GMP and GHP requirements. Measures to intensify standards conformance include:

- expanding outreach programmes, particularly among SMEs, to enhance the awareness and understanding of the importance of standards compliance, particularly standards such as HACCP, GMP and GHP; and
- providing the necessary institutional support to facilitate compliance to international standards among Malaysian-owned companies, including SMEs.

(8) UNDERTAKING SYSTEMIC DEVELOPMENT OF *HALAL* PARKS

21.47 Focus will be given on a more integrated development of the *halal* industry. This involves the systemic development of the entire value chain. In the RMK-9, Kedah, Perlis, Pulau Pinang, Perak and Pahang have been identified to lead in the development of the *halal* food industry. Measures towards the systemic development of *halal* products and services include:

- establishing *halal* parks dedicated to the downstream production of *halal* products. No upstream production, particularly the slaughtering process, will be permitted in the parks. The parks will:
  - be free from non-*halal* contamination; and
  - have requisite infrastructure and adequate shared facilities, including on-site water treatment plants, dedicated cool and cold chain facilities, and specialist test laboratories, as well as factory units for high capacity food processing and packaging activities and warehouses of various sizes;
- providing manufacturing companies and providers of services (including logistics) located in these parks with preferential utility rates;
- encouraging universities and research institutes to establish linkages with manufacturing companies located in these parks to facilitate collaboration in R&D, as well as the commercialisation of research findings;
- creating disease-free agricultural zones, in collaboration with the *halal* parks, to facilitate access to quality raw materials; and
- promoting the *halal* parks as free zones to make Malaysia a preferred transhipment location for *halal* goods. This will have the added advantage of making raw materials more readily available for domestic manufacturers.

(9) HARMONISING THE *HALAL* CERTIFICATION PROCESS

21.48 Increasingly, countries in the region are embarking on promoting their own *halal* certifications. To remain ahead of the competition, the process of *halal* certification by Federal and State agencies will be harmonised and streamlined. Measures will also include upgrading the capacity of these agencies, including that of the auditors and inspectors.

(10) ENHANCING THE COORDINATION AMONG THE AGENCIES

21.49 To promote the development of the *halal* industry, coordination among the ministries and agencies will be further enhanced:

- the Halal Industry Development Corporation, which will be established during the RMK-9 period, will coordinate the overall development of the industry;
- the Ministry of Agriculture and Agro-Based Industry will coordinate the upstream development of the industry, including the supply and first-stage processing of raw materials. The ministry will be responsible for *the halal* accreditation of abattoirs;
- the Ministry of International Trade and Industry will coordinate the development and promotion of downstream activities. In particular:
  - MATRADE will undertake the promotion of the *halal* standard for products and services;
  - SMIDEC will be responsible for the development and capacity building of SMEs; and
  - MATRADE and MIDA will undertake trade and investment promotion of *halal* products and services; and
- the Department of Standards Malaysia will coordinate the development of the Malaysian Halal Standard.

(11) STRENGTHENING THE INSTITUTIONAL AND HUMAN RESOURCE CAPACITY

21.50 The development and enhancement of the industry require a balance of knowledge and expertise in various fields, apart from Islamic tenets. The other areas include technological developments and the sciences, specifically food science, biochemistry, and micro-biology, as well as business and management. Towards achieving this balance, a comprehensive approach will be adopted to enhance the institutional and human resource capacity. Initiatives include:

- capacity building of:
  - the certification and inspection agencies, namely, the Federal and State Islamic Development Departments;
  - organisations involved in providing testing facilities for *halal* products;

- logistics and other related services providers; and
- other relevant agencies involved in the development of the industry, including those responsible for the promotion of *halal* products and services, as well as standards development;

- streamlining and harmonising the audit and certification requirements and processes between the Federal and State Islamic Development Departments;
- identifying selected local universities to provide degree courses in *halal* related science;
- providing more targeted training for SMEs to cover not only requirements on *halal* compliance, but also product choice, and packaging and labelling, as well as marketing and branding;
- providing consultancy services to foreign companies and multinational corporations (MNCs), as part of Malaysia's efforts to be the reference centre for *halal* standards and certification; and
- upgrading JAKIM to enable it to provide more efficient services to the industry, both at the domestic and international levels.

Chapter 22

ENHANCING DOMESTIC CAPABILITIES

ENHANCING DOMESTIC CAPABILITIES

SECTION I OVERVIEW

22.01 The role of Malaysian-owned companies will become more significant during the period of the Third Industrial Master Plan (IMP3), 2006-2020. They will be expected to undertake initiatives to enhance their capacities and capabilities towards achieving higher competitiveness and transform their operations to become more globalised, to be able to meet the challenge of intense competition.

22.02 Various factors will contribute to the intense global competition. There will be new major entrants into the market, as well as technological developments, which will permeate every aspect of the trade in goods and services, as well as influence decisions to locate investments. In addition, competition will become greater as increasing efforts are undertaken to reduce barriers to the flows of trade and investments, as well as movements of talents and resources. In such an environment, it is important that industrial policies focus not only on continuing to make Malaysia a competitive destination for businesses and investments, but also enhancing domestic capabilities in trade, investments and services. This will facilitate Malaysian-owned companies to remain competitive, both in the domestic as well as international markets, and enable them to take advantage of opportunities which will arise from global developments, as well as the liberalisation initiatives undertaken by the Government at the multilateral, regional and bilateral levels.

22.03 This Chapter:

- assesses the performance of Malaysian-owned companies, in terms of investments, human resource development and contribution to production and exports;
- provides an overview of the challenges in the development of domestic capabilities, including competitive pressures arising from a more open trading and investment environment and limited involvement in research and development (R&D) and innovation activities; and
- outlines strategies and policies for enhancing domestic capabilities, including integrating Malaysian-owned companies into regional and global networks and encouraging small and medium enterprises (SMEs) to become larger and more competitive entities.

SECTION II PERFORMANCE OF MALAYSIAN-OWNED COMPANIES

(a) Domestic Investments in the Manufacturing Sector

22.04 During the period of the Second Industrial Master Plan (IMP2), 1996-2005, private domestic investments accounted for 26.8 per cent of the growth of the Gross Domestic Product (GDP), compared with 14.5 per cent for foreign direct investments (FDIs). In 2005, domestic investments in the manufacturing sector amounted to RM13.1 billion, or 42.3 per cent, of the total investments of RM31 billion in approved projects. New projects accounted for RM9.2 billion, or 60 per cent, of the total investments, while the balance were in expansion or diversification projects (Table 22.1). The high level of domestic investments in the manufacturing sector was attributed to the further strengthening of the Malaysian economy, a more favourable external market environment and additional incentives introduced to encourage Malaysian-owned companies to reinvest in specific manufacturing activities.

TABLE 22.1

APPROVED INVESTMENTS IN THE MANUFACTURING SECTOR

	1996	*2000*	*2005*
	(RM billion)		
Total	**34.3**	**33.6**	**31.0**
Foreign	17.1	19.8	17.9
Domestic	17.2	13.8	13.1

Source: Malaysian Industrial Development Authority

22.05 For the period, investments in Malaysian-owned projects, implemented as at 31 December 2005, totalled RM73.6 billion. Of the total, domestic investments amounted to RM63.7 billion, or 87 per cent, while foreign investments, RM9.9 billion (13 per cent). Domestic investments in Malaysian-owned projects were mainly in electrical and electronics (E&E), valued at RM10.1 billion, natural gas (RM8 billion), transport equipment (RM6.5 billion), basic metal products (RM6.1 billion), petroleum products, including petrochemicals (RM4.4 billion), and chemicals and chemical products (RM4.2 billion) (Table 22.2).

(b) Domestic Investments in the Services Sector

22.06 For the period 2003-2005, the services sector accounted for the largest share of total approved investments. In 2005, a total of 2,453 projects were approved, with total investments amounting to RM56.2 billion (Table 22.3). Domestic sources contributed the larger share of these investments, accounting for RM52.5 billion, or 93.3 per cent, of the total investments. Major domestic investments in the sector were in real estate, transport, utilities, and telecommunications and information technology (IT). Investments in transport were in road, highway and maritime construction. In 2005, domestic investments in this sub-sector amounted to RM10.9 billion. In the telecommunications and IT sub-sector, domestic investments amounted to RM5.6 billion.

TABLE 22.2

MALAYSIAN-OWNED PROJECTS BY INDUSTRY[1]

Industry	*Capital Investments*		
	Domestic	*Foreign*	*Total*
	(RM billion)		
Total	**63.7**	**9.9**	**73.6**
Electrical and electronics products	10.1	2.8	12.9
Natural gas	8.0	1.5	9.5
Transport equipment	6.5	0.6	7.1
Basic metal products	6.1	1.0	7.1
Petroleum products, including petrochemicals	4.4	0.9	5.4
Chemicals and chemical products	4.2	0.4	4.6
Non-metallic mineral products	2.8	0.6	3.4
Wood and wood products	3.0	0.4	3.4
Paper, printing and publishing	3.0	0.4	3.4
Food manufacturing	3.2	0.3	3.5

Note: [1] Implemented as at 31 December 2005

Source: Malaysian Industrial Development Authority

22.07 As at the end of 2005, a total of 1,421 companies were granted Multimedia Super Corridor (MSC) status. Of these, 1,033 were Malaysian-owned companies and 39, joint ventures with equal ownership. In 2005, of the total of 258 companies granted MSC status, 185 were wholly Malaysian-owned and 41, joint-ventures. Domestic investments in information and communication tecnology (ICT) services totalled RM5.6 billion. Investments were in various types of ICT activities, including software development, systems integration, communication, multimedia, and education and training.

(c) Outward Investments

22.08 Outward investments by Malaysian companies have been increasing. According to the World Investment Report 2005, Malaysia's outward stock of investments increased from US$2.7 billion (RM7.3 billion or 6.1 per cent of Malaysia's GDP) in 1990 to US$13.8 billion (RM52.4 billion or 11.7 per cent of the GDP) in 2004. In 2005, gross outflows of outward investments from Malaysia totalled RM13 billion. These were mainly to newly industrialised economies, countries in the Association of Southeast Asian Nations (ASEAN), Africa, the Netherlands, the United States of America (USA) and the United Kingdom (UK). Malaysian companies operating overseas were mainly involved in oil and gas, and services, including construction, telecommunications, property and real estate. These accounted for 77 per cent of Malaysia's outward investments. Almost half of the outward investments were undertaken by non-financial public enterprises, while Malaysian-owned companies accounted for the remaining 52 per cent (Chart 22.1).

TABLE 22.3

APPROVED PRIVATE INVESTMENTS[1] IN SELECTED SERVICES SUB-SECTORS, 2003-2005

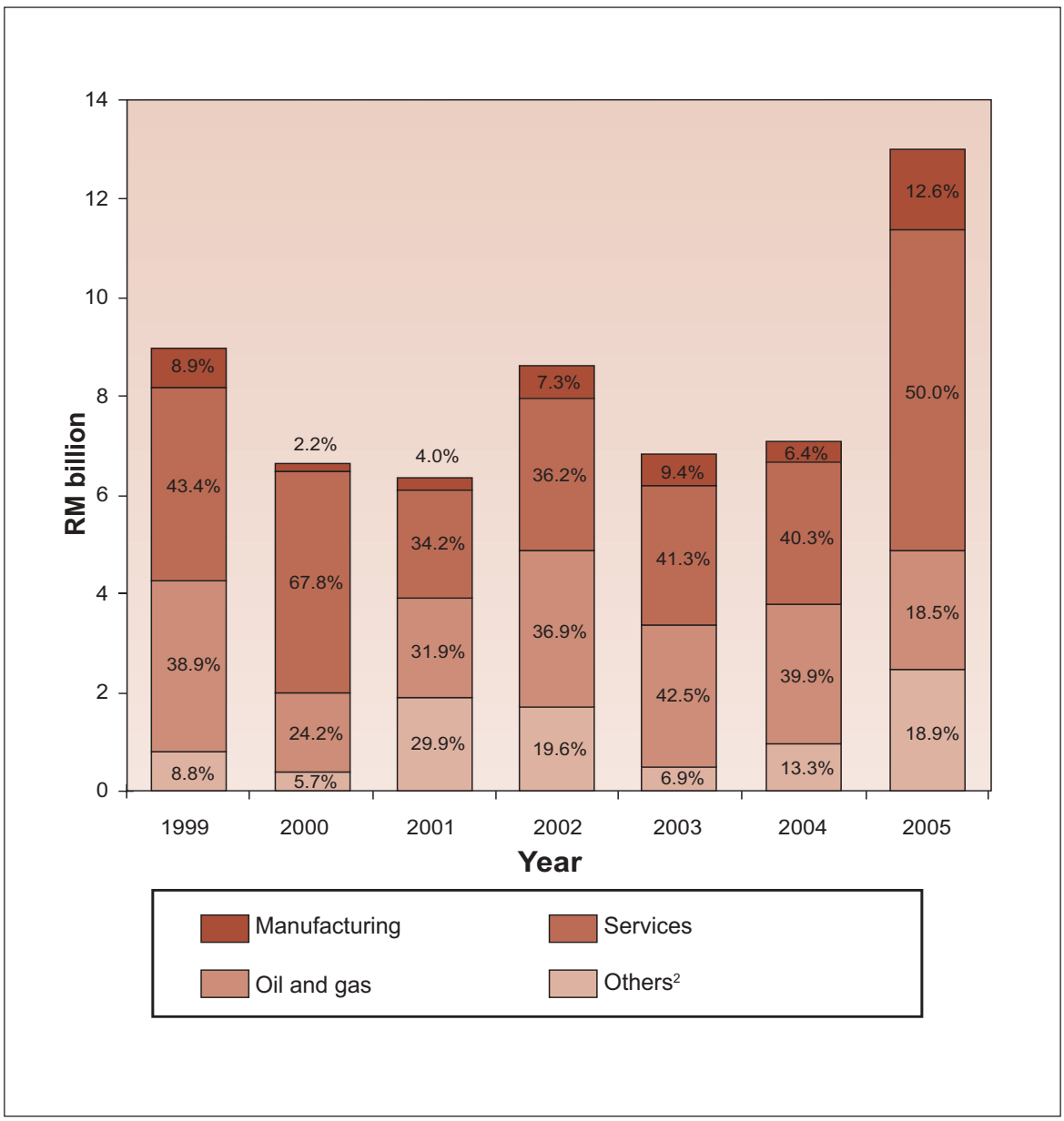
Services Sub-Sector	*2003*	*2004*	*2005*	*2003*	*2004*	*2005*	*2003*	*2004*	*2005*	*2003*	*2004*	*2005*
	Domestic Investments (RM million)			*Foreign Investments (RM million)*			*Total Investments (RM million)*			*Number of Projects Approved*		
Total	**51,735.8**	**42,757.5**	**52,456.4**	**2,808.7**	**3,500.9**	**3,773.2**	**54,544.5**	**46,258.4**	**56,229.6**	**2,626**	**2,140**	**2,453**
Real estate	20,583.8	19,359.2	21,719.2	151.4	120.8	127.4	20,735.2	19,480.0	21,846.6	662	296	1,209
Transport	11,174.6	9,282.2	10,917.6	85.1	30.0	41.5	11,259.7	9,312.2	10,959.1	78	51	71
Road and highways	1,149.7	400.9	7,958.4	nil	nil	nil	1,149.7	400.9	7,958.4	8	8	10
Maritime	4,168.4	7,992.7	2,276.4	50.0	nil	0.5	4,218.4	7,992.7	2,276.9	58	32	36
Utilities	11,225.7	4,372.3	8,671.6	1.9	nil	8.1	11,227.6	4,372.3	8,679.7	10	7	15
Telecommunications and IT	5,728.9	6,165.8	5,641.9	704.3	460.2	462.7	6,433.2	6,626.0	6,104.6	173	202	294
Financial services	1,297.9	2,043.6	2,654.6	203.1	2,032.6	651.4	1,501.0	4,076.2	3,306.0	64	61	79
Hotels and tourism	892.8	876.5	1,334.7	803.9	184.1	831.4	1,696.7	1,060.6	2,166.1	17	42	29
Education services	204.5	21.9	17.7	28.0	0.6	0.3	232.5	22.5	18.0	209	42	36

Note: [1] Data available cover only companies granted incentives and grants

Sources: Various ministries and agencies

CHART 22.1

GROSS OUTFLOWS OF INVESTMENTS[1] FROM MALAYSIA BY MAJOR SECTORS



Notes: [1] Include gross outflows of equity, short- and long-term inter-company borrowings and outflows for real estate. Exclude retained earnings

[2] Include agriculture, construction and other unclassified sectors

Source: Cash Balance of Payments Reporting System, *Bank Negara Malaysia*

(d) Research and Development

22.09 Total Government expenditures on R&D increased from RM549.2 million, or 0.2 per cent of the GDP, in 1996 to RM4.3 billion (0.9 per cent of the GDP) in 2005. Comparatively, expenditures on R&D by other countries in the region were higher. According to the World Competitiveness Yearbook 2006, Malaysia was ranked 44th out of 61 countries, in terms of total expenditures on R&D. In comparison, Japan was second, Republic of Korea (ninth), India (26th) and Singapore (30th). In terms of expenditures on R&D by the private sector, the yearbook ranked Malaysia 38th out of 59 countries. The private sector in Malaysia spent US$535 million or RM2 billion on R&D, compared with US$101.5 billion (RM385.5 billion) by the private sector in Japan (ranked second), US$12.2 billion (RM46.3 billion) by Republic of Korea (seventh), and US$1.5 billion (RM5.8 billion) by Singapore (28th).

22.10 Malaysia formulated policies and programmes to promote and encourage innovation. Priority is given to science and technology (S&T), R&D and human resource development. To encourage private sector involvement in R&D activities, the Government provided financing, in the form of grants and loans. During the period 2001-2005, a total of 2,431 projects were approved, involving funding of RM800 million. Funds established by the Government for R&D included:

- Industry Research and Development Grant Scheme for R&D in areas such as advanced manufacturing, advanced materials, environment technology, ICT and photonics. During the period 2001-2005, a total of 56 projects were approved, involving funding of RM127.1 million. Since the scheme was introduced in 1998, a total of 65 projects had been commercialised, which generated sales of RM149.6 million;

- Technology Acquisition Fund, which is aimed at enhancing the technology development of Malaysian-owned manufacturing companies, particularly in advanced materials, electronics and transport equipment. For the period 2001-2005, assistance was provided through the fund to 40 projects in the acquisition of technologies for enhancing manufacturing processes and product development. The projects resulted in the introduction of 20 new products, five new processes and 18 new production lines, in addition to the enhancement of four existing production lines; and

- Commercialisation of Research and Development Fund, which made available RM31.7 million for the commercialisation of 28 R&D projects. Of the amount allocated, 53 per cent were for the commercialisation of in-house R&D by companies, while 47 per cent were for the commercialisation of R&D findings by public research institutes and universities. The fund facilitated the development of 21 new products and 7 new production processes. It also led to the development of 30 patents and industrial designs.

(e) Human Capital

22.11 In general, the productivity level of foreign-owned companies was higher than that of Malaysian-owned companies. In 1996, the productivity level of foreign-owned companies was 1.1 times higher than that of Malaysian-owned companies. This gap widened to 1.8 times in 2005 (Table 22.4). In respect of companies in the textiles and apparel industry, in 1996, the productivity level of the foreign-owned companies was higher by 2.9 times. Nevertheless, in 2005, Malaysian-owned companies in the industry were able to overtake the foreign-owned companies, in terms of productivity levels, resulting in the drop of the productivity level of the foreign-owned companies to 0.8 times. Other industries which recorded improvements, in terms of reducing the productivity gap, were rubber products, non-metallic mineral products, beverages and tobacco, and furniture and fixtures.

22.12 In terms of productivity growth, during the period 1996-2005, Malaysian-owned companies recorded productivity growth of 0.4 per cent, compared with 5.4 per cent for foreign-owned companies. Among the industries in which Malaysian-owned companies registered high productivity growth were chemicals and chemical products (4.9 per cent), machinery, except electrical (4.3 per cent), food (4.2 per cent), and furniture and fixtures (3.2 per cent). Malaysian-owned companies in both the chemicals and chemical products, and rubber products industries registered higher productivity growth, surpassing that of the foreign-owned companies:

- productivity growth of 4.9 per cent in chemicals and chemical products, compared with 2.3 per cent by the foreign-owned companies; and
- productivity growth of 0.1 per cent in rubber products, compared with a decline of 2 per cent by the foreign-owned companies.

SECTION III CHALLENGES

22.13 Domestic companies are faced with challenges, which include increased liberalisation of trade, investments and services; rapid pace of technological developments; and the need for greater involvement in R&D and innovation activities. There will be opportunities arising out of the challenges. To be able to take advantage of the opportunities, Malaysian-owned companies will need to enhance their capacities and capabilities and undertake initiatives in various areas. The areas include:

- undertaking outward investments, including mergers and acquisitions (M&As);
- enhancing competitiveness in outsourcing;

TABLE 22.4

RELATIVE PRODUCTIVITY LEVELS AND GROWTH

	Foreign-Owned Companies		*Malaysian-Owned Companies*		*Relative Productivity (Malaysian-Owned Companies = 1)*		*Productivity Growth Rate (%)*	
	1996	*2005*	*1996*	*2005*	*1996*	*2005*	*1996-2005*	*1996-2005*
	(RM)						*Foreign*	*Malaysian*
Manufacturing	**50,259**	**73,559**	**44,050**	**40,749**	**1.1**	**1.8**	**5.4**	**0.4**
Non-resource based								
Transport equipment	47,898	83,926	78,095	61,050	0.6	1.4	8.1	0.01
Machinery, except electrical	51,619	82,792	45,117	50,013	1.1	1.7	7.1	4.3
Electrical and electronics	49,744	82,295	43,055	46,395	1.2	1.8	7.0	-0.2
Fabricated metals	53,428	61,261	37,910	39,158	1.4	1.6	4.1	1.8
Textiles and apparel	66,723	18,364	22,879	22,366	2.9	0.8	-3.7	0.2
Resource based								
Chemicals and chemical products	108,331	180,460	77,300	86,797	1.4	2.1	2.3	4.9
Non-metallic mineral products	81.468	67,635	60.493	66,277	1.3	1.0	-3.2	-0.1
Food	52,025	92,621	40,356	61,458	1.3	1.5	6.3	4.2
Beverages and tobacco	192,371	132,893	60,611	59,301	3.2	2.2	-1.9	-1.1
Rubber products	46,202	39,974	31,922	30,232	1.4	1.3	-2.0	0.1
Furniture and fixtures	27,184	29,913	20,817	24,931	1.3	1.2	4.0	3.2
Wood and wood products	19,480	29,407	22,856	21,408	0.9	1.4	6.5	0.3

Source: National Productivity Corporation

- enhancing capabilities in R&D, marketing and distribution to enable Malaysian-owned companies to become an integral part of the global supply chains, and production and distribution networks;

- encouraging greater conformance to international standards; and

- undertaking synergistic collaborations with other domestic entities, as well as foreign companies.

22.14 Challenges faced by Malaysian-owned companies include:

- competitive pressures arising from a more open trading and investment environment;

- leveraging upon outward investments to enhance competitiveness;

- enhancing technological capabilities;

- limited involvement in R&D and innovation activities;

- compliance with international standards;

- more active involvement of the private sector, trade and industry associations and chambers of commerce in enhancing the business environment; and

- increasing demands for corporate social responsibility.

The challenges for the Government are to develop and promote Malaysian standards and create a facilitative and conducive environment to facilitate the operations of the Malaysian-owned companies.

(a) Competitive Pressures Arising from a More Open Trading and Investment Environment

22.15 A key feature of the economic development during the Plan period will be an increasingly open trade and investment environment. The challenge for Malaysian-owned companies will be to manage these developments to be able to sustain and increase their domestic market share, as well expand globally to take advantage of opportunities which will arise. The challenge for the Government will be not only to ensure adequate policy space within the multilateral, regional and bilateral context, but also institutional support mechanisms to assist Malaysian-owned companies to remain competitive.

(b) Leveraging upon Outward Investments to Enhance Competitiveness

22.16 Outward flows of FDIs from developing countries have been increasing, in response to regional investment agreements, and regional and bilateral free trade agreements (FTAs). Malaysian companies will need to expand overseas to take advantage of opportunities arising from these agreements. Encouraging and supporting Malaysia's outward investments is important for strengthening and consolidating Malaysia's industrial competitiveness. Institutional support will be needed to facilitate such investments.

22.17 Market access and improvements in domestic capabilities, as well as enhancement of competitiveness can be facilitated through strategic alliances and partnerships with foreign affiliates. There may be a need for less competitive industries to relocate to third countries to maintain their competitiveness and market share. More established companies need to be encouraged to expand their operations overseas to gain greater access to markets and resources.

(c) Enhancing Technological Capabilities

22.18 Technology will enable Malaysian-owned companies, especially SMEs, to enhance product development, and improve production processes and service delivery. In addition, the presence of technologically capable Malaysian-owned companies will be an important leverage for attracting investments, as well as facilitating the involvement of these companies in the global supply chain. The challenge for Malaysian-owned companies will be in the acquisition, adoption and adaptation of technologies to facilitate the enhancement of value-added production processes and service delivery.

(d) Limited Involvement in Research and Development and Innovation Activities

22.19 Investing in R&D and innovation activities, including design and development (D&D), branding, and packaging and labelling, is important to enhance domestic capabilities. Given that these activities can lead to the creation of niche markets, as well as enhance the competitiveness of Malaysian-owned companies, it is important to:

- encourage Malaysian-owned companies, including SMEs, to increase investments in R&D and innovation activities; and
- create an environment which will facilitate such investments, including providing assistance for R&D.

(e) Compliance with International Standards

22.20 Compliance with international product and service standards is a pre-requisite for companies which aim to gain global competitiveness. The standards include those of International Organization for Standardization (ISO), Good Manufacturing

Practices (GMP), Good Regulatory Practices (GRP), phytosanitary requirements and quality standards with an environmental focus. The challenge for Malaysian-owned companies is to build up or acquire the required resources and capacity which will facilitate the adoption of and compliance with those standards.

(f) More Active Involvement of the Private Sector in Enhancing the Business Environment

22.21 Organisations of the private sector, in particular, trade and industry associations and chambers of commerce, are important in assisting the Government in the formulation and implementation of policies and plans for enhancing the business environment. To collaborate effectively with, and provide timely feedback, in respect of data and information, to the Government, there is a need for such private sector organisations to, among others:

- be well represented;
- have the necessary capabilities for research, for example, analysing the impact of globalisation and FTAs on industry; and
- have the capacity to undertake training for their members in areas such as productivity and quality management, standards, and technology acquisitions and applications.

(g) Increasing Demands for Corporate Social Responsibility

22.22 Issues of sustainable development, effective protection of the environment and prudent use of natural resources are increasingly having an impact on industry. Consumers, both domestic and foreign, are increasingly concerned about the environmental and social impacts of the products and services they purchase. To take advantage of this trend, Malaysian-owned companies will need to ensure that business practices contribute towards sustainable development and incorporate policies and measures to enhance corporate social responsibility.

(h) Developing and Promoting Malaysian Standards

22.23 Equally significant in enhancing the competitiveness of domestic industries is the development and promotion of Malaysian standards. This is relevant particularly in industries where Malaysia has the edge and competitive advantage, for example, the *halal* industry. There will be a need to ensure the systematic development and promotion of these standards. In addition, it will be necessary to hasten the harmonisation of Malaysian standards with international standards, to gain global acceptance of Malaysia's products and services. There will also be a need to enhance the enforcement of the standards, covering both domestic and imported products and services.

(i) Creating a More Facilitative and Conducive Environment

22.24 A well functioning public sector will contribute towards enhancing national competitiveness. There is a need to continually upgrade the efficiency and enhance the effectiveness of the public sector. This includes a regular review of policies, processes and procedures, as well as undertaking measures in ensuring the quality, reliability and cost effectiveness of public utilities. In view of the increasingly open trade and investment environment, resulting from liberalisation, the Government will need to consider appropriate measures, including incentives, to assist Malaysian-owned companies to operate effectively in such an environment.

SECTION IV STRATEGIES AND POLICIES

STRATEGIC THRUSTS

22.25 For Malaysian-owned companies to be competitive domestically and globally, measures will be undertaken to improve and enhance their capacities and capabilities, to be able to operate effectively in a rapidly changing business environment. Towards achieving this objective, 11 strategic thrusts have been set:

(1) upgrading the capacities and innovative capabilities of Malaysian-owned companies, including those in the agro-based industry and the services sector;

(2) enhancing value creation through human capital development;

(3) facilitating the development and application of knowledge-intensive technologies;

(4) developing and promoting standards and encouraging standards conformance;

(5) encouraging SMEs to strive towards becoming larger and more competitive entities;

(6) encouraging strategic alliances among Malaysian-owned companies. In this respect, the larger, more established Malaysian-owned companies will be encouraged to venture into strategic projects and industries and complement, rather than compete with, SMEs;

(7) integrating Malaysian-owned companies into the regional and global networks of production, trade, investments and services;

(8) promoting outward investments;

(9) creating a more conducive environment for the development of domestic capabilities;

(10) strengthening the role of private sector institutions, including trade and industry associations, and chambers of commerce; and

(11) nurturing exemplary corporate social responsibility.

(1) UPGRADING THE CAPACITIES AND INNOVATIVE CAPABILITIES OF MALAYSIAN-OWNED COMPANIES

22.26 To enable Malaysian-owned companies to participate effectively in the regional and global supply chains, their capacities and innovative capabilities will be upgraded. This involves:

- building and enhancing core competencies, including product D&D and product engineering, to meet international standards on quality and delivery. This will involve greater private sector investments in upgrading their capacities, including technological and human resource, complemented by appropriate Government support;

- developing innovative technopreneurs and entrepreneurs, through the creation of an environment which nurtures creativity and innovation. This will involve encouraging risk-taking and creating suitable reward mechanisms, including the sharing of intellectual property rights (IPRs);

- enhancing the capacity building for brand development and promotion. Malaysian-owned companies, especially SMEs, will continue to be provided with resources and assistance to facilitate capacity enhancement and initiatives for brand building and promotion;

- strengthening the intellectual property (IP) framework to encourage innovations, technology transfers and the commercialisation of R&D findings, including:

  - improving the IP regime to make it more conducive for the promotion of innovations and protection of new ideas;

  - reviewing the process of registration of IPRs, with a view to making it more efficient and less costly; and

  - undertaking measures to enhance the IP support facilities and hasten the IP approval process. In addition, the mechanism on the assignment of IP and sharing of royalties will be reviewed; and

- adopting benchmarking and best practices to improve the quality of products and services. This will be undertaken by enhancing the promotion of Benchmarking On-line Database and encouraging greater utilisation of the database of best practices.

22.27 For the agro-processing industry, efforts will focus on:

- enhancing productivity and performance through capacity building at the public sector institutional and industry levels. Particular attention will be given to strengthening the capacity of technical support, extension and research institutions;

- improving the efficiency and productivity of traditional agro-based activities. This will be achieved through the enhancement of technical skills and

diffusion of appropriate agro-engineering systems and technologies, to upgrade production and facilitate product development, innovations and diversification;

- intensifying initiatives on human resource development and R&D to develop highly skilled and innovative workforce in new and emerging sciences, such as food, genetic engineering and biotechnology; and
- strengthening marketing and overseas networking through greater private sector collaboration with public sector marketing and export promotion corporations, including the Federal Agriculture Marketing Authority (FAMA) and Malaysia External Trade Development Corporation (MATRADE).

22.28 For the services sector, measures which will be undertaken by the Government include:

- collaborating with the National Professional Services Council (NAPSEC) and Professional Services Development Corporation (PSDC) to facilitate the export of services by Malaysian-owned companies, including SMEs;
- facilitating market access for the service providers through mutual recognition arrangements (MRAs), negotiated either bilaterally or regionally;
- encouraging linkages between SMEs and larger service providers to develop expertise and enhance market access for the SMEs; and
- enhancing service quality through the Malaysian Centre for Service Excellence, an initiative undertaken by the National Productivity Corporation (NPC), in collaboration with local and international organisations.

(2) ENHANCING VALUE CREATION THROUGH HUMAN CAPITAL DEVELOPMENT

22.29 New technological knowledge and capabilities are important in creating innovation systems. Activities to upgrade the human capital to support Malaysian-owned companies include:

- regularly evaluating the academic and industrial training systems to improve the effectiveness of curricula and skills training programmes to enhance the employability and productivity of the workforce;
- strengthening the links among Government institutions of higher learning and the private sector, particularly in R&D and innovation activities, to enhance research in new technologies, products and processes;
- facilitating the sharing of knowledge between industry and academia, as well as collaborating in market-driven R&D activities;
- ensuring the availability of skills to support innovation and technology transfers by facilitating the mobility of researchers and academia to businesses, in particular, SMEs, and vice versa;

- creating more opportunities for undergraduates to undergo training at industry premises;

- providing support to employers to encourage them to intensify their participation in internship programmes for undergraduates; and

- amending the scope of the Human Resource Development Fund (HRDF) so that companies, especially SMEs, can utilise their contributions to continually upgrade industrial training.

(3) FACILITATING THE DEVELOPMENT AND APPLICATION OF KNOWLEDGE-INTENSIVE TECHNOLOGIES

22.30 Measures to facilitate the development and application of knowledge-intensive technologies include:

- intensifying the development of market-driven R&D, through greater collaboration between industry and public and private research institutes. Mechanisms will be put in place to encourage such collaboration, including the review of regulations to facilitate the cross-flow of human capital between industry and the academia;

- providing support to encourage companies to increase the use of enabling technologies to upgrade the processes throughout the value chain, namely, from D&D to marketing and the delivery of products and services; and

- improving access by SMEs to ICT and other enabling technologies. This will be undertaken through:

  - comprehensive outreach programmes, including training and mentoring, by related Government agencies;

  - facilitating access to funding for the acquisition of technologies;

  - promoting greater collaboration between training institutes and industry to assist SMEs in keeping pace with technological developments and applications; and

  - encouraging greater involvement of SMEs in market-driven R&D activities, undertaken by technology incubators.

22.31 For the agro-based industry, measures will also include supporting the application of advanced processing and packaging systems to improve on or replace conventional and traditional techniques for better post-harvest handling and storage, and longer shelf-life of the agriculture produce.

(4) DEVELOPING AND PROMOTING STANDARDS AND ENCOURAGING STANDARDS CONFORMANCE

22.32 Measures to develop and promote Malaysian standards include:

- enhancing the institutional capacity for the greater recognition and acceptance of Malaysian standards internationally. For example, in the case of the *halal* standard, more resources will be provided for the promotion and international recognition and acceptance of the standard; and

- continuing to seek acceptance of Malaysian standards by the relevant international accreditation bodies through MRAs, at the regional and bilateral levels.

22.33 Standards conformance is important for industrial efficiency, productivity and competitiveness. The development and promotion of standards will provide Malaysian industry the edge and leadership in areas where Malaysia has competitive advantage, for example, the *halal* industry. Measures to intensify standards conformance include:

- strengthening outreach programmes, particularly for SMEs, to enhance the awareness and understanding of the importance of standards compliance;
- providing the necessary institutional support to facilitate compliance with international standards among Malaysian-owned companies; and
- expanding accreditation schemes to include more areas, for example, Hazard Analysis and Critical Control Points (HACCP) and ISO 22000 (Food Safety).

Effective enforcement of Malaysian standards, on both imports and locally produced products and services, will also be given emphasis.

(5) ENCOURAGING SMALL AND MEDIUM ENTERPRISES TO BECOME LARGER AND MORE COMPETITIVE ENTITIES

22.34 SMEs have the potential to contribute more significantly to Malaysia's competitiveness. SMEs will be provided with support to:

- enable them to adopt and adapt appropriate technologies to enhance production capabilities and strengthen their competitiveness;

- assist them in developing and promoting new products and services; and

- enable them to expand their operations and businesses overseas and be integrated into the international production networks.

(6) ENCOURAGING STRATEGIC ALLIANCES AMONG MALAYSIAN-OWNED COMPANIES

22.35 For greater efficiency and better utilisation of resources, larger, more established Malaysian-owned companies will be encouraged to venture into more strategic industries and projects. This is to complement, rather than compete, with SMEs. Measures to facilitate this process include:

- encouraging selected companies, especially Government-linked companies (GLCs), to invest overseas, with the long term objective of developing a core group of home-grown multinational corporations (MNCs), capable of gaining access to the overseas markets;

- enhancing the collaboration among the larger Malaysian-owned companies with SMEs. In turn, the Malaysian-owned companies, with the participation of SMEs, will be encouraged to collaborate with MNCs; and

- encouraging the development of Malaysian MNCs. This will be undertaken, for example, through deepening the linkages between Malaysian companies and their partners in the region, to reap economies of scale and capitalise upon the existing networks, local knowledge and strengths of the partners.

(7) INTEGRATING MALAYSIAN-OWNED COMPANIES INTO THE REGIONAL AND GLOBAL NETWORKS

22.36 Integration into the regional and global supply chains will facilitate and hasten the development of Malaysian-owned companies, including SMEs, which are able to operate and compete in an open international business environment. It will result in the building of strategic capabilities, such as market development, technological innovation and international brand building. Measures to facilitate this integration include:

- facilitating mergers, acquisitions, consolidations and strategic partnerships among Malaysian-owned companies, as well as between Malaysian-owned companies and MNCs in Malaysia, and MNCs abroad. Such linkages will enable Malaysian-owned companies to leverage upon the networks and market access of their international partners. Towards this end, public sector agencies, such as MATRADE and Malaysian Industrial Development Authority (MIDA), will intensify their business matching activities. Support will be provided to promote such mergers, acquisitions and partnerships;

- making Malaysia the base for outsourcing activities for manufacturing and services. MNCs will continue to be encouraged to source inputs and resources, including parts and components, from Malaysia, as well as outsource their non-core manufacturing and services activities to Malaysia;

- encouraging Malaysian-owned companies to focus on improving the level of sophistication of their products and services, in terms of quality, design and functionality, as well as meeting international standards for quality and delivery; and

- encouraging Malaysian-owned companies in the services sector to merge or form joint ventures to position themselves to compete for projects overseas.

(8) PROMOTING OUTWARD INVESTMENTS

22.37 Measures to facilitate and encourage outward investments by Malaysian-owned companies include:

- strengthening the institutional support for Malaysia's outward investments. This involves:

  - assisting in the identification of areas for collaborative ventures and synergistic ties for Malaysian-owned companies venturing overseas;

  - intensifying awareness programmes to promote outward business opportunities in selected developing countries; and

  - developing a comprehensive database on information on outward investments, including policies, rules and regulations; administrative procedures; and fiscal and non-fiscal incentives; offered by foreign countries; and Malaysian-owned companies with investments overseas;

- encouraging less competitive industries to relocate overseas to maintain their competitiveness and market share, and encouraging well established companies to expand their operations in other countries to gain greater access to markets and resources; and

- encouraging more financial institutions to support initiatives of Malaysian-owned companies, including SMEs, which undertake new investments overseas.

(9) CREATING A MORE CONDUCIVE ENVIRONMENT FOR THE DEVELOPMENT OF DOMESTIC CAPABILITIES

22.38 A conducive environment is important for the development of domestic capabilities. The Government will undertake measures to enhance the business operating environment, including:

- reviewing regularly regulations, procedures and processes to ensure that they facilitate businesses and investments;

- enhancing assistance programmes to promote investments and reinvestments;

- improving present policies and programmes to enhance the access to capital and financing for the application, adoption and adaptation of technologies;

- encouraging Malaysian-owned companies to utilise alternative sources of financing, including equity financing and venture capital, as well as other financial instruments; and

- providing appropriate economic adjustment programmes and measures to enable Malaysian-owned companies to be better positioned to meet the competition arising from the increasing liberalisation of trade, investments and services.

(10) STRENGTHENING THE ROLE OF PRIVATE SECTOR INSTITUTIONS

22.39 Measures to strengthen the role of private sector trade and industry associations and institutions include:

- encouraging greater participation of companies in trade and industry associations. This will:

  - contribute towards strengthening collective views and responses in the face of increased competition;

  - facilitate the development of outreach programmes which meet the needs of the private sector;

  - ensure that the interests of domestic entities are duly represented in national policy development and decision-making processes; and

  - facilitate the creation of database on the respective industries;

- encouraging greater interactions and networking between private sector organisations and investors;

- encouraging the establishment of Malaysian business councils and associations among Malaysian companies operating overseas. This will facilitate networking, enhance the gathering of market intelligence and enable them to represent their interests more effectively in the host countries;

- providing support to encourage private sector associations to undertake:
  - capacity building, including training and information dissemination;
  - trade and investment promotion; and
  - the provision of other common-user facilities for their members;

  and

- encouraging the establishment of strategic teams in selected industries to develop a long-term vision for the industries and advise relevant Government agencies on policies to be adopted for the industries.

(11) NURTURING EXEMPLARY CORPORATE SOCIAL RESPONSIBILITY

22.40 The level of corporate social responsibility is reflective of the extent to which attitudes and skills for responsible business practices are embedded across businesses. Both the Government and business entities will work in tandem to achieve a higher level of corporate social responsibility. Malaysian-owned companies will be encouraged to establish closer links with consumers to:

- enhance the awareness of consumers of their rights; and
- provide consumers with relevant and accurate information on products of the companies to enable them to make informed choices on their purchases.

22.41 The Government will collaborate with Malaysian-owned companies to:

- intensify outreach and information sharing to enhance the appreciation by the public of the processes of adoption and adaptation of environment-friendly technologies and practices;
- encourage companies to utilise raw materials and energy more efficiently in their production processes;
- ensure the sustainable management and utilisation of resources in the pursuit of agricultural and forestry development. Regulations and rules will be strengthened to encourage environment-friendly agricultural and forestry practices and minimise the negative impact of such activities on the environment. In this respect, research and application of appropriate technologies and innovations will continue to be emphasised; and
- provide appropriate support programmes to enable industry to adopt environment-friendly technologies.

Chapter 23

HUMAN RESOURCE REQUIREMENTS

HUMAN RESOURCE REQUIREMENTS

SECTION I OVERVIEW

23.01 The Third Industrial Master Plan (IMP3), 2006-2020, emphasises two aspects of human resource requirements, namely, ensuring sufficient availability of the human resources, as well as providing a facilitative environment for the workforce to acquire the necessary skills in the professional and technical fields to drive the economy into higher value-added activities. Strategies for human resource management, including human resource planning and development, will focus on the roles of education, training, lifelong learning, capacity building and operating environment to enhance Malaysia's competitive position. In the longer term, strategies adopted on human resources will lead to a more equilibrium labour market, as well as more competitive business operating environment. Appropriate systems and structures for human resource planning will enable Malaysia to respond to the changing global environment and enhance competitiveness at the national and enterprise levels.

23.02 This Chapter:

- assesses the current human resource situation in the manufacturing and services sectors, including employment size and categories, and productivity in the manufacturing sector;
- provides an overview of the global trends influencing human resource management, including technological advancements and greater application of flexible work systems;
- identifies issues and challenges on human resources, including improving the quality of labour through enhancing total factor productivity (TFP) and ensuring available human resources meet industry requirements;
- provides projections of human resource requirements up to 2010 in the manufacturing, services and agriculture sectors; and
- recommends strategies and policies to meet the human resource requirements, including enhancing capacity building for human resource management, planning and development, and increasing the supply of technically-skilled, knowledgeable and ICT-trained workforce.

SECTION II LABOUR MARKET SITUATION

23.03 During the first half of the Second Industrial Master Plan (IMP2), 1996-2005, the manufacturing sector recorded a tight labour market, largely due to the full employment situation and the robust performance of the sector. The Asian financial crisis adversely affected economic growth and employment. In response, measures were undertaken to accelerate economic recovery and address unemployment. These included Government-initiated programmes to improve employability through retraining and skills upgrading, as well as greater emphasis on productivity and competitiveness.

23.04 While Malaysia offers a pool of talented human resources, there is presently a shortage of skilled workforce in specialised fields in engineering, information and communication technology (ICT) and high technologies. To overcome this shortage, companies engaged foreign experts and specialists. As at 2005, there were 35,480 expatriates employed in Malaysia, with 18,679 (52.6 per cent) in the services sector, 40.6 per cent in the manufacturing sector, 2.8 per cent in the construction sector and 0.2 per cent in the plantation sector. Expatriates were generally employed in the higher managerial category and specialised fields, such as oil and gas, biomedicine, research and development (R&D), ICT consultancy and software management. To increase the availability of local experts, the Government implemented the Brain Gain Programme to attract Malaysian talents abroad to return.

23.05 A large number of foreign workers are employed in tasks which require lower skills. As at 2005, there were 1.8 million foreign workers in the country, with 581,379, or 32 per cent, in the manufacturing sector, 26.1 per cent in the plantation sector, 15.5 per cent in the construction sector and 8.8 per cent in the services sector. These workers were employed in jobs for which Malaysians were not available or not willing to fill.

Employment in the Manufacturing and Services Sectors

Employment Size and Categories

23.06 During the IMP2 period, the average annual rate of growth of employment in the manufacturing sector was 4.4 per cent. In 2005, of the total employment of 10.9 million, 3.1 million, or 28.7 per cent, were in the manufacturing sector and 4.5 million (41.3 per cent) in the services sector, excluding Government services. In the manufacturing sector, significant growth in employment was recorded in the chemicals, fertilisers, plastics and petroleum products, and basic metal products industries. In 2005, the largest contributor to employment was the electrical and electronics (E&E) industry, with 840,800 workers, or 26.8 per cent, of the total employment in the manufacturing sector, followed by the wood-based products, including furniture, industry (373,800 or 11.9 per cent) (Table 23.1).

TABLE 23.1

EMPLOYMENT IN THE MANUFACTURING SECTOR

Industry	*1996*		*2005*		*1996-2000*	*2001-2005*	*1996-2005*
	('000 persons)	*Share (%)*	*('000 persons)*	*Share (%)*	*Average Annual Growth (%)*		
Total	**2,203.9**	**100.0**	**3,132.1**	**100.0**	**4.8**	**4.1**	**4.4**
Non-resource based	**1,227.6**	**55.7**	**1,628.3**	**52.0**	**3.0**	**4.3**	**3.7**
Electrical and electronic products	626.6	28.4	840.8	26.8	2.2	5.4	3.8
Basic metals and metal products	177.3	8.0	282.8	9.0	3.8	7.9	5.8
Textiles and textile products	208.7	9.5	214.8	6.9	1.7	-0.1	0.8
Machinery and equipment	130.5	5.9	162.6	5.2	5.8	0.1	2.9
Transport equipment	84.5	3.8	127.4	4.1	5.6	4.7	5.2
Resource based	**922.8**	**41.9**	**1,423.7**	**45.5**	**7.1**	**3.7**	**5.4**
Wood products, including furniture	236.3	10.7	373.8	11.9	10.4	1.2	5.7
Chemicals, fertilisers, plastics and petroleum products	184.6	8.4	327.0	10.4	7.5	6.6	7.0
Food processing, beverages and tobacco	196.7	8.9	298.9	9.5	5.8	4.7	5.2
Rubber processing and products	124.0	5.6	171.5	5.5	2.9	5.4	4.1
Paper and paper products, printing and publishing	95.9	4.4	137.7	4.4	6.7	2.5	4.6
Non-metallic mineral products	85.3	3.9	114.9	3.7	5.8	1.9	3.8
Others	53.5	2.4	80.0	2.6	4.7	5.4	5.0

Source: Economic Planning Unit and Department of Statistics

23.07 During the IMP2 period, the requirement for workers with higher technical skills increased, as a result of more investments in higher value-added manufacturing activities. This shift towards higher value-added activities also led to a greater demand for highly skilled professionals in areas such as engineering, R&D, marketing and ICT. Employment in the managerial and professional group grew at an average annual rate of 4.9 per cent. There was increased demand for engineers in fields such as mechatronics, machine technology and component designing, as well as highly skilled ICT personnel in product and software design and development, and process engineering. Similarly, there was a rising demand for personnel in the technical and supervisory areas. Employment of such personnel grew at an average annual rate of 4.5 per cent, with their share of the total employment in the manufacturing sector constituting 13.5 per cent in 2005. In the skilled workers category, employment grew at an average annual rate of 4.6 per cent, while that for unskilled workers declined by 0.6 per cent (Table 23.2).

TABLE 23.2

EMPLOYMENT IN THE MANUFACTURING SECTOR BY OCCUPATION

Occupational Group	*2000*		*2005*		*2001-2005*
	Number ('000 persons)	*Share (%)*	*Number ('000 persons)*	*Share (%)*	*Average Annual Growth (%)*
Total	**2,565.8**	**100.0**	**3,132.1**	**100.0**	**4.1**
Managerial and professional	184.7	7.2	234.9	7.5	4.9
Technical and supervisory	338.7	13.2	422.8	13.5	4.5
Clerical workers	246.3	9.6	285.0	9.1	3.0
General workers	125.7	4.9	140.9	4.5	2.3
Skilled	1,518.9	59.2	1,901.2	60.7	4.6
Unskilled	151.4	5.9	147.2	4.7	-0.6

Sources: Ministry of International Trade and Industry, and Economic Planning Unit

23.08 While the demand for professionals and skilled workforce grew steadily during the IMP2 period, their availability was limited. The shortage of highly skilled personnel was due to a mismatch in skills and industry requirements. In the technical category, there was a shortage of skills in web designing and development, content development, animation and graphic designing, systems analysis and designing, and systems and hardware engineering. In the management category, the industry faced difficulty in recruiting professionals in finance, international marketing and management information systems. There was also a shortage of engineers and scientists in R&D. This posed a major constraint for public and private sector institutions in expanding their research activities. In 2002, there were 18 researchers per 10,000 workers in Malaysia, compared with 112.8 in Japan, 99 in Australia and 83.5 in Singapore.

Productivity

23.09 During the IMP2 period, the manufacturing sector recorded an average annual growth in productivity of 3.9 per cent. High growth in output and productivity was recorded in 2000, at 18.3 per cent and 11.1 per cent, respectively (Table 23.3). In 2005, sales value per employee grew by 14.1 per cent. The sector benefited from strong external demand, particularly for semiconductors and chemical related products. The E&E industry continued to produce high-end industrial and consumer electronic products for the world market.

TABLE 23.3

GROWTH IN PRODUCTIVITY AND OUTPUT IN THE MANUFACTURING SECTOR

	1996	*2000*	*2005*
	(%)		
Productivity	5.8	11.1	3.8
Output	12.4	18.3	4.8

Source: National Productivity Corporation

23.10 In 2005, the manufacturing sector recorded an improvement in labour cost competitiveness. The improvement was the result of the higher increase in productivity of 14.1 per cent, compared with the increase in labour cost per employee of 3.2 per cent. Most of the industries recorded improvement in labour cost competitiveness, including iron and steel, chemicals and chemical products, automotive, petroleum products, textiles and E&E (Table 23.4).

TABLE 23.4

LABOUR COST COMPETITIVENESS, 2005

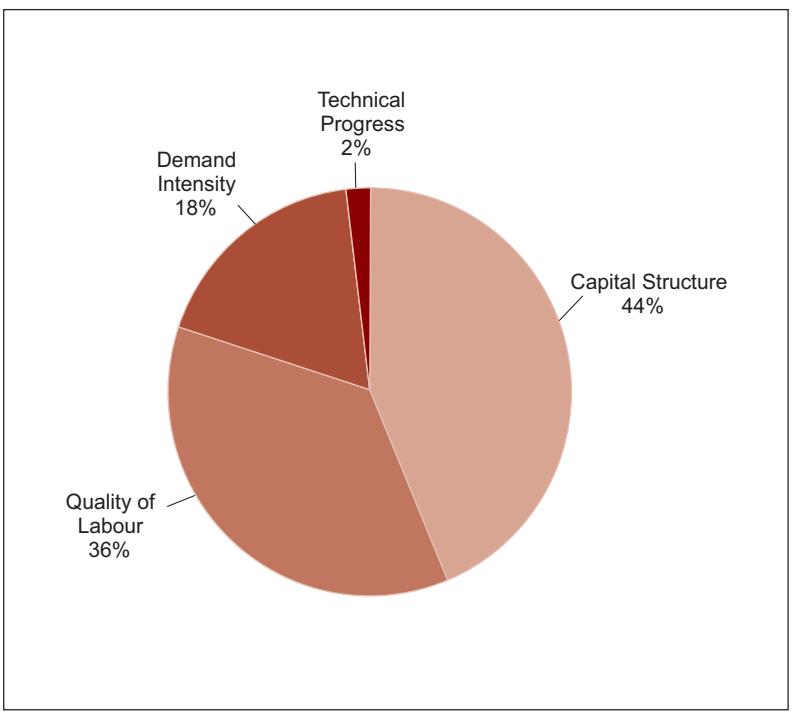
Industry	*Growth (%)*	
	Productivity	*Labour Cost per Employee*
Overall manufacturing	**14.1**	**3.2**
Iron and steel	22.0	6.9
Chemicals and chemical products	16.1	9.6
Automotive	14.8	-4.7
Petroleum products	14.3	5.1
Textiles	12.3	-5.3
Electrical and electronics	10.4	4.1
Apparel	7.7	0.2
Rubber products	6.1	3.2
Machinery and equipment	5.2	-0.2
Wood and wood products	4.5	2.4
Cement	4.1	0.4

Source : National Productivity Corporation

23.11 During the IMP2 period, the manufacturing sector recorded an overall growth in TFP of 3.4 per cent. Sources of growth in the TFP were capital structure, which contributed 44 per cent to the TFP growth, quality of labour (36 per cent), mainly as a result of continuous human resource development (HRD) through training and skills upgrading, demand intensity (18 per cent) and technical progress (2 per cent) (Chart 23.1).

CHART 23.1

SOURCES OF GROWTH IN TOTAL FACTOR PRODUCTIVITY FOR THE MANUFACTURING SECTOR, 1996-2005



Source : National Productivity Corporation

Legal Environment for Employment

23.12 Present labour laws include:

Act	Major Provisions
Employment Act 1955	Covers: - all manual and non-manual workers earning RM1,500 and below; - minimum benefits and rights of employees, including working hours, annual leave and public holidays, overtime rates and sick leave; and - issues, such as termination and retrenchment. The act was amended in 1998 to allow, among others, for workers earning RM5,000 and below to complain to Labour Department for violation by the employer of any term and condition of the employee's contract of service. The act was last amended in 2000.
Industrial Relations Act 1967	Governs the relationship between employers and employees and their trade unions, and the prevention and settlement of differences of disputes arising from the relationship.
Social Security Act 1969	Covers workers who earn RM3,000 and below. The act provides for benefits and pension if a worker is injured or disabled during working hours, or while travelling to and from work. It was last amended in 2005.
Occupational Health and Safety Act 1994	Protects the worker against unsafe work sites and unhealthy work practices.

Although the necessary labour legislations are in place, organisations and workers still face constraints, including lack of flexibility to adjust work systems relating to employment, remuneration systems and multi-tasking, determination of hours of work and termination.

SECTION III GLOBAL TRENDS IN THE DEVELOPMENT OF HUMAN RESOURCES

23.13 Trends which influence the management, planning and development of human resources include:

- globalisation, which promotes bilateral and regional economic integration, encourages freer movement of people and intensifies competition for skilled workers;
- technological advancements;
- greater application of flexible work systems; and
- growing emphasis on the need for the adoption of international business standards and social obligations by enterprises.

(a) Globalisation

23.14 Globalisation influences the nature of supply of and demand for human resources in a country. Greater bilateral and regional economic integration promotes freer movement of people. As the knowledge, skills and innovativeness of the workforce increasingly become a major influence on economic competitiveness, the global demand for such skilled workers has resulted in increased cross migration of these talents.

(b) Technological Advancements

23.15 Advancements in technology form a significant feature of global transformation. The continuing diffusion of information technology (IT) has increased opportunities for businesses to improve production and operating efficiencies. Companies leverage upon ICT to reduce costs and enhance productivity. Besides having an impact on work processes, ICT is changing the concept of the workplace. By facilitating networking and interconnectedness, workers need not be located at a specified place. Thus, ICT facilitates corporate decisions, for example, outsourcing of non-core activities, while increasing the possibilities for greater workplace flexibilities, including tele-working and e-learning on the job. In addition, advancements in ICT have also led to the development of related activities, for example, e-commerce. These developments have given rise to the need for specialised ICT skills.

(c) Flexible Work Systems

23.16 Work systems are evolving towards high performance, self-managed, cross-functional teams, with greater transparency and information sharing. More decision-making is delegated and employees are more empowered. Under such work systems, the remuneration system is increasingly linked to the performance of employees and corporations. This requires a flexible system of remuneration, based on productivity and performance.

(d) International Business Standards

23.17 Greater global competition and growing awareness of social responsibility have led to the formulation of international business standards, which influence workplace practices. Examples are the application of ISO 9000 (Quality Management Systems), ISO 14001 (Environment Management Systems), Occupational Health and Safety Management Systems and ISO 22000 (Food Safety Management Systems). These standards represent international consensus on business practices on quality management, environmental management, occupational health and food safety management.

23.18 International organisations, such as the Organisation for Economic Cooperation and Development (OECD), International Labour Organisation (ILO) and United Nations, are promoting standards in the areas of human rights, labour and sustainable development. Conventions, protocols and initiatives by these organisations include:

- ILO declarations on fundamental principles and rights at work;
- Global Compact, an initiative of the United Nations, which encourages corporate responsibility and support, among others, on the protection of human rights, upholding the freedom of association, recognition of the rights of collective bargaining and promotion of environmental responsibility;
- guidelines on social responsibility by the International Organization for Standardization (ISO), which will be published in 2008 as ISO 26000; and
- OECD guidelines for multinational enterprises.

Enterprises are committing to these initiatives, as part of the larger goal of social responsibility and also to meet market requirements.

SECTION IV CHALLENGES

23.19 Challenges in meeting human resource requirements in the IMP3 include:

- ensuring human resources meet industry requirements;
- enhancing total factor productivity (TFP);
- greater acceptability and adoption of performance-based remuneration systems, for example, Productivity-Linked Wage System (PLWS);
- legal environment for employment;
- regional integration;
- human resource management as a strategic organisational function;

- enhancing capacity building;
- employment of expatriates;
- employment of foreign workers;
- increasing the involvement of women in employment; and
- increasing employment opportunities for people with disabilities.

(a) Ensuring Human Resources Meet Industry Requirements

23.20 Competition arising out of globalisation, together with technological advancements, intensifies the demand for a more highly skilled workforce. Education and knowledge will be a major determinant of competitiveness at the national, organisational and individual levels. There is a need for a high degree of coordination between industry, and educational and training institutions, to address the mismatch between the output from these institutions and industry requirements. A more effective mechanism needs to be established to monitor human resource trends and match industry requirements.

(b) Enhancing Total Factor Productivity

23.21 An important element of productivity improvement is the quality of labour, which has an impact on the growth of TFP of an economy. TFP measures the quality of capital and labour, as well as the efficiency with which these are managed to enhance productivity growth. It refers to the additional output generated through enhancements in efficiency, arising from advancements in knowledge, skills upgrading, results-oriented management techniques, application of best practices and technology, and innovations.

23.22 To achieve the targeted growth of the GDP of 6.3 per cent in the IMP3, Malaysia needs to maintain TFP growth in the manufacturing sector at an average annual rate of 2.6 per cent. As the quality of labour is one of the components of the TFP, industries need to continously upgrade the levels of knowledge, skills and quality of their workforce, to keep pace with technological advancements. Contributions by the other components of the TFP, namely, capital structure, demand intensity and technical progress, will also need to be enhanced.

(c) Performance-Based Remuneration Systems

23.23 The present system of wage determination, which focuses on fixed salary scales with pre-determined salary increments, is not reflective of the changing economic situation or productivity and performance improvements. Performance-based remuneration systems link productivity and performance of the employees or company, either individually or collectively, to the remuneration system. By

doing so, the company will be able to reduce the cost of doing business, while employees are rewarded for enhanced performance. A remuneration system linked to performance will contribute towards enhancing the competitiveness of the organisation. At the enterprise level, performance-based measures are needed to promote continuous improvements in productivity and quality for sustained competitiveness. The productivity gains from performance improvements will need to be shared among the employees through profit sharing schemes.

23.24 The Productivity-Linked Wage System (PLWS) represents a model which comprises fixed and variable components. The fixed component determines the value of the job, while the variable component determines the incentives to be paid, if productivity and performance improve. The model is based on three main approaches:

- profitability;
- productivity; and
- combination of profitability and productivity.

23.25 In the unionised sector, wages and other conditions of employment are determined through collective bargaining. The wage structure in the non-unionised sector is specified in the contract of service. It may be in the form of a fixed salary scale or range, with minimum and maximum annual increments, until the employee reaches the maximum in the salary range. The fixed wage structure may not reflect the prevailing business performance or financial position of the company.

23.26 To enhance competitiveness, a wider adoption of remuneration systems, based on productivity and performance (for example, the PLWS) needs to be encouraged at the firm level. Such systems will:

- establish a closer link between wages and productivity to enhance competitiveness and promote employment stability;
- enable employers to develop a wider and systematic approach towards improving productivity and rationalising the wage structure through the involvement and cooperation of their employees; and
- enable employees to obtain a fair share of the gains arising from productivity growth and performance improvements.

(d) Legal Environment for Employment

23.27 Labour legislation needs to allow for more flexibility for organisations to manage their human resources and businesses, particularly in the areas of:

- remunerations based on productivity;

- determination of hours of work;
- multi-skilling and multi-tasking;
- on-the-job training;
- mobility of labour;
- restructuring of businesses;
- termination of service;
- part-time employment; and
- internship programmes for undergraduates.

The challenge is to ensure that the labour laws promote human resource practices which are conducive to productivity improvement and enhancement of competitiveness.

(e) Regional Integration

23.28 ASEAN Economic Community (AEC) is expected to become a reality by 2020. With the creation of the AEC, it is envisaged that there will be freer movement of workers within ASEAN. A major challenge is to sustain and enhance the competitiveness of the Malaysian workforce. In addition, while retaining local talents, there is a need to attract best talents from the region. Other initiatives on regional integration, such as ASEAN + 3 (People's Republic of China, Japan and Republic of Korea) and other free trade arrangements (FTAs), will result in more intense global competition for workers with high skills, knowledge and talents. The challenge is for the education and training systems to produce a workforce able to take advantage of the opportunities which will arise from the greater and freer flow of information, capital, goods, services and people.

(f) Human Resource Management as a Strategic Organisational Function

23.29 Given global competition for investments and resources, human resource management, including planning and development, needs to be undertaken as a more strategic function within the organisations. For human resource professionals, the effective management of knowledge workers will be important. Whether at the organisational or national levels, they need to acquire detailed understanding of both business needs, as well as sourcing of relevant human resources. Equally important will be the management, retention and continued development of such talents.

(g) Capacity Building

23.30 As Malaysia strives for greater industrialisation, initiatives on capacity building need to be strengthened. The private sector needs to be more involved in such initiatives, in collaboration with relevant public sector agencies and

organisations. The areas of involvement and collaboration include the development and training of the workforce, as well as the reform of the national education and training systems, and designing of the infrastructure.

23.31 Challenges in capacity building will need to be addressed at the stages of pre-employment and during employment:

- Pre-employment
  - reducing teacher-to-student ratio to 1:25;
  - building more technical, vocational and community colleges to provide greater avenues for school leavers to acquire relevant skills;
  - establishing networks between institutions of higher learning, alumni and industry to enhance career development, training and R&D;
  - strengthening the internship programme for students at the tertiary level;
  - developing industry-based curricula which are flexible to meet the changing needs of industries; and
  - developing an educational system which promotes an innovative culture; and
- During employment
  - encouraging more employers to undertake on-the-job training for their employees; and
  - promoting a culture of lifelong learning to enhance skills and employability.

23.32 As a short-term measure, the National Brain Gain Programme was introduced to attract Malaysian talents abroad to return to increase the domestic availability of professionals and skilled workforce. The challenge is not only in making the programme more attractive for such talents, but also in facilitating the optimal utilisation of such talents.

(h) Expatriates

23.33 The challenge will be to attract foreign talents into the country, especially professionals, middle-level skilled personnel and entrepreneurs. This will be necessary to complement indigenous talents, for example, in R&D required by high technology industries, as well as the services sector.

(i) Foreign Workers

23.34 Foreign workers are employed in lower-skilled and lower value-added jobs, where Malaysians are not available, nor interested. The challenge is to reduce the dependence on foreign workers over time. There is a need to promote automation, improve the work environment to make it more conducive for Malaysians to be employed and enhance flexibility in entry levels to allow for appropriate remuneration.

(j) Women in Employment

23.35 The objectives of the National Policy on Women are to:

- ensure equitable sharing of resources and development opportunities between the genders; and
- integrate women into all sectors of development, in accordance with their capabilities and needs.

23.36 Out of the total of 8.2 million women, aged between 15 and 64, female employees constitute 48 per cent of the workforce. There is a need to improve the percentage, taking into consideration that there is a greater number of females, compared with males, enrolled in secondary and tertiary educational institutions. The challenge is to work towards better resource utilisation through creating a more conducive and flexible work environment for the employment, as well as re-employment, of competent and skilled women.

(k) Persons with Disabilities

23.37 There is a need to increase the employment of persons with disabilities. It is estimated that 220,000 persons, or about 1 per cent, of Malaysia's population comprise persons with disabilities. However, presently, only 99,000 of these persons are registered with the Welfare Department. As at 2005, a total of 6,167 of these persons have been placed in employment in the private sector by the Ministry of Human Resources and other agencies. The challenge is not only to provide greater opportunities for the utilisation of the potential talents of the persons with disabilities, but also create the employment environment which can accommodate such individuals.

SECTION V HUMAN RESOURCE AVAILABILITY AND REQUIREMENTS

(a) Human Resource Availability

23.38 The cohort of 17-18 year olds graduating from the school system is expected to total 373,283 in 2005, 414,170 in 2010 and 477,581 in 2020. Students graduating from vocational and technical institutes are expected to account for about 19 per cent of the total school leavers in 2005 and 21 per cent of the total school leavers in 2010 and 2020.

23.39 The cohort of 19-20 year olds with post secondary education is expected to total 137,994 in 2005, with about 66 per cent from the arts stream and 34 per cent, the science stream. The size and composition of the cohort in 2010 and 2020 are expected to be:

- in 2010, the cohort will increase to 194,876, with 65 per cent from the arts stream; and
- by 2020, the total will number 288,487, with about 64 per cent from the arts stream.

23.40 The 21-24 year olds with tertiary education from public universities will total 244,527 in 2005, with 42.4 per cent from the arts stream, 29.4 per cent, the sciences and 28.2 per cent, the technical field. The size and composition of the cohort in 2010 and 2020 are expected to be:

- by 2010, the cohort will total 305,314, with 39.5 per cent from the arts stream, 29.4 per cent, the sciences, and 31.1 per cent, the technical field; and
- by 2020, the total is expected to reach 430,600, with 40 per cent from the arts stream and 60 per cent, the sciences, including the technical field (Table 23.5).

TABLE 23.5

OUTPUT OF THE EDUCATIONAL SYSTEM BY COHORT

Cohort	*No. of Graduates*		
	2005	*2010*	*2020*
17-18 year olds	373,283	414,170	477,581
19-20 year olds	137,994	194,876	288,487
21-24 year olds	244,527	305,314	430,600

Sources: Ministry of Education and Economic Planning Unit

(b) Human Resource Requirements

23.41 Total employment in the economy is projected to register an average annual growth of 1.9 per cent during the period 2006-2010, from 10.9 million workers in 2005 to 12 million in 2010 (Table 23.6). For the period 2011-2020, total employment is expected to register higher growth. This is in tandem with the anticipated expansion in the economy, particularly the manufacturing, services and construction sectors, which together, are expected to contribute more than 95 per cent of the GDP in 2020. Expected employment in the manufacturing, services and agriculture sectors during the period 2006-2010 is:

- the average annual growth of employment in the manufacturing sector is projected at 2.8 per cent. By 2010, the sector is projected to employ 3.6 million workers, or 30 per cent, of the total employment. The E&E industry is expected to absorb the largest share of employment, at 26.2 per cent, followed by chemicals, fertilisers, plastics and petroleum products (13.3 per cent) (Table 23.7);

- employment in the services sector is projected to reach 6.2 million workers, or 52.2 per cent, of the total employment in 2010. The increase in the share of employment in the sector reflects, among others, the greater importance of the manufacturing-related services industry in supporting the manufacturing sector in the next five years; and

- the share of employment in the agriculture sector is estimated to account for 11.1 per cent of the total employment in 2010. More highly skilled human resources will be required in this sector, as it is targeted to become more commercialised and technology-driven. It is anticipated that there will be a greater need for agriculture and soil scientists, botanists, and aquaculture and organic farming specialists, as well as biotechnologists.

23.42 There is a need to protect the environment through sustainable development and effective environmental conservation and preservation. Production technology needs to focus on energy-saving processes and the utilisation of new and alternative energy resources, such as bio-fuel, hydrogen, and solar and wind energy. Hence, jobs will be created in areas such as environmental management, environmental engineering and chemistry, pollution control, waste management and R&D. With the development and creation of new products and services for existing and new regional and global markets, there will be a higher demand for workers with knowledge, skills and talents in the areas of international marketing, branding, distribution, logistics, international trade laws, intellectual property (IP) and foreign languages.

SECTION VI STRATEGIES AND POLICIES

23.43 HRD is a dynamic process which needs to be reviewed periodically, in line with the changing economic and business environment. There are six important components in the HRD framework, which contribute to the development of skilled and knowledge workforce:

- stakeholders' expectations;
- performance-based compensation system;
- planning for human resources;
- basic requirements at pre-employment;
- review of human capital; and
- legislative environment.

TABLE 23.6

PROJECTED EMPLOYMENT BY SECTOR

Sector	2005		2010		2006-2010
	('000 persons)	*Share (%)*	*('000 persons)*	*Share (%)*	*Average Annual Growth (%)*
Total	**10,894.8**	**100.0**	**11,976.0**	**100.0**	**1.9**
Manufacturing	3,132.1	28.7	3,594.7	30.0	2.8
Services sector	5,554.7	51.0	6,248.1	52.2	2.4
Wholesale and retail trade, hotels and restaurants	1,927.2	17.7	2,171.0	18.0	2.4
Finance, insurance, real estate and business services	732.3	6.7	826.8	6.9	2.5
Transport, storage and communications	631.2	5.8	701.5	5.9	2.1
Electricity, gas and water	93.0	0.8	103.5	0.9	2.2
Government services	1,052.8	9.7	1,109.8	9.3	1.1
Other services	1,118.2	10.3	1,335.5	11.1	3.6
Agriculture, forestry, livestock and fishing	1,405.7	12.9	1,323.8	11.1	-1.2
Construction	759.6	7.0	764.7	6.4	0.1
Mining[1] and quarrying	42.7	0.4	44.7	0.4	0.9

Note: [1] Comprising mainly crude oil and natural gas

Source: Economic Planning Unit

TABLE 23.7

PROJECTED EMPLOYMENT IN THE MANUFACTURING SECTOR

Industry	*2005*		*2010*		*2006-2010*
	Number ('000 persons)	*Share (%)*	*Number ('000 persons)*	*Share (%)*	*Average Annual Growth (%)*
Total	**3,132.1**	**100.0**	**3,594.7**	**100.0**	**2.8**
Non-resource based	**1,628.4**	**52.0**	**1,798.3**	**50.0**	**2.0**
Electrical and electronic products	840.8	26.8	943.6	26.2	2.3
Basic metal and metal products	282.8	9.0	340.0	9.5	3.8
Textiles and textile products	214.8	6.9	192.3	5.3	-2.2
Machinery and equipment	162.6	5.2	178.1	5.0	1.8
Transport equipment	127.4	4.1	144.3	4.0	2.5
Resource based	**1,423.8**	**45.5**	**1,703.4**	**47.4**	**3.7**
Wood products, including furniture	373.8	11.9	405.8	11.3	1.7
Chemicals, fertilisers, plastics and petroleum products	327.0	10.4	477.6	13.3	7.9
Food processing, beverages and tobacco	298.9	9.5	346.5	9.6	3.0
Rubber processing and products	171.5	5.5	201.6	5.6	3.3
Paper and paper products, printing and publishing	137.7	4.4	156.3	4.3	2.6
Non-metallic mineral products	114.9	3.7	115.6	3.2	0.1
Others	80.0	2.6	93.0	2.6	3.1

Sources: Ministry of International Trade and Industry and Economic Planning Unit

There are continuous interactions among the six components, consistent with the dynamic nature of the environment and the need for the continuous development of individuals (Diagram 1).

STRATEGIC THRUSTS

23.44 Nine strategic thrusts have been set for human resource management, planning and development:

(1) enhancing the institutional capacity for human resource management, planning and development;

(2) increasing the supply of technically-skilled, knowledgeable and ICT-trained workforce;

(3) providing greater focus on creativity, innovation and other enabling skills in the educational, and technical and vocational training systems;

(4) creating a critical mass of local experts in the scientific and engineering fields to meet R&D demand;

(5) creating a competitive employment environment, which is able to attract and retain the best talents;

(6) enhancing productivity and competitiveness;

(7) strengthening collaboration in HRD among the industry, public sector organisations and the academia;

(8) reviewing laws and legislations to provide flexibility and mobility in employment; and

(9) intensifying automation and labour saving initiatives.

(1) ENHANCING THE INSTITUTIONAL CAPACITY FOR HUMAN RESOURCE MANAGEMENT, PLANNING AND DEVELOPMENT

23.45 Strategies to enhance the institutional capacity for human resource management, planning and development include:

- implementing the National Human Resource Development Master Plan, based on the Human Resource Framework (Box 23.1). The framework incorporates:
  - human resource planning, covering pre-employment (primary, secondary and tertiary education) and during employment;
  - human resource management, including remuneration and review of human resource requirements;
  - HRD; and
  - review of labour legislation;

- ensuring that *Institut Sumber Manusia Kebangsaan* develops a centralised and comprehensive database system, covering all aspects of HRD and management, as well as monitoring human resource trends and needs. Data availability will facilitate systematic human resource planning, recruitment of expatriates by industry and minimisation of shortages and mismatches of labour and skills;

- reviewing and enhancing the capacity of public sector institutions of higher learning; and

- providing assistance to private sector institutions to assume a greater role in the development of human resources.

(2) INCREASING THE SUPPLY OF TECHNICALLY-SKILLED, KNOWLEDGEABLE AND ICT-TRAINED WORKFORCE

23.46 Strategies to increase the supply of technically-skilled, knowledgeable and ICT-trained workforce include:

- reviewing and enhancing the capacity of vocational schools and community colleges to provide pre-employment training for school leavers and during employment training of the workforce;

- upgrading skills training to school leavers in vocational schools and community colleges to enhance their skills and employability in the fields required by industry; and

- increasing the supply of highly skilled workforce in the 17-23 age group, from the present 30 per cent to 40 per cent by 2010, in targeted industries. The industries include ICT; biotechnology; *halal* industry; petrochemicals; education; tourism, including health and eco-tourism; financial services; logistics; and agro-based industries, including aquaculture and fishery.

(3) ENHANCING CREATIVITY, INNOVATION AND OTHER ENABLING SKILLS

23.47 Strategies for providing greater focus on creativity, innovation and other enabling skills in the educational, technical and vocational training systems include:

- reviewing all curricula to incorporate enabling skills, particularly critical thinking, creativity, innovation, problem-solving and decision-making; and

- instituting benchmarking processes at all levels of the education system to standardise best practices in the education curricula.

(4) CREATING A CRITICAL MASS OF LOCAL EXPERTS IN SCIENCE AND ENGINEERING

23.48 Strategies for creating a critical mass of local experts in the scientific and engineering fields include:

- reviewing the education system (primary, secondary and tertiary levels) to enhance the scientific, technological and business orientation of the school curricula and inculcate an R&D culture;
- enhancing the national capacity for R&D through the adoption of a parallel technical salary scheme at the executive level of the Government service, especially in public sector tertiary level education institutions and research organisations, to provide more attractive career progression for highly qualified technical personnel;
- encouraging a higher enrolment in the tertiary education, especially in technical, scientific and engineering fields;
- targeting to achieve the 60:40 ratio in respect of the enrolment of students in science and arts streams, at the secondary school level by 2010 and at the tertiary level by 2015;
- promoting research activities as part of existing courses, with the collaboration of the private sector; and
- establishing more public-private sector joint research centres in institutions of higher learning.

(5) CREATING A COMPETITIVE EMPLOYMENT ENVIRONMENT

23.49 Strategies for creating a competitive employment environment, which is able to attract and retain best talents, include:

- amending the coverage of the Human Resource Development Fund (HRDF) to include internship programmes;
- improving and strengthening the National Brain Gain Programme to:
  - encourage Malaysian citizens abroad with high knowledge and skills to return; and
  - utilise the skills and expertise of Malaysian talents overseas by enhancing collaboration between them and local experts;
- encouraging foreign experts and professionals, including qualified spouses and foreign retirees, to serve in the country through the simplification of immigration procedures; and
- instituting measures, such as flexi-hours, tele-working and job sharing, to enable highly skilled women and persons with disabilities to join or re-enter the workforce.

(6) ENHANCING PRODUCTIVITY AND COMPETITIVENESS

23.50 Strategies to enhance productivity and competitiveness include:

- setting up a panel of experts to review labour legislations. The panel will comprise representatives from the Ministry of Human Resources, Economic Planning Unit, Ministry of International Trade and Industry (MITI) and members of the private sector;
- promoting and enhancing the implementation of the PLWS in the private sector;
- encouraging employees to continuously upgrade their knowledge and skills through training, such as in business enabling skills and lifelong learning, to keep pace with technological advancements; and
- enhancing opportunities for more on-the-job training and knowledge acquisition, as well as inculcating a culture which encourages innovations and creativity.

(7) ENHANCING INDUSTRY-PUBLIC SECTOR-ACADEMIA COLLABORATION

23.51 Objectives of the strategies to enhance industry-public sector-academia collaboration are to:

- ensure that the output of the education system is able to meet the requirements of the industry;
- facilitate the sharing of knowledge between the industry and the academia, as well as contribute towards more market-driven R&D;
- evaluate existing academic and industrial training systems to:
  - identify factors contributing to the mismatch in supply and demand of skilled and competent human resources; and
  - promote the effectiveness of skills training programmes to enhance the employability and productivity of the labour force; and
- recommend strategies, policies and programmes for the development of skilled and competent human resources through:
  - curriculum development;
  - industry-academia collaboration in industrial training;
  - greater flexibility and mobility of expertise between the academia and the industry and vice versa; and
  - improvement in data management and dissemination of human resource information.

23.52 Strategies at the levels of industry, the Government and institutions of higher learning include:

Industry

- creating more opportunities for undergraduates to undergo training at industry premises during their studies; and

- enhancing collaboration with institutions of higher learning in:

    - R&D; and

    - designing programmes for the continuing education of workers, particularly those from small and medium enterprises (SMEs), in the areas of international and domestic marketing, entrepreneurship, finance, management and governance;

Government

- encouraging the greater utilisation of the HRDF, so that companies, especially SMEs, will be able to benefit from their contributions;

- improving and upgrading the industrial training and internship programme;

- encouraging employers to intensify their involvement in the industrial training and internship programmes for undergraduates. In this respect, the appropriate legislation will be amended to facilitate such involvement;

- facilitating industry-public sector-academia collaboration; and

- improving data management and dissemination of human resource information; and

Institutions of Higher Learning

- enhancing the collaboration with industry at all levels of curriculum development;

- extending the internship programme to all tertiary level students and instituting a system of granting appropriate credit hours for this programme;

- encouraging all tertiary level education institutions to promote their alumni activities to include knowledge sharing and enhance networking, as well as increase alumni support for the institutions. Tertiary education institutions will also be encouraged to continue to be engaged with their graduates, to provide re-skilling, where necessary, and make known their job placement rates; and

- encouraging the movement of experts between the academia and industry, to increase the availability of expertise, and enhance knowledge creation and sharing between the academia and industry.

(8) IMPROVING THE LEGAL ENVIRONMENT FOR EMPLOYMENT

23.53 Strategies to improve the legal environment for employment involve rationalising and reviewing laws and legislations to provide flexibility and mobility in employment. A panel, comprising experts on labour practices and legislations, will be set up to review labour legislations to facilitate:

- continuous promotion of performance-based remuneration systems, for example, the PLWS;
- multi-skilling and multi-tasking;
- part-time work, flexi-hours, tele-working, outsourcing and job sharing;
- transparency in communication between employers and employees, as part of the efforts to promote industrial harmony; and
- internships and other forms of practical training for students.

(9) INTENSIFYING AUTOMATION AND LABOUR SAVING INITIATIVES

23.54 Strategies will focus on optimising human resources, including through:

- encouraging companies to automate their manufacturing processes; and
- encouraging the outsourcing of non-core and labour-intensive activities to potentially productive groups, including persons with disabilities and retirees. For seasonal and temporary jobs, students will be allowed to be recruited on a part-time basis.

Box 23.1

Human Resource Development Framework for Capacity Building

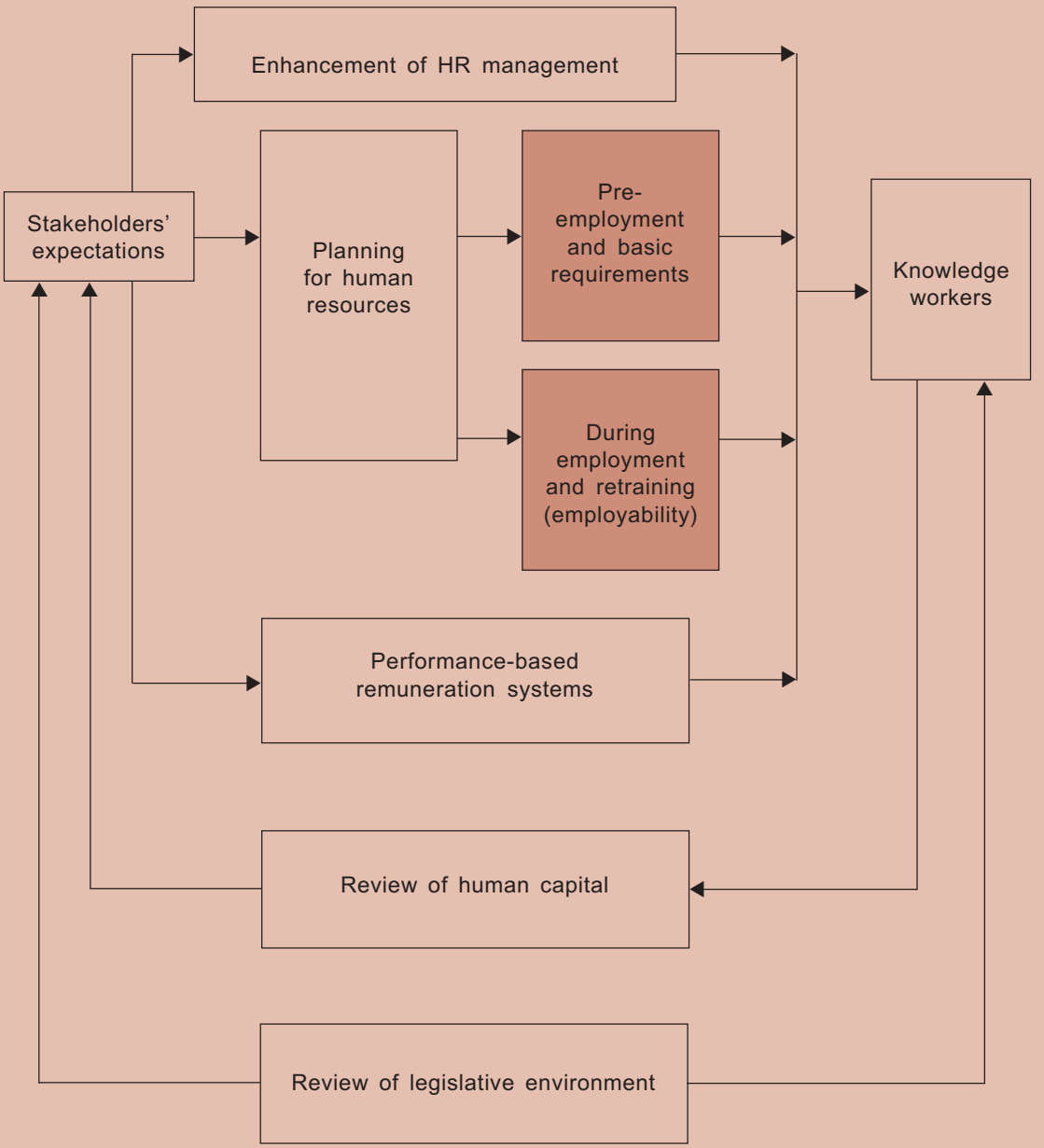
Malaysia is being transformed into a knowledge-based economy. Knowledge workers have an important role to drive economic growth.

In the knowledge-based economy, employers need to view and treat workers in a new perspective. Workers can no longer be viewed and treated as mere assets or costs to organisations. They need to be treated as 'investors' who invest their capital (qualifications, competencies, skills, time, motivation and experience) in the organisation which they serve. In the absence of appropriate treatment and remuneration by the organisations, the knowledge workers, as investors, can take their capital elsewhere. In a liberalised environment, knowledge workers are highly mobile, thus posing a challenge for employers to retain them.

Capacity building of human resources focuses on a series of actions directed at developing individuals to enhance their knowledge, skills and understanding. This, in turn, develops the attitudes needed to bring about the desired developmental changes. Based on these requirements, the following concept of HRD framework for capacity building is developed, as shown in Diagram I:

DIAGRAM 1

HUMAN RESOURCE DEVELOPMENT FRAMEWORK FOR CAPACITY BUILDING



HUMAN RESOURCE DEVELOPMENT FRAMEWORK

The framework depicts HRD as a continuous and ongoing process, which evolves through various stages of development. The stages need to be reviewed periodically, to adjust to the changing environment in the short, medium and long terms.

There are nine important components in the framework:

- stakeholders' expectations;
- enhancement of human resource management;
- performance-based remuneration systems;
- planning for human resources;
- pre-employment and basic requirements;
- during employment and retraining (employability);
- knowledge workers;
- review of human capital; and
- review of legislative environment.

There are continuous interactions among the nine components, consistent with the dynamic nature of the environment and the need for continuous development of individuals.

Chapter 24

INFORMATION AND COMMUNICATION TECHNOLOGY AND OTHER TECHNOLOGY DEVELOPMENTS

INFORMATION AND COMMUNICATION TECHNOLOGY AND OTHER TECHNOLOGY DEVELOPMENTS

SECTION I OVERVIEW

24.01 The global economy, including Malaysia, is undergoing rapid development into a knowledge-based economy, where technology, driven by skills and innovation, will be among the key determinants to enhance efficiency, productivity and competitiveness. In this respect, information and communication technology (ICT) and other technologies have become important enabling tools, leading to changes in the comparative advantage and competitiveness of economies worldwide. The application of technologies in various industries has increased over the years, in terms of value and scope. One of the factors in the measurement of total factor productivity (TFP) is capital structure, which reflects a change in the composition of capital from a lower to a higher level technology. In Malaysia, capital structure represented 17.4 per cent of the TFP for the period 1996-2005. In the Third Industrial Master Plan (IMP3), 2006-2020, TFP is targeted to grow by 2.6 per cent. To achieve this target, increased utilisation of technology in industrial development will be one of the major contributing factors.

24.02 ICT has evolved from being an operational tool to support businesses in areas such as research and development (R&D), marketing and sales, to become a strategic industry on its own. Prior to 1996, activities in ICT in Malaysia mainly comprised sales and distribution, involving foreign technology, with minimal domestic R&D. Recognising the importance of ICT, both as an enabler, as well as its potential development as an industry, the Government launched the Multimedia Super Corridor (MSC) initiative in 1996, aimed at providing an enabling technology infrastructure for the development of an ICT-based industry. During the IMP3 period, ICT will be further developed as a strategic enabler to support and contribute directly to the growth of the economy. Greater access to ICT will be made available and efforts will also be undertaken to harness ICT as a new source of growth and wealth creation. At the regional level, ASEAN has begun various collaborative initiatives in ICT to facilitate greater regional integration. This will contribute towards enhancing competitiveness and the overall economic strengthening of the region.

24.03 This Chapter covers:

- the current status of ICT and other technology developments, both at the national and regional levels, including progress in the development of MSC, formulation of policies and programmes to improve Malaysia's

capabilities in science and technology and progress in the regional initiatives, such as the ASEAN Single Window and e-ASEAN;

- the development of the ICT industry, including shared services and outsourcing, digital content development and bioinformatics. Technologies with potential commercial applications include biotechnology, nanotechnology and photonics;
- challenges faced by industries in applying ICT and adopting the new technologies, including the shortage of skilled workforce and talents and the lack of infostructure facilities; and
- strategies and policies to address the challenges, including building domestic technological capacities and capabilities and promoting ICT and other potential technologies in the services sector.

SECTION II CURRENT STATUS OF INFORMATION AND COMMUNICATION TECHNOLOGY AND OTHER TECHNOLOGY DEVELOPMENTS

(a) Information and Communication Technology

24.04 Progress was achieved in the development of ICT in Malaysia:

- in 1996, the size of Malaysia's ICT market was estimated at RM14 billion. From 1996 to 2005, the market grew at an average annual rate of about 13.7 per cent to RM40.2 billion in 2005;
- overall expenditures in ICT across economic sectors increased at an average rate of 12.4 per cent, from RM25.6 billion in 2000 to RM40.2 billion in 2005. Of the expenditures in 2005, RM26.8 billion were spent on telecommunications and RM13.4 billion on information technology (IT);
- in terms of sectoral breakdown of expenditures in 2005, the manufacturing sector spent the largest amount, at 44.6 per cent, followed by the consumer sector, at 25.1 per cent. Increased competition in global trade has prompted many Malaysian manufacturers to invest in ICT for greater cost efficiency; and
- expenditures on ICT by other sectors included those of finance and business services, at 8.8 per cent of the total expenditures in ICT, Government (7 per cent), and wholesale and retail trade (5.8 per cent).

24.05 According to estimates by the International Data Corporation (IDC), spending on ICT by small and medium enterprises (SMEs) with less than 500 employees amounted to RM2.9 billion, or 27.4 per cent of the total expenditures on IT

(RM10.6 billion) in 2005. The spending by SMEs is estimated to grow at an average annual rate of 11 per cent during the period 2003-2008. About 80 per cent of the spending on ICT was in hardware, while spending on services amounted to 13 per cent and packaged software, 7 per cent. This indicates that many SMEs are still in the early stages of investing in ICT and there is opportunity for them to invest strategically in software and services, as they grow.

24.06 Investments in ICT infrastructure were accelerated to support the growth of the industry. Presently, there are 699 global systems for mobile communication (GSM) towers nationwide, with an additional 218 towers to support the Kuala Lumpur City area, MSC Malaysia[1] and Kuala Lumpur International Airport (KLIA). A major initiative undertaken by the Government to speed up the involvement of the country in ICT was the establishment of the MSC in 1996. Through this initiative, various measures were implemented:

- new laws were enacted to provide a conducive regulatory environment for the creation, protection and growth of intellectual property (IP) in Malaysia. Altogether, 14 cyber laws and IP laws are enforced presently:
  - five are cyber laws, which relate to the establishment of the Multimedia Development Corporation (MDeC) and Malaysian Communication and Multimedia Commission, digital signature, computer crimes and telemedicine;
  - nine are IP laws, which relate to the establishment of the Intellectual Property Corporation of Malaysia, optical disks, copyrights, trade marks, patents, industrial designs, layout designs of integrated circuits, geographical indications and trade descriptions; and
  - in addition, other relevant laws to be implemented include the Electronic Commerce Act, Electronic Government Activities Act and Personal Data Protection Act;
- flagship applications were introduced to encourage the adoption and utilisation of ICT in specific areas, including the Smart Card, Smart School, Electronic Government, Tele-Health and E-Business; and
- for the E-Business Flagship, the manufacturing, construction, tourism, agriculture and retail sectors were identified as the main pathways to foster rapid growth of e-commerce. Specific projects were undertaken in each sector, designed to provide web presence, online transaction capabilities and supply chain visibility. In the manufacturing sector, for example, the Malaysian Automotive Network Exchange (MANeX) Thrust Project promotes electronic communication and transactions among a number of local manufacturers of automotive parts and components.

[1] Effective 7 April 2006, MSC was renamed MSC Malaysia.

24.07 Progress achieved in the development of MSC Malaysia included:

- being the catalyst for the growth and development of a dynamic domestic ICT industry. By the end of 2005, a total of 1,421 companies were awarded MSC-status, exceeding the target of 500 for the first phase of the implementation period, 1996-2003;
- the involvement of more than 300 companies, as at December 2005, in the development and expansion of the flagship applications;
- the establishment of more than 40 shared services and outsourcing companies, by the end of 2005, in MSC Malaysia, providing 12,000 high-value jobs. In 2005, Kuala Lumpur was ranked highly as a preferred shared services and outsourcing destination for supply chain management, customer service and back-office operations and IT;
- the introduction of the Financial Process Exchange by *Bank Negara Malaysia,* in collaboration with the Malaysian Electronic Payment System (MEPS), strengthened the business-to-business and business-to-citizen online transactions and provided the platform for the greater growth of e-commerce;
- expansion of the MSC during the second phase of the development of MSC Malaysia, to cover other areas, namely, Bayan Lepas in Pulau Pinang, Kulim High Technology Park in Kedah and KL Sentral. This enabled the establishment of MSC-status companies in the designated areas, which were conferred cybercity status; and
- generation of considerable investor interest, both at local and international levels. This also resulted in twinning partnerships in a number of the flagship applications, with Jeddah in Saudi Arabia and Dalian in the People's Republic of China.

24.08 In 2002, a series of international e-business standards, called RosettaNet standards, were introduced in the country. These internationally accepted standards facilitate speed, efficiency and reliability, enabling greater collaboration and improved communication among trading partners. The standards provide a common language for business-to-business transactions and the technical basis for integrating important processes among partners within the global trading network. To encourage companies to adopt the standards, the Government established the RosettaNet Grant. Administered by the Small and Medium Industries Development Corporation (SMIDEC), the grant was originally provided to eligible companies in the electrical and electronics (E&E) industry. Since 2005, it has been expanded to include manufacturing-related services (MRS). As at December 2005, a total of 299 companies have adopted the standards, with a total of 4,132 electronic business process connections transacted.

24.09 In 2006, the Ministry of Energy, Water and Communications introduced the Malaysian Information, Communication and Multimedia Services Strategy (MyICMS 886), which provides the policy focus to drive the country towards the development of advanced information communication and multimedia services by 2010. The strategy identifies eight services, eight infrastructure types and six growth areas for development and deployment during the period 2006-2010 (Table 24.1). Targets in the MyICMS 886 include:

- total broadband penetration of 75 per cent of households from the present 25 per cent; and
- increasing the number of Third Generation Cellular Technology (3G) subscribers to five million by 2010. This volume provides the critical mass necessary for the provision of advanced value-added services, such as mobile TV, digital multimedia broadcasting and digital home.

TABLE 24.1

MALAYSIAN INFORMATION, COMMUNICATIONS AND MULTIMEDIA SERVICES STRATEGY

Services	Infrastructure	Growth
1. High speed broadband	Hard	1. Content development (such as education, entertainment and games)
2. 3G and beyond	1. Multiservice convergence networks	2. ICT education hub
3. Mobile TV	2. 3G cellular networks	3. Digital multimedia receivers (for example, set top box)
4. Digital multimedia broadcasting	3. Satellite networks	4. Communication devices
5. Digital home	Soft	5. Embedded components and devices (for example, RFID)
6. Short range communication	4. Next generation internet protocol (IPV6)	6. Foreign ventures
7. Voice over internet protocol (VoIP) or internet telephony	5. Home internet adoption	
8. Universal service provision	6. Information and network security	
	7. Competence development	
	8. Product design and manufacturing	

Source: Ministry of Energy, Water and Communications

24.10 Since 1995, the Customs Information System (SMK), together with the integration system provided by the Application Service Providers (ASPs), has enabled electronic data exchange of customs transactions between Customs and its

clients and trading partners. This system will be further expanded to interface with the proposed Trade Facilitation Portal, the relevant systems of the Trading Community, Other Governmental Agencies (OGAs), including Permit Issuing Agencies (PIAs), transport operators, and banking and insurance industry, to become Malaysia's National Single Window.

24.11 The National Single Window will form part of the ASEAN Single Window, which is a trade facilitating environment, for the clearance and release of cargo at entry points of ASEAN member countries. Preparatory work towards the establishment of the ASEAN Single Window has been initiated, as a step towards the realisation of the ASEAN Economic Community (AEC). The ASEAN Single Window will operate on the basis of standardised information parameters, procedures, formalities and international best practices. Other regional collaborations at the ASEAN level include the e-ASEAN Initiative, which continues to be a key driver for trade liberalisation in ICT products, services and investments, and promotes electronic connectivity among member countries. Progress under this Initiative included:

- elimination of import tariffs on ICT products. In this respect, Malaysia has fulfilled its commitment to eliminate tariffs on 270 ICT products;
- development of an interoperable technical architecture framework;
- launch of 'ASEANconnect' portal (ASEANconnect.gov.my), a comprehensive web portal which collates essential information and data on ASEAN initiatives and activities in ICT. It contains a list of key indicators on convergence, trade in telecommunications equipment, conformity assessment procedures, infrastructure and digital divide;
- establishment of the Regional Internet Exchange;
- publication of a Common Reference Framework for E-Commerce Legal Infrastructure; and
- establishment of the ASEAN Internet Service Providers Association.

(b) Other Technology Developments

24.12 During the period of the Second Industrial Master Plan (IMP2), 1996-2005, efforts on science and technology were focused towards strengthening indigenous capacities and capabilities in key technology areas to facilitate industrial growth and economic diversification. Innovation and technological development formed an integral part of national development policies. Investments in infrastructure and R&D were undertaken to facilitate industrial growth and economic diversification. Total expenditures on R&D increased from RM549.2 million in 1996 to RM4.3 billion in 2005. The ratio of total expenditures on R&D to the GDP, which indicates a nation's commitment to R&D, increased from 0.2 per cent in 1996 to 0.9 per cent in 2005.

24.13 Several policies and programmes were formulated to improve Malaysia's capabilities in science and technology, including the introduction of the Second Science and Technology Policy in 2003. The policy aims to:

- enhance national capacities and capabilities in R&D and technology development and acquisition;
- facilitate technology transfers and increased applications in science and technology to enhance productivity and competitiveness;
- increase the commercialisation of R&D findings; and
- create a competent workforce.

Developments of specific areas of technology were undertaken, based on relevance and demonstrated needs, as well as the availability of indigenous capacity. The areas included biotechnology, advanced manufacturing, advanced materials, robotics, aerospace-related technology and nanotechnology.

24.14 The National Biotechnology Policy, introduced in April 2005, aims to develop biotechnology for wealth creation and national well being. Areas which have been identified include healthcare, agriculture and industrial biotechnology. In line with the Government's commitment to develop biotechnology, competitive financial incentives, including the enhancement of existing packages, are provided to encourage the private sector to venture into biotechnology.

24.15 The rapid global development in nanotechnology and its impact on manufacturing techniques will give rise to new forms of competition in the industry. Companies will need to keep pace with developments in nanotechnology and plan accordingly, to remain competitive and relevant in their respective industries at the international level. In this respect, the Malaysian Nanotechnology Initiative has outlined strategies and policies to promote the implementation of market-driven nanotechnology, as well as R&D programmes and infrastructure among industries.

24.16 Other areas in technology which have been given emphasis to contribute in enhancing the competitiveness of the manufacturing sector include:

- development of niche areas in advanced manufacturing technology, namely, computer-aided design/computer-aided manufacturing/computer-aided engineering (CAD/CAM/CAE), industrial automation, robotics, and machinery and equipment; and
- aerospace-related technology, advanced materials and robotic technology, which are also recognised as key technology areas in strengthening the technological development capability and generating new sources of growth for the country.

24.17 Measures to facilitate greater participation by SMEs in science and technology development are:

- funding schemes for R&D and commercialisation, such as the Industrial Research and Development Grant Scheme, MSC Research and Development Grant Scheme, Demonstrator Applications Grant Scheme, Technology Acquisition Fund, Technology Acquisition Fund for Women and Commercialisation of Research and Development Fund; and

- other support programmes, such as the Industrial Technical Assistance Fund for product and process improvements and the Skills Upgrading Programme by SMIDEC to upgrade the technical capabilities of SMEs.

The Government has allocated almost RM2 billion for this initiative in the Ninth Malaysia Plan (RMK-9), 2006-2010. This is reflective of the Government's commitment to focus on downstream R&D activities and commercialisation.

SECTION III DEVELOPMENT OF THE INFORMATION AND COMMUNICATION TECHNOLOGY INDUSTRY

(a) Shared Services and Outsourcing

24.18 During the last decade, substantial offshoring has been recorded in IT outsourcing and business process outsourcing (BPO). These activities are also known as shared services and outsourcing. India has predominantly been the preferred destination for offshoring, due to its language and IT skills. Nevertheless, other countries, including Malaysia, are beginning to emerge as niche contenders. The shared services and outsourcing industry is expected to improve the efficiency of the manufacturing sector, by providing cost-effective and relevant services to manufacturers. Effective shared services and outsourcing strategies will also enable manufacturers to be more responsive to market dynamics and improve productivity in a competitive business environment.

24.19 The market for global offshoring is estimated to reach US$110 billion by 2010. To take advantage of this opportunity, the Government, under Phase Two of the MSC Malaysia development, has targeted that by 2010:

- 100,000 jobs will be created from the shared services and outsourcing industry, accounting for 40 per cent of the total potential employment under the MSC initiative; and

- RM15 billion will be generated in export revenues from offshoring, representing about 21 per cent of the total revenues for MSC companies.

(b) Digital Content Development

24.20 The development of digital content in Malaysia is being undertaken through the MSC Malaysia's Creative Multimedia Cluster programme. The programme aims to attract and develop MSC-status companies, using multimedia and digital technologies, to develop, create, add value to, and deliver content to the marketplace. The main markets include mobile content, games, films, animation, music and arts. By 2009, it is estimated that:

- the global market for applications in computer graphics (multimedia and animation) will exceed US$189.2 billion;
- the number of mobile service subscribers in the Asia-Pacific region (excluding Japan) will exceed 901 million; and
- the video game market in Asia-Pacific will grow at an average annual rate of 18 per cent, from US$10.1 billion in 2004 to US$23.1 billion in 2009.

24.21 Malaysia, through MDeC, has recently been integrated into the Creative Commons Licensing scheme. A Creative Commons licence will enable its owner to keep his copyrights, but allow others to copy and distribute his work, provided due credit is given and only on the conditions specified by the owner under the scheme. MDeC has also formulated a strategy to develop the digital content industry, which includes the following initiatives:

- generating awareness about the creative content industry in Malaysia, with regard to potential output, markets and career and business opportunities;
- developing core competencies of the industry, including training programmes for human capital development, funding, market access and collaborative projects with Government departments on key areas; and
- monitoring the development of the industry and the performance of the programmes implemented.

A Digital Media Zone in Cyberjaya has been designated as a content development area, together with a number of other creative zones in the new cybercities. The zones will leverage upon the existing infrastructure and generate specialised technologies required for content development.

(c) Bioinformatics

24.22 The National Biotechnology Policy emphasises on the development of bioinformatics, which is the convergence of biotechnology and ICT, to support the country's emerging biotechnology industry. The global market for the

bioinformatics industry is estimated at US$1.4 billion and is expected to grow at an average annual rate of 15.8 per cent to almost US$3 billion by 2010.

24.23 The development of bioinformatics in Malaysia will focus on supporting the product and process development work in the agriculture and healthcare industries. The designated centres of excellence under the BioNexus Malaysia, together with the second phase of the Malaysia Research and Education Network (MyREN), are expected to stimulate the development of new applications in bioinformatics. A bioinformatics benchmarking centre will be established to ensure conformance with global standards and practices.

(d) E-Commerce

24.24 Focus will continue to be given towards encouraging the wider use of e-commerce to facilitate manufacturing and trade activities. The private sector and industry associations will be encouraged to undertake more initiatives to improve the adoption of e-commerce systems across the supply chain. Greater emphasis will be given towards wider integration of business-to-business applications within the agriculture, tourism, construction, manufacturing and retail sectors. In addition, SMEs are also encouraged to leverage upon the existing networked environment, in gaining access to information and marketing their products electronically, to expand their scope beyond national and regional borders. The Government has targeted up to 10,000 SMEs to be e-enabled by 2010, through the e-Business Anchor and Thrust Projects.

(e) Services and Applications

24.25 The MyICMS 886 Strategy has targeted eight specific services for development and deployment by 2010. Apart from high speed broadband, other services expected to drive industrial development include 3G cellular networks, short range communication, digital multimedia broadcasting, universal service provision and digital home. A digital home, for example, will extensively use networking technologies to integrate appliances, devices and services within the home, to control and monitor the entire living space from within the home, as well as from remote locations. Under the strategy, voice over internet protocol (VoIP) and internet telephony services will also be further developed. In addition to cost benefits, the provision of this service is expected to generate revenues of up to RM1.5 billion by 2010.

SECTION IV TECHNOLOGIES WITH POTENTIAL COMMERCIAL APPLICATIONS

24.26 Technologies highlighted in this section may have been adopted, to a certain extent, by some companies in Malaysia, but their optimum potential is yet to be realised. These technologies have the potential to enhance competitiveness

and have become necessary for compliance with international requirements, or will render existing manufacturing processes obsolete.

(a) Biotechnology

24.27 Biotechnology uses bio-techniques to develop new products or processes by manipulating living organisms. Industrial biotechnology applies the techniques of modern molecular biology to improve the efficiency and reduce the environmental impact of processes in industries, such as food production, grain cleaning, textiles, paper and pulp, and speciality chemicals. Biotechnology has widely contributed to the rapid development and transformation of the medical and pharmaceutical industries. Pharmaceutical products which are being improved by biotechnology include zinc ointments and anti-depressant medication, while improved medical equipment include expensive, high technology instruments and tongue depressors.The potential for further applications in biotechnology, such as cloning and protein re-engineering, will lead to new products and processes in manufacturing. Industries will be able to apply diverse manufacturing capabilities to produce products such as human insulin, antibiotics and biodegradable plastic bags. In line with Malaysia's aim of becoming a global hub for *halal* products, the application of biotechnology is also expected to make a significant impact on the existing food processing technologies, such as integrated product and process design, preservation and extraction.

24.28 Areas in biotechnology which are being commercially developed include:

- biomaterials, including polymers, metals, ceramics and composites, which are produced synthetically or biologically, for use in the treatment or management of a disease, condition or injury. The worldwide market for biomaterials was estimated at US$23 billion in 2000. Growth is estimated at 12 per cent per year. Major markets are the United States of America (USA) and Europe;

- biosensors, which represent a powerful new evolutionary field in analytical measurement technology. The commercial application of biosensors is in the areas of healthcare, industrial process control, agriculture, veterinary medicine, defence and environmental pollution monitoring; and

- biopolymers, which are biologically produced polymers with unique functional uses, such as stabilisers, thickeners, gallants, binders, dispersants, lubricants, adhesives and drug delivery agents. The main beneficiary of biopolymers is the food processing industry. Other industries which will benefit include cosmetics, pharmaceuticals, packaging, paper and textiles. Advances in plant genetics and fermentation and purification technologies can eventually influence a shift towards the use of more biopolymers than synthetic petroleum-based polymers.

24.29 Market drivers for biotechnology include:

- needs of an aging population, with expectations of healthier and longer active years, which will generate a demand for products to treat chronic ailments and repair degenerative life conditions; and

- tissue-engineering technology, which is expected to produce widely acceptable clinical products of possible major significance to medical care in the future.

24.30 Malaysia has a comparative advantage in biotechnology, as it is one of the 12 most bio-diverse countries in the world. Malaysia potentially holds the largest unique gene pools in the world. The rainforests can generate vast bio-wealth in fields such as healthcare, food production and environmental protection. Under the National Biotechnology Policy, the Malaysian Biotechnology Corporation was established. This corporation is responsible for the overall implementation of the strategies outlined in the policy. The corporation will coordinate initiatives in biotechnology by relevant ministries and agencies in facilitating the development of the biotechnology industry and formulate business and marketing strategies for the industry. To provide support for R&D in biotechnology, the institutional machinery which has been established comprises the National Institute of Genomics and Molecular Biology, National Institute of Agro-Biotechnology and National Institute of Pharmaceuticals and Nutraceuticals.

24.31 Growth areas in biotechnology which have been identified for Malaysia include:

- agriculture biotechnology, with nutraceutical and cosmeceutical products as a potential area. In addition, the application of plant biotechnology will be aimed at increasing crop yields, including pest-resistant strains;

- healthcare, with growth potential in bio-generics and molecular diagnostics for diseases, as well as vaccines for tropical diseases; and

- industrial biotechnology, including the development of biocatalysts for foods, chemicals and pharmaceuticals, and bio-generic manufacturing. The rise in crude oil prices will provide opportunities for the country to develop alternative sources of fuel, for example, biodiesel.

Challenges in adopting biotechnology include the high costs of development, lack of availability of funds to finance more sophisticated and expensive health care and the fear of litigation.

(b) Nanotechnology

24.32 Nanotechnology allows the manipulation of properties of materials at the molecular or atomic level, giving rise to products with enhanced properties, faster production processes, lower production costs, much smaller manufacturing equipment, cleaner environment or new manufacturing systems. The potential of this technology has yet to be fully realised. Nanoelectronics is expected to create an impact on the local E&E industry. An example is the production of nanoscale devices for semiconductors. Other novel techniques include production of nanoparticles and carbon nanotubes. When these new methodologies are adopted in production, it will result in devices and systems with new levels of performance. Identifying business opportunities in nanoelectronics requires diverse knowledge, because nanoelectronics cuts across devices, products and market segments. Market development of nanoelectronic devices will be uneven and will occur in several phases. These phases will reflect the practical realities and complexities of nanodevice construction, industry requirements and the status of present technologies.

24.33 Nanomaterials attract high industrial interest because of their vast potential in industrial usage. One such material, carbon nanotubes, is being researched for diverse applications, including sensors and probes, molecular electronics, molecular filtration, hydrogen storage, energy, coatings, structural materials and biomedical equipment. The worldwide market for nanomaterials has been growing at an average annual rate of 17 per cent. It was valued at about US$48 billion in 2003 and is projected to be worth about US$230 billion in 2013. Industries with potential applications of nanomaterials include:

- automotive industry, where the trend of the automotive design is towards lower fuel consumption through weight reduction. New lightweight materials with increased functionalities, special characteristics and extended performance range are being developed. Smart materials, which have the ability to change colours on demand or self-repair upon small impacts, are being explored. It was estimated that a reduction of 250 kg (17 per cent) in the weight of a car may be achieved by 2020; and

- textile industry, where specifically engineered nanocomposite materials provide textiles with enhanced properties, such as moisture permeability, stain resistance, wrinkle-free, self-cleaning and fire retardation. Electro-actuated fabrics are also being introduced, which keep the body warm after self-adapting to temperature variations. Shoes can be made with lighter and more wear resistant nanomaterials. They can also benefit from other unique properties, such as antimicrobial, odour-stopping and self-cleaning.

24.34 Many aspects of nanotechnology are still in their early stages of development. Investors considering the near-term potential of nanotechnology require a realistic assessment of this technology. Of importance is the identification of practical production techniques, filtering media and industry information about nanotechnology in general and the options offered by many present and competing technologies. It is envisaged that when more applications using nanotechnology are developed, major structural changes will occur in the entire manufacturing value chain.

(c) Radio Frequency Identification

24.35 Radio frequency identification (RFID) technology uses radio frequency waves to identify objects. A typical RFID system consists of a tag or microchip with an antenna, which sends out a signal (data), and a reader with an antenna, which receives the signal. The RFID reader can detect multiple products, which are tagged simultaneously. In comparison, bar-coded products require a line-of-sight, which means that every item must be scanned one at a time.

24.36 The use of RFID provides opportunities for virtually every industry, offering high potential for productivity gains and cost reductions. With the application of the technology, there will be benefits with respect to the movement of goods in supply chains, through reductions in administrative errors, labour costs associated with scanning bar codes, internal thefts and errors in shipping goods and improvements in overall inventory management. When these benefits are multiplied across various supply networks of different industries, significant positive impact can be expected on the country's economy and competitiveness as a trading nation and regional logistics centre.

24.37 Under the MyICMS 886 Strategy, short range communication has been identified as one of the core eight services to be developed. The service will support the creation of short-range wireless connection type of applications, which uses minimal power. RFID is among the technologies categorised under this service. Examples of applications include inventory management, transportation and logistics, live stock management and security and access control.

24.38 Local manufacturing of RFID chips has progressed in 2006. The chips and related services are expected to gain a global market share of 2 per cent over time. RFID is also expected to be widely used in personal identification cards (for example, MyKad and office access) and personal identification systems for electronic payment, logistics, and handling and tracking of baggage. Although RFID has been available for several years, the technology is still in its early stage of development and commercialisation. The accuracy and reliability of the technology need to be improved. Global standards for the technology are incomplete and difficult for developers to establish.

24.39 Existing infrastructure is limited, with an insufficient number of readers and middleware, connecting RFID captured data to other software modules. Implementation of an infrastructure which enables seamless use of the technology across all supply chain partners will incur high costs, mainly due to the purchase of the required hardware and software. Developers, users and investors need to take a realistic view of the issues related to the technology in their strategic business decision making.

(d) Wireless Technologies

24.40 Wireless technologies use electromagnetic waves to convey signals over the communication path. Well-known wireless technologies being developed include 3G, wireless fidelity (Wi-Fi) and worldwide interoperability for microwave access (WiMAX). It is expected that a majority of the world population will be able to benefit from the high speed wireless internet access within the next decade. Broadband wireless presents a viable opportunity to improve communication among the one billion people who presently enjoy internet access and connect five billion potential users. It is expected that governments and industry will invest heavily in developing this technology. It requires the development of support technologies, components, platforms, infrastructure and services to meet the demand.

24.41 One technology of interest to domestic telecommunications companies is WiMAX. The technology is applied to gain a certification mark for products which pass conformity and interoperability tests for the IEEE 802.16 Standard. WiMAX can be described as a framework for the evolution of wireless broadband, rather than a static implementation of wireless technologies. Products which pass the conformity tests for WiMAX are capable of forming wireless connections between them to allow the conveying of internet packet data. In concept, it is similar to Wi-Fi, but has certain added features, aimed at improving performance and allowing usage over greater distances. It is anticipated that WiMAX will allow inter-penetration for the broadband service provision of VoIP, video and internet access simultaneously. Most cable and traditional telephone companies are assessing or trial-testing the potential of WiMAX for connectivity to end users. This will possibly lead to better pricing for both home and business customers, as competition may result in the elimination of the captive customer bases, which both telephone and cable networks enjoyed traditionally.

24.42 There is also potential for WiMAX to interoperate with existing cellular networks. Another possible application is ad-hoc networking among computer gaming consoles. Being an emerging wireless standard, WiMAX needs to overcome a number of constraints to gain widespread acceptance:

- equipment must be robust, stable, efficient and scalable;
- WiMAX needs to demonstrate that it is cost-effective in a real-world environment; and

- as standards are still evolving, WiMAX will need to eventually provide a flexible and long-term upgrade path for carriers.

A key feature of the development of WiMAX is the creation of Multiservice Convergence Network. The network is a next generation network, through which multimedia services, which integrate telecommunications, broadcasting and the internet, are delivered. The network will accommodate both wired and wireless access to communication and multimedia services.

(e) Micro-Electromechanical System

24.43 Micro-electromechanical system technology allows smaller components to be integrated to produce smaller electrical and mechanical equipment. It capitalises upon the computational ability of microelectronics. The technology is expected to revolutionise many product categories. Industries will be able to produce equipment in much smaller dimensions, while expanding the space of possible designs and applications. Such equipment can be further enhanced by embedding chips which can be programmed with smart features. The technology will allow for high levels of functionality, reliability and sophistication at a relatively low cost.

24.44 Typically confined to larger firms, the technology is being used for manufacturing high volume inexpensive components or packaged solutions for end markets, such as automobiles, biomedical products and electronics. Common applications include inkjet printers, accelerometres in modern cars for airbag deployment in collision, car tyre pressure sensors and disposable blood pressure sensors. The digital light projection technology, which is based on the micro-electromechanical system technology, uses more than a million arrayed micro-mirrors to deflect and modulate light for video projection. There is a high potential for the further development of the micro-electromechanical system technology in integrated circuit manufacturing and design.

24.45 In 2004, the world market for the micro-electromechanical system was valued at US$6.4 billion and is expected to grow to US$25.3 billion by 2008. The average annual growth rate of the world market for the micro-electromechanical system for the period 2000-2010 is estimated at 33.2 per cent. Products based on the micro-electromechanical system technology are presently used in relatively low or medium volume applications. Constraints faced by companies include limited options for prototyping or manufacturing devices and a lack of capability or expertise in micro-fabrication technology.

24.46 The packaging of the micro-electromechanical system devices also needs improvement. Micro-electromechanical system packaging is regarded as more challenging than integrated circuit packaging, due to the diversity of the micro-electromechanical system devices and the requirement that many of these devices be in contact with their environment. Presently, almost all

development efforts in the micro-electromechanical systems need to focus on designing a new and specialised packaging for each device. Packaging is considered the single most expensive and time consuming task in the overall product development programme for the micro-electromechanical systems. Often the development of even the most basic micro-electromechanical system device requires a dedicated research effort to find a suitable process sequence for fabrication. The design of the micro-electromechanical system device needs to be separated from the complexities of the process sequence.

24.47 Micro-electromechanical system is regarded as a strategic technology for Malaysia because it provides an avenue for semiconductors and microelectronics to move up the value chain and offer higher value-added products. This advantage is important as more downstream activities are being absorbed by lower cost producing countries. In Malaysia, the pace of adoption of the micro-electromechanical system technology is growing. Industries have the capability to manufacture products using this technology, such as pressure sensors, accelerometres, thermopiles, binary lens, thermopile arrays, application specific integrated circuits and silicon microphones.

(f) Photonics

24.48 Photonics is a technology which uses light particles (photons) to transmit information over hair-thin fibres of very pure glass. For example, fibre-optic cables provide much higher bandwidth than copper telephone wires or other transmission technologies and support a richer and more sophisticated selection of information, including real time multimedia applications.

24.49 Industries which use photonics are growing. In 2000, sales of optoelectronic components totalled about US$15 billion. The production of photonic parts and components is expected to continue growing at 15 per cent per annum, to about US$28 billion by 2006. Presently, almost 75 per cent of optoelectronic components are produced in Japan. The demand for photonic components is mainly by makers of fibre-optic communication systems, optical storage systems, instrumentation and lighting. Telecommunications systems continue to be the largest market. Demand is increasing for the usage of optoelectronics and photonics in shorter-distance networks - metro-networks, optical local area networks, storage area networks and optical back planes in computing.

24.50 It is estimated that between 60-80 per cent of manufacturing expenses for producing photonic components are in packaging, which include methods for aligning optical elements and integrating photonics and electronics components. These costs can be reduced through the development of automated alignment techniques, modified component designs or other innovations. Costs will be further reduced with the development of precise processing methods and pure, non-toxic source materials for making the compounds used in the photonics

components. The development of efficient, high-volume photonics manufacturing processes will reduce costs and enhance production efficiency. The commercial use of these processes will significantly increase the value of IT products and services. They can also be used in other applications, for example, to enhance the performance and reduce the costs of sensors for smart cars and highways, laser surgery equipment and digital cameras.

24.51 The most promising, but challenging, field of photonics is the development of optoelectronic integrated circuits. Fabrication problems and incompatibility of materials have impeded progress in this area. Malaysian manufacturers will need to acquire the capability to develop photonics components and equipment and manufacture them efficiently in large volumes, to be able to reduce product costs and compete in the international market for photonics.

(g) Laser Technology

24.52 In 2004, the global market for laser materials and components was estimated at US$1.8 billion. It is expected to expand to US$2.8 billion by 2009. Demand for laser materials and components is expected to be driven by the expansion of the manufacturing capacity in Asia Pacific. Laser technology is used in various fields:

- in the manufacturing sector, application of laser welding in serial manufacturing is expected to expand. While laser cutting and welding of conventional blank sheets and laser cracking of motor parts are widely applied, the technology is also presently used in processing innovative materials (for example, foamed metals) and the manufacture of automobiles, where laser welding robots are used for cutting covering plastics. Automotive suppliers are also increasingly using laser welding for plastic housings (for example, electronics components). Laser soldering and laser welding for micro-applications (for example, sensors) are being tested for applicability;
- in consumer electronics, telecommunications and data communication, lasers are used as transmitters in optical communication over optical fibres and free space. They are used to store and retrieve data from compact discs and digital video discs, as well as magneto-optical discs. Laser lighting displays accompany many musical concerts;
- in medicine, laser scalpel is used for laser vision correction and other surgical techniques. Lasers are also used for dermatological procedures;
- in surveying and construction, laser line levels are used;
- in aerospace, lasers are used in aircraft guiding system;
- in law enforcement, the most widely known use of lasers is for lidar to detect the speed of vehicles; and
- in military, lasers are used as target designators for weapons.

24.53 For all these advanced applications, process and quality control are important. Digital image processing is essential for testing welding seam quality. Sensors are important to enable high precision control, as a variety of parameters have to be surveyed with a high degree of precision. New kinds of laser sources will be explored to enable further applications. However, the primary challenge of adopting laser technology is cost, where the initial outlay for advanced laser cutting equipment may be prohibitive to most SMEs in Malaysia.

(h) Fuel Cell Technology

24.54 A fuel cell is an electro-chemical energy converter. It combines hydrogen with oxygen to produce water and electricity. The energy conversion process in the fuel cell is therefore intrinsically clean and silent, with greater efficiency, less noise and far less pollution than combustion technologies. Fuel cell efficiency is relatively high, even at low load levels and in small systems. Fuel cell technology involves the capability to convert fuel and air directly into electricity, creating an affordable and clean source of energy. Fuel cells are modular, allowing the construction of a power plant of almost any size and simple expansion of existing facilities.

24.55 Fuel cells have provided electric power for some orbiting space vehicles, but are not yet economically competitive for widespread commercial terrestrial use, because of high capital costs. Development of market-entry products for portable power, remote power and small scale distributed or on-site power generation is nearing completion. Heavy investments by a few automobile manufacturers have spurred rapid growth in R&D for transportation applications and produced some demonstration vehicles. It is projected that the current cost of a fuel cell vehicle engine, at US$225/kilowatt, can be reduced to US$30-US$50/kilowatt in 2010. This may make fuel cell vehicles a commercially viable mass market product. Fuel cell-powered portable electronic devices may enter the market in 2007.

24.56 Fuel cells may enable new technologies. For example, fuel cells may offer a way to power next-generation systems for military applications in remote areas. Should fuel cells be widely used, they will represent a new market for materials suppliers, equipment manufacturers and even companies with software for process simulation and control. New markets may emerge for products of membrane manufacturers, catalyst companies and suppliers of specialised components, for example, power electronics.

(i) Robotics

24.57 An industrial robot is an automatically controlled, programmable, multipurpose, manipulative machine, with three or more reprogrammable axes. About 750,000 robots are in operation daily around the world, with more than 40 per cent of them in Japan. The market for industrial robots has matured. As computer processors increase in power and decrease in costs, robots will be provided

with increasing flexibility and will operate more autonomously than present robots. Such capabilities will broaden the application of future robots into areas such as medicine, personal assistance, and construction and manipulation of flexible materials. Presently, the use of robots depends on established actuation techniques, such as pneumatic, hydraulic and electric. New approaches to robot actuation involve ultrasonic motors and artificial muscles. For artificial muscles, several materials are under study, including shape-memory alloys, contractile polymers, micro-fabricated electrostatic devices and piezoelectric and magnetostrictive materials.

24.58 An emerging area for the application of robots is the service industry. Personal robots are emerging, especially for household applications, for example, floor cleaning. Military applications will also drive the development of many mobile robots. In 2002, the total market value of all types of industrial robots was US$3.4 billion. In Malaysia, the use of industrial robots is limited to a few industries, such as automotive assembly, semiconductors and certain chemicals.

(j) Information Technology Solutions

(i) Product Lifecycle Management

24.59 Traditional paper-based systems, designed to manage product information, are prone to error. They involve substantial handling and information is scattered throughout different departments of an organisation. Product lifecycle management eliminates these errors and cuts costs, by keeping documents in a central web-based repository, which also prevents version-control problems. Product lifecycle management tools allow the management to make more effective decisions, as product development goes through its life cycle. A major benefit of product lifecycle management is that it helps resolve as many problems in the design phase as possible. Product lifecycle management projects, confined to the product development phase, can even save costs, including document production, shipping and employee travel.

24.60 Product lifecycle management is being increasingly applied in Europe and the USA, as it is viewed as an extension to the existing supply chain management and enterprise resource planning applications. However, they are mainly developed for multinational corporations (MNCs). In 2004, the global market value of product lifecycle management solutions was estimated at US$1.5 billion and is expected to grow to US$2.1 billion in 2008.

24.61 Product lifecycle management can improve the competitiveness of the manufacturing sector, particularly export oriented industries, where companies compete primarily on product designs, costs and time to market. With product lifecycle management, new and incremental product designs can be created more rapidly and brought more speedily to market. Existing product features can also be reused in different configurations, thereby saving costs and

reducing time to market. Many industries in developed countries are deploying these tools, including electronics, complex discrete manufacturing, consumer goods, life sciences and rubber. There is potential for product lifecycle management to be used in the chemicals, textiles and apparel, materials, E&E and transportation industries.

(ii) Manufacturing Execution System

24.62 Manufacturing execution system is a dynamic information system, with a set of functions which provides minute-to-minute shop-floor information, from point-of-order for manufacturing to product delivery as finished goods. It provides mission critical information about production activities to others across the organisation and supply chain through bi-directional communication. The system is viewed as the vital missing link for tying plant-floor information with business management information provided by applications such as enterprise resource planning and customer relationship management. Delivering minute-to-minute shop-floor information is important to support a web-based, built-to-order manufacturing model. The plant-wide system in manufacturing execution system is used to monitor production schedules, inventory availability, work-in-progress and a range of other operations management-related information flowing to and from the shop-floor.

24.63 Manufacturing execution system tools have many more advanced functionalities. Presently, they are mainly used in the process industries, to support key operations management functions, ranging from resource allocation and data acquisition to maintenance management, quality control, performance analysis and labour management. Many local manufacturers will benefit from such a system. For example, large inventory holding costs can be reduced, improving profitability. A full implementation of the system also necessitates the creation of a leaner and more disciplined production system, which will enhance productivity and improve competitiveness.

SECTION V PROSPECTS OF INFORMATION AND COMMUNICATION TECHNOLOGY

24.64 The MyICMS 886 Strategy provides the major policy thrust for the further development of ICT. The strategy will position the industry towards the delivery of advanced information, communication and multimedia services by 2010. Examples of advanced value-added services which will be provided include mobile television, digital multimedia broadcasting and digital home. The strategy envisages that:

- short range communication will gradually gain higher usage in logistics and transportation, as the costs of devices and infrastructure are lowered by localised manufacturing activities;

- commercial usage of RFID is expected to generate substantial revenues to the production of RFID chips, which are targeted to achieve a global market share of 2 per cent by 2010;

- VoIP and internet telephony services will be further developed to provide higher quality services, and the demand to be created will lead to cheaper voice services. By the end of 2010, the revenues from these services are expected to reach RM1.5 billion;

- e-commerce will be more widely applied within the manufacturing and services sectors. Business-to-business transactions will increase in finance and insurance, wholesale and retail, transport, storage and communication. Business-to-consumer transactions will be more prevalent within hotels and restaurants, electricity, gas and water;

- digital content development will expand rapidly, in tandem with the integrated broadband infostructure to be created under the strategy. The allocation of RM150 million under the RMK-9 for the development of the creative content industry will provide opportunities for entrepreneurs and SMEs to develop and market localised content for educational and entertainment purposes; and

- e-learning and training services will grow, as cheaper broadband and more localised content will enable more effective e-learning solutions to be provided among schools and commercial institutions.

24.65 Other development initiatives for ICT include:

- further developing Cyberjaya to be the National ICT Hub, under the second phase of the development of MSC Malaysia, by enhancing the business-friendly environment, wireless broadband facilities and other transportation and infrastructure amenities; and

- further intensifying the efforts towards bridging the digital divide through the provision of online services nationwide to enable more Malaysians to gain access to and utilise internet-based knowledge and information resources. It is anticipated that there will be a greater demand for personal computers, with the usage in the number of computers increasing from 21.8 to 40 per 100 population by 2010.

SECTION VI CHALLENGES

24.66 Towards sustaining the competitiveness of Malaysian industries in the global market, several challenges in the application of ICT and other technologies need to be addressed, including:

- shortage of skilled workforce and talents to support and manage ICT and other technologies;
- limited utilisation of technologies and lack of effective linkages and support in R&D;
- limited access to financial support;
- lack of knowledge and comprehensive data on the usage of ICT and other technologies; and
- inadequate infostructure facilities to support the ICT services.

(a) Shortage of Skilled Workforce and Talents

24.67 Greater utilisation of technologies will require a highly skilled workforce, which is a significant cost component of investments in technology. A shortage of the required specialists and experts will impose a constraint on the application of ICT and other technologies. In 2005, the ICT workforce totalled 183,204 persons. Although it is expected to increase at an average annual rate of 10.4 per cent to 300,000 persons by 2010, rapid developments in ICT necessitate both the Government and industry to place greater emphasis on ICT education and training.

24.68 While there are programmes on re-skilling, as well as industrial skill development training for unemployed graduates, the supply of a skilled workforce is still inadequate and often mismatched, due to rapid changes in technology developments. Industries face difficulties in coping with the supply shortage, in view of:

- the increasingly competitive nature in the recruitment for a skilled workforce, which has given rise to job hopping and contributed to high staff turnover among companies; and
- the present insufficient availability of technically skilled human capital required for industrial upgrading. There is a shortage of qualified scientists and engineers who can adapt to the new technologies and also develop new products to enhance competitiveness.

24.69 With the rapid development in ICT-related technologies, the demand for high quality, skilled and creative ICT personnel will increase. Such personnel will be necessary to provide the talents and technical support, as part of the efforts to enable companies to maintain their competitive edge in the world market. There is a need to develop core skills in multi-disciplinary fields, such as software development in the life sciences and knowledge applications, as part of the skilled workforce training to support the ICT services sub-sector. Equally important is the need to promote a wider and more intensive adoption and usage of ICT for economic value creation and improvement in the quality of life. The focus will need to be on enhancing computer literacy

and equipping potential users with the requisite know-how and skills for tele-working and distance learning, as well as general computing and communication. This will create a broader user base for the growth of ICT services in the provision of content development, as well as infrastructure.

(b) Limited Utilisation of Technology and Lack of Effective Research and Development Linkages and Support

24.70 There is a need for greater utilisation of technology by Malaysian companies, especially SMEs. A survey conducted in 2003 indicated that less than 5 per cent of the operations of SMEs were fully automated, while 75 per cent, semi-automated. The survey also indicated that 69.2 per cent of these enterprises operated using indigenous technology. The lack of resources and limited involvement in R&D among Malaysian companies pose a constraint in their ability to innovate or develop new products and services to enhance their integration into the global supply chains. To keep pace with rapid technological developments, Malaysian companies need to continually upgrade their products and processes and be involved in R&D and product innovation. To remain competitive, companies need to take advantage of the recent trends in technology convergence, as this will lead to opportunities in new applications and creation of new products and services.

24.71 Government research institutes, institutions of higher learning, technology parks and incubation centres assume a major role in R&D, since they contribute to the development of ICT and other enabling technologies. However, the lack of effective R&D collaboration between these research institutes and industry has led to many of the research projects undertaken having low commercial applicability. It has also resulted in R&D losing its focus on developing products for specialised market needs.

24.72 There is a need to promote partnerships between Malaysian companies and their foreign counterparts to sustain competitiveness and gain global market access. Malaysian companies need to enhance their awareness, knowledge and skills in partner relationship to enable them to build durable and mutually productive collaborations and strategic alliances in technology development and R&D.

24.73 R&D and innovation in ICT and other technologies are important in sustaining competitiveness. However, involvement in such activities is capital-intensive, making them unaffordable for most Malaysian companies to undertake. There is also a need to further strengthen the patent registration and management system to enhance the protection of IP. Such protection is viewed as an important facet in promoting R&D.

(c) Limited Access to Financial Support

24.74 Costs which companies have to bear to acquire technologies cover:

- capital equipment;
- technology and related software licences for the right to use certain patented processes or products;
- upgrading and maintenance; and
- remunerations for both local and foreign experts and skilled personnel.

Technology acquisition through foreign suppliers can be costly, partly due to the premium placed on the quality and reliability of the equipment and services. This compels most local industries to borrow heavily from financial institutions, to be able to invest in new technologies required for their operations.

24.75 The venture capital industry needs to be more supportive of the increasing needs of certain industries, with respect to technology acquisition. It needs to review evaluation criteria, which are viewed by technopreneurs as being restrictive, to avoid a funding mismatch between the financing needs of the technopreneurs and the criteria of the venture capitalists. There is also a need for flexibility in the provision of financial and technical support for R&D. R&D activities involve a long gestation period. It is necessary to ensure that there is continuity in providing financial and technical support to enable research projects to be completed and produce expected benefits. Product development of industries such as biotechnology and pharmaceuticals, involves long gestation periods and numerous regulatory approvals before the products can be accepted or marketed. Financial institutions are also cautious in financing the development of such technologies, which have uncertain returns.

(d) Lack of Knowledge and Comprehensive Data on the Usage of Technologies

24.76 Firms which are involved in knowledge and capital-intensive industries, such as pharmaceuticals, biotechnology, and petrochemicals and petroleum, are compelled to adopt current technologies to comply with stringent regulatory procedures, for example, Good Manufacturing Practice (GMP). In other industries, where there is no such requirement, firms are less keen in adopting new technologies. Conservative attitude among decision makers in corporate management towards investing in ICT and other technologies is often attributed to their cautious view on the return on investments. Companies which lack professional management expertise and appreciation on the importance of strategic technology mapping may encounter slower progress in the adoption, adaptation and implementation of newer technologies.

24.77 Rapid technological obsolescence is a major concern among firms, causing uncertainty, doubt and reluctance in the acquisition of new technologies. This is often perceived to lead to a low return on investments and tends to make firms risk-averse to the adoption of new technologies. Companies which have experienced poor planning and weak technical support from technology vendors often fail in their implementation and, thus, are cautious to implement new technologies. Companies need to enhance their technical expertise in the implementation process of ICT. A management-supported and centralised knowledge management system is required to coordinate the inter-relationships of complex system processes. Companies require capable internal knowledge management expertise in the implementation of systems, to avoid being overly reliant on vendors and external consultants.

24.78 ICT extends the ability of companies to innovate by providing quick and easy access to internal and external sources of knowledge. Coordinated and consistent efforts are required to disseminate information on relevant technologies. There is a lack of awareness among companies, particularly SMEs, on the productivity benefits of ICT and other technologies. The SMEs also require information and resources on the effective use of appropriate technologies for their industry. There is a lack of a single source of reference on comprehensive data on surveys and studies to enable companies to update and analyse the trends and issues of adaptation, benefits, costs and impediments of ICT and other technologies in various industries. Without such data, the level of technology adoption by industries cannot be gauged. More importantly, it will be difficult to chart a strategic plan of action for technology adoption for local industries.

(e) Lack of Infostructure Facilities to Support the Information and Communication Technology Services Sub-Sector

24.79 Advancements in the global digital environment are expected to have a significant impact on the positioning of Malaysia as a competitive knowledge-based economy, where the local ICT services sub-sector is expected to assume a bigger role.

24.80 There is a need to undertake measures to enhance the roll-out of ICT infostructure for improved broadband connections for advanced multimedia applications, local content development, greater e-commerce adoption and improved information security. The existence of an adequate and reliable ICT infrastructure, together with the capacity to support widespread access and delivery of information are important components for the creation of a knowledge-based economy. Equally important is the availability of a broadband network to enable greater adoption of online multimedia and internet-based applications. Measures are also needed to allow service providers to gain greater access to infrastructure capacity, at satellite and cable landing stations.

24.81 The development of local content for commerce and industrial activities, as well as education and entertainment, becomes increasingly important to enable the widespread growth of the multimedia content industry for both local and global markets. In this respect, collaboration is required with major world content providers to upgrade the creative talents among local content providers. While measures will need to be undertaken to develop the local content industry, equally important is the need to overcome software piracy. An area for local content providers to be aware of, and take action on, is IP registration, particularly patents, trademarks and copyrights, for ICT-related products and services.

24.82 Although e-commerce is gaining substantial ground in newly industrialised countries, its adoption, particularly among SMEs, will need to be enhanced. In this respect, constraints faced by the SMEs, which need to be addressed, include:

- costs of installation, management and maintenance of e-commerce system for a business;
- costs of remuneration of highly skilled workforce, especially ICT personnel and knowledge workers; and
- prevailing mindset, which does not facilitate the migration to the new work culture, requiring buying and selling of products and services using virtual networks within and across the globe. Areas where the mindset will need to change include trust, business transaction security elements, authentication of information and sharing of business knowledge and databases.

24.83 The need for adequate protection from information leakage and financial losses through computer fraud remains a challenge in the ICT services sub-sector. As the economy becomes more connected, concerns on computer abuse, misuse and information security will need to be addressed more effectively, to provide greater reliability, confidentiality and integrity of networked information. Enhancement of information security management, including ensuring current cyber laws and related regulations remain relevant and enforceable, capacity building measures and support structures within relevant agencies, will need to be undertaken to reduce online fraud and promote trust and confidence in networked systems.

SECTION VII STRATEGIES AND POLICIES

STRATEGIC THRUSTS

24.84 Ten strategic thrusts have been set to address the challenges and further promote the application of ICT and other potential technologies in industrial development:

(1) enhancing the awareness of the trends on and potential benefits from the greater adoption of ICT and other technologies;

(2) improving international linkages in ICT and other technology developments to facilitate the sourcing of global knowledge;

(3) nurturing and fostering collaborations between domestic business entities and foreign technology providers to accelerate technological diffusion, adoption and adaptation;

(4) integrating Malaysian-owned companies into the global supply chains;

(5) promoting ICT and other potential technologies in the services sector;

(6) intensifying private sector investments, including foreign direct investments (FDIs), to enhance technological capabilities and transfers;

(7) establishing a data centre for developments and applications of ICT and other technologies;

(8) building domestic technological capacities and capabilities;

(9) developing programmes on human resource development (HRD) to support technological enhancements in the manufacturing and services sectors; and

(10) enhancing the institutional support in facilitating technological developments and applications.

(1) ENHANCING THE AWARENESS OF TRENDS AND POTENTIAL BENEFITS FROM TECHNOLOGIES

24.85 Awareness on potential applications of other technologies is important for enhancing industrial development, especially advanced technologies, methods and processes. Strategies to raise the level of awareness include:

- creating opportunities for companies to experience and assess the benefits of ICT, for example, through formulating apprentice and internship programmes in ICT for newly operating companies;
- hosting regular activities, such as awareness seminars, workshops, dialogues, science camps and visits to institutions in science and technology and ICT, and providing rewards for best practices. The assistance of industry associations will be sought in raising the awareness;
- undertaking outreach programmes to stimulate interest in science and technology and ICT among various groups, such as students, workers, youth and women; and
- narrowing the digital divide through the establishment of tele-centres to promote computer education and empower rural communities to gain access to and utilise information using ICT.

(2) IMPROVING INTERNATIONAL LINKAGES TO FACILITATE THE SOURCING OF GLOBAL KNOWLEDGE ON TECHNOLOGIES

24.86 The growing interdependence of the global economy provides opportunities in international networking and collaborations in enhancing domestic capacities and capabilities in science and ICT. Measures to improve the international linkages in science and ICT include:

- creating international networks and alliances, as well as strategic partnerships, with internationally renowned technology-based institutions for information exchange, knowledge sharing and sabbatical placements in areas of excellence and competence; and

- leveraging upon existing bilateral, regional and multilateral cooperation programmes in promoting and strengthening development activities in ICT and science.

(3) NURTURING COLLABORATIONS

24.87 Collaborative initiatives will be undertaken to build smart partnerships to create value and sustain competitiveness among participating business entities. Measures to nurture and foster collaborations include:

- encouraging strategic alliances between local and foreign technology-intensive companies to hasten the acquisition of knowledge by local companies on product and process developments; and

- initiating collaboration programmes, at bilateral, regional and multilateral levels, which promote technological diffusion, adoption and adaptation by industries.

(4) INTEGRATING MALAYSIAN-OWNED COMPANIES INTO THE GLOBAL SUPPLY CHAINS

24.88 There is a need to strengthen the capabilities of Malaysian-owned companies in moving along and up the value chain to enhance their global competitiveness. Strategies to achieve this include:

- encouraging the effective utilisation of applications in ICT in management and production processes to enhance their technological capabilities and productivity;

- improving support programmes to accelerate the adoption of ICT and other technological applications in strategic areas to meet industry requirements;

- facilitating the acquisition and enhancement of skills and competencies of local companies in emerging technologies;
- encouraging the adoption and application of leading technologies;
- nurturing local companies as R&D partners to tap opportunities in outsourcing of R&D by MNCs; and
- nurturing and promoting capable domestic technology-intensive companies to participate in the global e-supply chains of MNCs.

(5) PROMOTING TECHNOLOGIES IN THE SERVICES SECTOR

24.89 The services sector is expected to generate new sources of growth and export earnings. ICT, as a driver in the knowledge-based economy, will add value and further contribute towards the expansion of the sector. The development and application of ICT and other potential technologies will become increasingly important in the creation of new types of services, resulting in the emergence of innovative business and services companies. Efforts will be intensified to promote the application and integration of ICT and other technologies in the services sector.

24.90 Strategies to promote ICT and other technologies in the services sector include:

- rolling out the initiatives on tele-health and e-commerce;
- implementing e-commerce initiatives under MSC Malaysia in the manufacturing, retail, construction, tourism, logistics and agriculture sectors;
- promoting and nurturing local content industries;
- encouraging local companies to undertake high-end shared services outsourcing-related services;
- encouraging strategic alliances and joint ventures among leading MSC-status companies with relevant Government-linked companies (GLCs) to create new growth generating activities; and
- accelerating the implementation of the MyICMS 886 Strategy. The development of the eight targeted service areas under the strategy will be hastened, to equip Malaysia in the delivery of advanced information, communication and multimedia services.

(6) INTENSIFYING PRIVATE SECTOR INVESTMENTS TO ENHANCE TECHNOLOGICAL CAPABILITIES AND TRANSFERS

24.91 The participation and contribution of private sector investments, including FDIs, in technology development and transfers, are important towards enhancing

domestic capacities and capabilities in R&D and applications of ICT. Measures to encourage such private sector investments include:

- continuing to undertake progressive liberalisation autonomously, regionally (through ASEAN) or multilaterally (through the World Trade Organisation) in ICT products and ICT-related services, such as telecommunications, audiovisual services, computer and related services and ICT support or data centres;
- enhancing access to public research activities;
- reviewing the present incentives for R&D to promote greater investments by industry in R&D, as well as attract significant foreign R&D projects to Malaysia;
- enhancing collaborative technology ventures among MNCs, GLCs and technologically capable SMEs; and
- improving mechanisms for effective technology transfers and commercialisation, through strengthening the existing systems for IP and technology licensing.

(7) ESTABLISHING A DATA CENTRE ON TECHNOLOGIES

24.92 Relevant and up-to-date data on ICT and its applications are important for planning, monitoring and evaluating initiatives on technology development. There is a need to improve the present statistical system, to enable it to provide comprehensive data on ICT.

24.93 Measures to enhance the information system include:

- reviewing and realigning the present statistical system, including on trade, industry and employment, to incorporate data requirements on ICT;
- undertaking surveys to fill data gaps on ICT;
- upgrading the data collection and collation mechanism, through using new technological means, to be able to produce cost effective and timely data;
- establishing a central database system for coordinating and disseminating data and information on ICT;
- developing relevant data and indicators at sectoral level on ICT, as well as composite measures, for strategic planning and policy formulation and implementation; and
- enhancing partnerships and collaborations with international development agencies and statistical institutions towards producing consistent, comparable and harmonised statistics on ICT, which are essential for benchmarking purposes.

(8) BUILDING DOMESTIC TECHNOLOGICAL CAPACITIES AND CAPABILITIES

24.94 Measures will be undertaken to promote indigenous technologies through innovation, technology transfers and commercialisation. The measures include:

- improving the present IP system, through:
  - simplifying search and registration procedures;
  - making costs involved affordable; and
  - providing a dedicated fast track registration facility for IP for products and services in ICT, as they involve short life cycles;
- facilitating the growth of R&D activities, through:
  - increasing the spending on R&D;
  - promoting the commercialisation of research findings;
  - realigning financing and resource utilisation towards more demand-driven R&D; and
  - encouraging alternative sources of financing, including venture capital and derivatives, or secondary stock market.

(9) DEVELOPING PROGRAMMES ON HUMAN RESOURCE DEVELOPMENT

24.95 The present education and training programmes and curricula for both students and the workforce are not adequately meeting the demands of the emerging knowledge-based and technology-intensive industries. Measures to address such inadequacies include:

- aligning present curricula and developing new curricula of training institutes and institutions of higher learning to match the needs of industries in R&D, creativity and innovation;
- improving and strengthening the Brain Gain Programme, by encouraging Malaysian citizens residing abroad, with the required skills, knowledge, experience and expertise, to return. A central database on the programme will be developed. The database will contain information of Malaysians residing abroad who possess skills and expertise in niche areas, such as ICT, microelectronics, biotechnology and life sciences, and advanced manufacturing technologies in pharmaceuticals, machinery, automotive engineering, aerospace and medicine;
- encouraging foreign experts and professionals to serve in Malaysia, to facilitate technology transfers and exchange of knowledge and experience among researchers and industry practitioners, as well as policy formulators; and
- developing training programmes for the academia to acquire and update knowledge on industrial technological developments, through attachments with industries, study visits and conducting periodic training programmes, as well as promoting smart partnerships and collaborations.

(10) ENHANCING THE INSTITUTIONAL SUPPORT IN FACILITATING TECHNOLOGICAL DEVELOPMENTS AND APPLICATIONS

24.96 An integrated institutional support will be provided to nurture and promote research and technological developments, as well as new applications. Measures to be undertaken include:

- promoting research-based cluster development, through fostering collaborations among Government research institutes, institutions of higher learning, technology parks and industries, including GLCs;
- providing assistance for promoting collaborations among the industry, the Government and academia. Areas of assistance include:
  - attracting foreign test laboratories to locate in Malaysia;
  - providing facilities for companies to be engaged in applied research; and
  - allowing learning and teaching institutions to leverage upon private sector facilities;
- improving the present policies, programmes and mechanisms to enhance the scope and access to capital and financing for technology applications;
- creating a more conducive environment for the venture capital industry to develop and increasing allocations for venture capital;
- adopting a more comprehensive and effective approach and mechanism in disseminating information, particularly various financial assistance programmes supporting technology applications;
- instituting a more efficient and effective public delivery system, aimed at facilitating the application and approval processes, especially for obtaining employment visas and permanent residence status for foreign experts and knowledge workers;
- establishing a system of technology benchmarking to evaluate the level of application of technologies by industries;
- extending broadband coverage progressively to major industrial areas, in line with the demand for online applications and services;
- developing web-based shared facilities to provide technology-related information and services; and
- investing in upgrading the infrastructure for science and technology development, including establishing new institutions and facilities in research and technology development.

Chapter 25

LOGISTICS

SECTION I OVERVIEW

25.01 The logistics industry serves as an important link in the initiatives to enhance Malaysia's progress in industrialisation and international trade. The performance of the industry will have an impact on the pace of the nation's industrialisation and its competitiveness in international trade. The industry comprises transport as its core element and is complemented by various related services, such as warehousing, forwarding and other value-added services. The transport sub-sector covers ports, airports, roads, railways and inland haulage services. Although transport comprises several modes, more than 90 per cent of international trade is seaborne, with ports providing the important interface between shipping and land transport. Ports are linked to the hinterland and marketplace largely by roads, railways, haulage services and, to some extent, through airports. The transport sub-sector is supported by a number of integrated logistics services and, together, they provide the logistics support to both domestic and export oriented suppliers and manufacturers.

25.02 The efficient performance of ports and inland logistics services is important, as part of the efforts to achieve the overall objectives of the Third Industrial Master Plan (IMP3), 2006-2020. The expansion of trade and the flow of foreign direct investments (FDIs) will enhance the integration of Malaysia into the global economy. Hence, the logistics industry will need to be further developed to keep pace with the increasing demand of international trade, as well as provide a source of growth to the national economy.

25.03 This Chapter covers:

- the overall performance of the logistics industry and the performance of the two main sub-sectors, namely, transport service providers and logistics service providers;
- projected growth of freight transport by sea, air and rail;
- issues and challenges faced by the sub-sectors, including integrating the shipping services into the international supply chains, the need for more Malaysian companies to venture into higher value-added services of freight forwarding, including warehousing and distribution, and the need to initiate an efficient multimodal transport and modal shift; and

- strategic thrusts and policy measures to enhance the performance and contribution of the logistics industry towards achieving greater industrialisation and a higher level of international trade, including creating an efficient and competitive logistics industry and promoting the development of multimodal transport modes.

SECTION II PERFORMANCE AND PROJECTED GROWTH OF THE LOGISTICS INDUSTRY

OVERALL PERFORMANCE

25.04 The Second Industrial Master Plan (IMP2), 1996-2005, set a growth target of 8.8 per cent for the services sector, which includes the logistics industry. During the IMP2 period, the services sector grew at an average annual rate of 6 per cent. By 2005, the sector contributed 58.1 per cent of the Gross Domestic Product (GDP). There are no specific data on the contribution of the logistics industry to the GDP. The contribution of the industry is partly reflected under transportation, including storage and communication, which grew at an average annual rate of 6.5 per cent during the IMP2 period. The higher growth of the transportation, storage and communication services, compared with the overall growth of 6 per cent of the services sector, was in line with the robust expansion of the country's manufacturing base and external trade.

(a) Contribution of the Transport Sub-Sector

25.05 In 2005, transport, storage and communication services contributed RM23.2 billion, or 8.8 per cent, to the GDP. The status of the transport, storage and communication services, based on the Census on Transport and Communications, 2004[1] by the Department of Statistics, was as follows:

- there were 3,816 establishments involved in providing the services, contributing RM77.9 billion in fixed assets and employing 217,671 workers;

- within the transport sub-sector (excluding services allied to transport, post and courier, and telecommunications), land transport services constituted the major component, in terms of the number of establishments (1,082), employment (60,289 persons) and size of fixed assets (RM15 billion), followed by maritime transport; and

- the road haulage component was the most labour intensive, with employment of 35,227 persons, followed by air (24,620) and maritime transport (19,663) (Table 25.1).

[1] Census was undertaken for companies with financial year ending between 31 December 2003 to 30 June 2004.

In 2005, the transportation component of the balance of payments (BOP) registered a deficit, amounting to RM15.7 billion, compared with RM6.5 billion in 1996. This widening deficit reflected Malaysia's continued reliance on foreign transportation and logistics services.

TABLE 25.1

ECONOMIC INDICATORS OF THE TRANSPORT, STORAGE AND COMMUNICATION SERVICES, 2003

Transport Service	*Establishments (number)*	*Employment (persons)*	*Value-Added (RM million)*	*Size of Assets (RM million)*
Total	**3,816**	**217,671**	**25,723**	**77,902**
Land transport	**1,082**	**60,289**	**2,136**	**15,032**
Rail	4	6,916	198	12,412
Road haulage	819	35,227	1,557	1,909
Public bus transport	259	18,146	381	711
Maritime	**403**	**19,663**	**3,972**	**12,769**
Sea transport	348	18,318	3,903	12,702
Inland water transport	55	1,345	69	67
Air	**15**	**24,620**	**1,421**	**2,053**
Services allied to transport	**2,171**	**54,056**	**4,935**	**17,452**
Highway operations services	16	5,049	1,882	9,811
Port operations services	9	9,976	1,582	5,733
Shipping and forwarding agencies services	750	14,754	787	445
Storage and warehousing services	35	2,672	156	366
Cargo handling and stevedoring	138	5,917	220	227
Others[1]	1,223	15,688	308	870
Post and courier	**84**	**21,342**	**721**	**453**
Telecommunications	**61**	**37,701**	**12,538**	**30,143**

Note: [1] Car parking services, and travel agencies and tour operator services

Source: Census on Transport and Communications 2004, Department of Statistics

(b) Comparison with Selected Countries

25.06 During the period 1996-2004, the average annual growth rate of Malaysia's transport sub-sector, including storage and communication, at 6.6 per cent, was higher than selected countries, namely, Singapore, which grew at 6.1 per cent and Thailand (5 per cent). The contribution of the sub-sector to the growth of Malaysia's GDP, in percentage points, was 0.5, compared with Singapore (0.8) and Thailand (0.4) (Table 25.2).

TABLE 25.2

COMPARISON OF MALAYSIA'S TRANSPORT SERVICES SUB-SECTOR, INCLUDING STORAGE AND COMMUNICATION, WITH SELECTED COUNTRIES, 1996-2004

	Malaysia	*Singapore*	*Thailand*
Annual growth of GDP (%)	4.6	4.7	2.5
Annual growth of transport, storage and communication (%)	6.6	6.1	5.0
Share of transport, storage and communication to GDP (%)	8.2	12.9	9.6
Contribution of transport, storage and communication to growth (% points)	0.5	0.8	0.4

Sources: Department of Statistics, Malaysia and CEIC Data Company Limited, Hong Kong. Compiled by the Ministry of International Trade and Industry

DEVELOPMENTS AND PROJECTED GROWTH

(a) Overall Freight Transport

25.07 During the period 1990-2005, the overall volume of freight transport in Malaysia by sea, rail and air increased. In 2005, the port component handled the largest portion of freight traffic, at 252.6 million tonnes (Table 25.3).

TABLE 25.3

FREIGHT TRAFFIC BY PORT, AIRPORT AND RAIL

	Ports[1]	*Airports*	*Rail*
	('000 tonnes)		
1990	99,897	241.6	4,631
1995	147,378	482.0	5,249
2000	190,417	775.1	5,481
2005	252,620	1,006.8	4,031

Note: [1] Include Port Klang, Pulau Pinang, Pasir Gudang, Kuantan, Bintulu, Tanjung Bruas, Kuching, Miri, Rajang, Kota Kinabalu, Lahad Datu, Sandakan, Tawau, Port Dickson, Kemaman, Teluk Ewa and Tanjung Pelepas. Data refer to only 17 main ports, which differ from the data contained in the Ninth Malaysia Plan, which cover all 24 ports

Sources: Ninth Malaysia Plan and Ministry of Transport

(i) Maritime Cargo

25.08 In 2005, the total cargo throughput, or the volume handled by Malaysian ports, for both exports and imports, including container and non-container cargo, was 252.6 million tonnes, comprising 135.1 million tonnes, or 53.5 per cent, for exports and 117.5 million tonnes (46.5 per cent) for imports. Port Klang handled the largest volume of cargo, mainly containerised, followed by Port of Bintulu, which largely handled only one major commodity (liquefied natural gas - LNG). Other large ports include Port of Tanjung Pelepas (PTP), Port of Pasir Gudang and Port of Pulau Pinang. With the expected expansion of international trade during the IMP3 period, the total maritime cargo handled is expected to increase to 751 million tonnes by 2020, with an export and import ratio of 1.12 : 1 (Table 25.4).

TABLE 25.4

CARGO THROUGHPUT IN MALAYSIAN PORTS

Year	*Exports*	*Imports*	*Total*
	(million tonnes)		
2005	135.1	117.5	252.6
2010	207.3	185.3	392.6
2015	286.7	256.3	543.0
2020	396.5	354.5	751.0

Source: Ministry of Transport

25.09 The overall volume of container throughput in Malaysian ports is projected to increase, in absolute terms, from 12 million twenty-foot equivalent units of containers (TEUs) in 2005 to 36.6 million TEUs in 2020. Local containerised cargo is projected to increase from 4.9 million TEUs in 2005 to 15.3 million TEUs in 2020. With the further expansion of the transhipment capacities, transhipment volume is projected to register a larger increase in throughput, from 7.1 million TEUs in 2005 to 21.3 million TEUs in 2020 (Table 25.5). During the IMP3 period, the share of containerised cargo to the total throughput is projected to increase from 139.2 million tonnes, or 55.1 per cent, in 2005 to 441 million tonnes (58.7 per cent) in 2020 (Table 25.6). This is in line with the expected increase in Malaysia's total trade in manufactured goods. Non-container trade includes all commodities which are conveyed as bulk, as well as general cargo. Total non-containerised cargo is projected to increase from 113.4 million tonnes in 2005 to 310 million tonnes in 2020. Malaysian ports handle a variety of cargo, including palm oil, wood products, machinery, appliances and parts, textiles and apparel, rubber products, and chemicals and chemical products.

TABLE 25.5

CONTAINER THROUGHPUT IN MALAYSIAN PORTS

Year	*Local*[1]	*Transhipment*[2]	*Total*
	(million TEUs)		
2005	4.9	7.1	12.0
2010	7.2	10.8	18.0
2015	11.0	15.4	26.4
2020	15.3	21.3	36.6

Notes: [1] Local containerised volume refers to containers which are moved into and out of the country and represents international trade flow

[2] Transhipment volume refers largely to containers which are on transit, using Malaysian ports, without leaving the port premises, for connections with other origins or destination ports or for some value added activities

Sources: Ninth Malaysia Plan and Ministry of Transport

TABLE 25.6

CONTAINER AND NON-CONTAINER TRADE

Year	*Container*			*Non-container*		*Total*	
	(million TEUs)	*(million tonnes)*	*Share (%)*	*(million tonnes)*	*Share (%)*	*(million tonnes)*	*Share (%)*
2005	12.0	139.2	55.1	113.4	44.9	252.6	100
2010	18.0	225.0	57.3	167.6	42.7	392.6	100
2015	26.4	319.0	58.7	224.0	41.3	543.0	100
2020	36.6	441.0	58.7	310.0	41.3	751.0	100

Source: Ministry of Transport

(ii) Airfreight Cargo

25.10 Airfreight cargo mainly comprises high valued and time sensitive cargo, such as electronics and information and communication technology (ICT) products, biotechnology, medical products and perishable items, such as fresh fruits and flowers. Electronics and ICT products are mainly exported by air through Pulau Pinang Airport (60 per cent) and Kuala Lumpur International Airport - KLIA (40 per cent). In line with the targeted growth of trade in high value added electronics and ICT products, the volume of air cargo trade is expected to increase by more than two-fold during the IMP3 period, from 1 billion tonnes in 2005 to 2.4 billion tonnes in 2020 (Table 25.7).

TABLE 25.7

AIR CARGO

Year	*Volume ('000 tonnes)*
2005	1,007
2010	1,482
2020	2,357

Sources: Ninth Malaysia Plan and Ministry of International Trade and Industry

(iii) Railway Freight

25.11 It is estimated that only about 7 per cent of the seaborne traffic is transported via rail. In terms of inland movements, railways convey less than 1 per cent of the cargo generated by the economy. The cargo volume of railway freight is expected to more than quadraple, from 4 million tonnes in 2005 to 18.6 million tonnes by 2020 (Table 25.8).

TABLE 25.8

RAILWAY FREIGHT

Year	*Volume (million tonnes)*
2005	4.0
2010	11.6
2020	18.6

Source: Ministry of Transport

SECTION III INDUSTRY STRUCTURE AND PERFORMANCE

INDUSTRY STRUCTURE

25.12 The logistics industry comprises:

- transport service providers, including operators of road, rail, air and sea transport; multimodal operators; and terminal operators; and
- logistics service providers
  - facilitation services

    customs brokers, freight forwarders, consolidators, non-vessel operating common carriers, ship brokers and shipping agents;

- distribution services

  warehousing and transportation, inventory management, and domestic and regional distribution and courier companies;

- integrated logistics services

  third party logistics providers (3PLs) and lead logistics providers, often referred to as fourth party logistics providers (4PLs); and

- business support services

  ICT, banking and insurance, suppliers of human resource and equipment handling, education and training, maintenance and repairs, and security.

The principal services generated in the supply chain are provided by a number of logistics service providers. Some of them are emerging as experts or professionals, particularly in their ability to bring together various components of the links in the supply chain and ensure that the process flow is efficient. One such category of specialists which has emerged to provide the service, particularly arising from the trend of manufacturing companies to outsource such services, is the 3PLs.

25.13 An increasing number of multinational corporations (MNCs) are outsourcing their logistics activities to international logistics providers. This trend towards outsourcing encourages logistics service providers to engage in supply chain management directly with their customers on a global basis. An effective logistics system integrates both the supply chains within the country and the networks at the international level.

SHIPPING SERVICES

(a) International Shipping

(i) World Seaborne Trade

25.14 World seaborne trade, comprising dry and tanker cargo, grew from about 4 billion tonnes in 1990 to 6.7 billion tonnes in 2004. Of the total seaborne trade in 2004, dry cargo amounted to 4.4 billion tonnes, or 66 per cent, while tanker cargo, 2.3 billion tonnes (34 per cent):

- dry cargo comprised containerised, main and minor cargo:
  - containerised cargo amounted to 1.9 billion tonnes (43.2 per cent);
  - main bulk commodities, such as iron ore, coal, grains, bauxite and alumina, and rock phosphate, amounted to 1.6 billion tonnes (36.4 per cent); and

- minor bulk, comprising, among others, steel products and agricultural products, amounted to 900 million tonnes (20.4 per cent); and

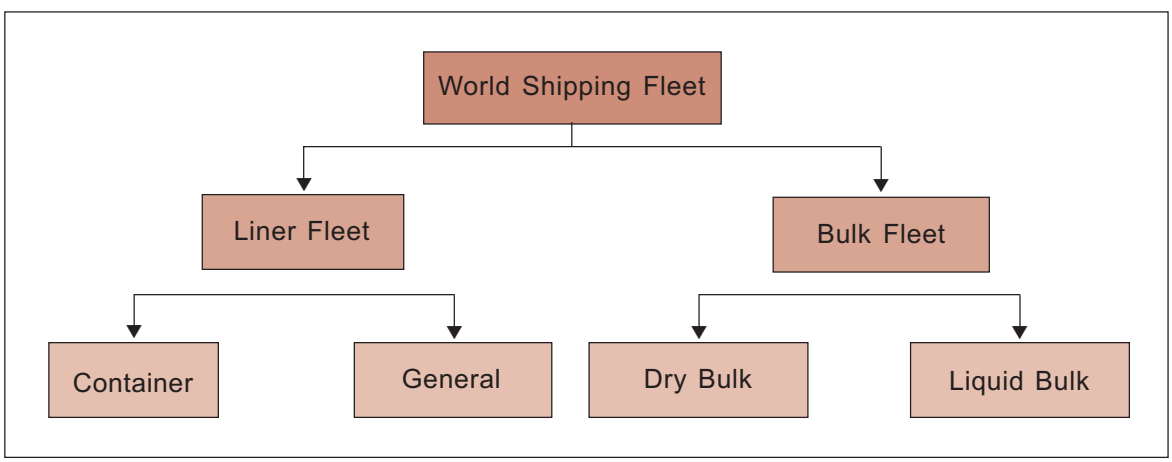
- tanker cargo mainly comprised crude oil (77.5 per cent), followed by petroleum products.

(ii) World Shipping Fleet

25.15 International seaborne trade is undertaken by a world shipping fleet, which comprises two broad market segments - liner and bulk (Chart 25.1). As at January 2005, the vessel capacity of the world shipping fleet totalled 895 million deadweight tonnes (DWT), largely comprising oil tankers and bulk carriers. Together, they accounted for more than 73 per cent of the world's capacity. The rest of the global fleet is accounted for by specialised carriers, such as LNG ships, chemical carriers, general cargo ships, container ships and passenger ferries.

CHART 25.1

WORLD SHIPPING FLEET



Source: Ministry of International Trade and Industry

(iii) Liner Shipping: Container Services

25.16 Liner shipping companies mainly provide container services, which convey a diverse range of cargo, including construction materials, foodstuffs and manufactured products, such as machinery, textiles, automobiles and trailers. In 2004, liner shipping conveyed 1.9 billion tonnes, or 28.4 per cent, of the total world cargo. Within the liner trade, more than 50 per cent of all cargo (in volume terms) are in containerised form. In some developed countries, containerised cargo account for more than 75 per cent of their liner trade by volume.

(iv) Bulk Shipping Services

25.17 Bulk shipping services involve conveying a variety of cargo types, including crude oil, LNG, grains, chemicals, sugar and agricultural commodities. They also handle specialised cargo, such as equipment for the oil exploration industry, shipment of fertilisers or grains in bulk and specialised automobile carriers. Bulk shipping services are provided on a non-scheduled basis. The service providers operate in a more competitive market through the chartering of ships. The vessels are usually offered in the world charter markets or shipping pools. The port requirements of these bulk vessels also differ, compared with the container shipping fleet.

(v) Development Trends in the World Shipping Industry

25.18 Development trends in the world shipping industry have largely been influenced by globalisation and the application of ICT, which have led to higher expectations of customers or shippers. Major developments include:

- ***Increase in the Size of Container Ships***

25.19 The capacity of the largest vessel had increased more than five-fold, from 1,500 TEUs in 1980 to 8,750 TEUs in 2005. The increase poses a new challenge to countries with low cargo volume, in terms of their ability to service large ships and improve their connectivity to the wider network of markets.

- ***Industry Concentration***

25.20 The shipping industry has moved towards consolidation through mergers and acquisitions (M&As). Presently, the industry is dominated by the top 20 carriers, which account for more than 60 per cent of the global containerised shipping fleet. The expansion in the container ship trade has affected the structure of the market, characterised by increased capacity and the presence of larger ships. The large shipping companies have entered into co-operation agreements among themselves, in terms of price fixing, which will enable them to continue to dominate the international market. Through these agreements, the companies are also able to enter into alliances with their competitors to widen their market coverage. Presently, three global alliances have been formed, involving major carriers:

- New World Alliance (comprising APL, Mitsui OSK Lines and Hyundai Merchant Marine);
- Grand Alliance (comprising Hapag Lloyd, NYK, OOCL and *MISC Berhad*); and
- CHKY (comprising Coscon, Hanjin, K Line and Yang Ming).

In addition to these alliances, there are also independent operators, such as Maersk, the world's largest shipping line, Evergreen and Mediterranean Shipping Company.

- ***Service Contracts***

25.21 Under the anti-trust rules in the United States of America (USA) and the European Union (EU), container lines are allowed to enter into fixed term service contracts at discounted rates, in return for promised volumes of cargo, directly with some principal customers and major integrated logistics providers, freight forwarders and non-vessel operating common carriers.

- ***Container Consortia***

25.22 An increasing number of shipping companies has formed container consortia with their competitors, which involve the co-sharing of cargo capacities and boxes, both at sea and ports. In Europe, a number of shipping lines has cooperated with other shipping lines in sharing inland facilities, including cargo transfer, warehousing and storage. This is undertaken by conveying a major portion of containerised cargo from major European ports to designated inland locations through the use of inland waterways and rail services. This arrangement has altered the nature of shipping from 'port-to-port' to 'door-to-door'. An increasing number of shipping lines are integrating their logistics services to compete with specialised service providers, such as 3PLs and 4PLs.

- ***Transportation Intermediaries***

25.23 The traditional role of non-vessel operating common carriers in selling cargo space to smaller shippers is extended to cover comprehensive integrated logistics services on a 'door-to-door' basis. Ocean carriers are beginning to compete directly with transportation intermediaries, by using competitive tools at their disposal, including confidential service contracts. This development will pose a further threat and challenge to the logistics industry in Malaysia, which is presently characterised by fragmentation and lack of integration, in terms of the services provided to customers.

(b) Malaysian-Owned Shipping Lines

25.24 Similar to international shipping, domestic shipping also consists of scheduled and non-scheduled shipping services, especially in the transportation of general and break-bulk cargo. The non-scheduled shipping service is an important component, as it mainly serves the oil and gas sub-sector, particularly the offshore supply boats, which service the offshore oil and gas platforms. Operators of the non-scheduled services also provide crude oil and product tankers, serving between local refineries and consumption centres. In addition,

a number of domestic shipping companies handle containerised and non-containerised cargo, including major types of manufactured goods and commodities.

25.25 As at December 2005, the status of domestic shipping was:

- there were more than 300 Malaysian shipping companies, owning or operating a total of more than 3,900 Malaysian flag ships;
- the total capacity (DWT) and total gross registered tonnage (GRT) of Malaysian registry ships were 8.6 million and 8.2 million, respectively;
- 65 per cent of these companies owned or operated a total of 421 ships, plying international routes;
- it was estimated that 50 per cent of the Malaysian shipping companies were operators or owners of single vessels of less than 500 GRT in size; and
- the top seven Malaysian shipping companies, which are members of Malaysian Shipowners' Association, owned and operated a total of 320 vessels (under Malaysian and foreign registries), with a total capacity of 8.3 million DWT and accounting for 54 per cent of the total fleet of the members of the association. *MISC Berhad* accounted for 18 per cent, in terms of the number of vessels, and 80 per cent, in terms of DWT.

25.26 Tax incentives are provided for the shipping sub-sector, ranging from tax exemption to shipping companies for income earned from shipping, to tax drawbacks and double deduction on freight charges for shippers in Sabah and Sarawak, which use ports in Peninsular Malaysia.

(c) Regulatory Mechanism

25.27 The domestic shipping services sub-sector is regulated by the Cabotage Policy. The policy reserves the transportation of cargo and passengers in the domestic waters to Malaysian-owned companies and Malaysian registered ships. Traditionally, most countries have applied some controls on shipping which is engaged in their domestic trade. Ships engaged in cabotage trade are required to be:

- manned by the country's own citizens;
- wholly or majority owned by nationals; and
- built at domestic shipyards or registered under the country's national flag.

This is a general rule and the policy is applied differently in different countries, depending on the state of the maritime industry.

25.28 In Malaysia, although domestic shipping is restricted to Malaysian ships and shipping companies, the Domestic Shipping Licensing Board issues licences, on a case-by-case basis, to allow foreign ships to operate, if the specific type of vessel is not available or the number of vessels is not adequate. In 2005, a total of 3,646 domestic shipping licences were issued. Of the total, 2,022 licences, or 55.5 per cent, were issued to local vessels and 1,624 (44.5 per cent), foreign-owned vessels. Licences issued to foreign vessels are generally for a period of not more than three months. A total of 35 companies were issued domestic shipping licences to hire foreign vessels, of which 27 were joint-ventures between Malaysian and foreign companies.

PORTS

25.29 In 2005, there were 24 main ports operating in the country. In terms of the overall throughput, Malaysian ports[2] handled a total of 252.6 million tonnes of cargo, representing an increase of 49 per cent of the volume of 169.5 million tonnes handled in 1996. This expansion was attributed to the growth of merchandise trade and the increase of transhipment traffic. More than half (55.1 per cent) of the throughput in 2005 consisted of containerised cargo. In the case of Port Klang, containerised cargo accounted for 77 per cent of the total cargo handled by the port.

(a) Transhipment of Containers

25.30 In recent years, there has been a growth of transhipment activities in Malaysian ports. In 2005, Malaysian ports handled a total of 7.1 million TEUs of transhipment containers, of which PTP in Johor recorded the largest share (53.9 per cent). PTP, Westports and Northport are the three major ports which handle transhipment traffic (Table 25.9). PTP presently provides a multi-lane transhipment hub for containers and is suitable for the development of related value-added integrated logistics activities. The strategic location of PTP, at the confluence of the main east-west shipping lanes, provides a distinct advantage to the port to position itself in the international logistics network. The distripark in the Free Zone of PTP will encourage regional and global shipping lines to utilise the services provided by the port. In addition, the proximity of the port to the airport in Senai, Johor provides further opportunities for the development of multimodal trade, involving air, road, rail and sea links on a global scale. Other transhipment ports are Northport and Westports in Port Klang. Both ports have increased their transhipment trade, including value-added activities. The ports are focusing on value-added operations by expanding their distripark activities and increasing the volume of transhipment with higher value-added content.

[2] Refer to the 17 ports covered by the Ministry of Transport.

TABLE 25.9

VOLUME OF TRANSHIPMENT CONTAINERS HANDLED BY MAJOR PORTS

	Port Klang				
	Northport ('000 TEUs)	*Westports ('000 TEUs)*	*Sub-total ('000 TEUs)*	*PTP[1] ('000 TEUs)*	*Total ('000 TEUs)*
2000	807	478	1,285	356	1,641
2005	962	1,962	2,924	3,853	6,777

Note: [1] Port of Tanjung Pelepas

Source : Ministry of Transport

(b) Port Regulations

25.31 The overall responsibility for the regulation and administration of all Federal ports in Malaysia is under the purview of the Ministry of Transport. There are also ports under the jurisdiction of the State Governments of Sabah and Sarawak. Tariffs for Federal ports are regulated by the Ministry of Transport under the various Port Acts (Table 25.10). While ports are allowed to offer discounts from their tariff prices, they are not allowed to increase charges beyond the approved threshold, without the approval of the Minister of Transport. As part of the strategy to coordinate the development of ports, a Malaysian Port Commission will be established. The commission will provide the forum to deliberate on and formulate national strategies and policies for the development of infrastructure and services in ports.

TABLE 25.10

CONTAINER TARIFFS AT SELECTED MALAYSIAN PORTS, AS AT DECEMBER 2005

Port	*RM per TEU*	*RM per FEU[1]*	*Transhipment RM per TEU*
Port of Tanjung Pelepas	230	345	200
Port Klang	230	345	140
Port of Pasir Gudang	180	260	80
Port of Pulau Pinang	140	210	120
Port of Bintulu	90	115	152

Note: [1] Refers to forty-foot equivalent units of containers

Source: Compiled by Portsworld Sdn. Bhd.

(c) Globalisation of Port Operations

25.32 With the rapid pace of globalisation and increased outsourcing of logistics services to logistics service providers on a worldwide basis, port operations have become a vital link in the efficient performance of international supply chains. Presently, major ports adopt the strategy of forming horizontal linkages with ports in various parts of the world. There are also vertical linkages by ports, through being involved in warehousing and storage, with the objective of providing efficient hinterland services for international trade.

ROAD TRANSPORT SERVICES

(a) Industry Structure

25.33 General cargo and container haulage companies are presently the largest segment of the road transport sub-sector. In 2003, based on the census undertaken by the Department of Statistics, there were 819 general cargo and container haulage companies, employing 35,227 persons and owning total assets valued at RM1.9 billion.

(i) Container Haulage

25.34 As at 2002, there were five licensed container haulage companies. As a result of liberalisation in the licensing policy, introduced in May 2002, an additional 85 container haulage licences were issued. As at September 2005, the 90 licensed companies operated a total of 7,256 prime movers and 36,413 trailers.

(ii) General Cargo

25.35 Companies transporting general cargo are larger in number and account for the movement of a wide range of general and break-bulk cargo, including heavy lifts and special cargo. As at September 2005, a total of 246,499 licences were issued to transport companies, which convey both containerised and general cargo. The licences issued are in two categories, namely, Class A and Class C. Class A licences are for the transportation of commercial cargo, while Class C licences are for the transportation of own cargo.

(b) Road Transport Regulations

25.36 The development and regulation of Malaysian road transport infrastructure and services fall under the purview of a number of ministries and departments. These include the Ministry of Transport, Ministry of Entrepreneur and Cooperative Development, Ministry of Works and Road Transport Department. The Road Transport Department is responsible for the safety aspects of commercial vehicles, including the competencies of drivers. *Pusat Pemeriksaan Kenderaan*

Berkomputer Sdn. Bhd. (PUSPAKOM) inspects vehicles for technical compliance with relevant safety regulations. Operating licences for commercial vehicles, such as prime movers, lorries, trucks and tankers, are issued by the Commercial Vehicle Licensing Board, under the Ministry of Entrepreneur and Cooperative Development.

25.37 Bonded trucks require licensing from the Royal Malaysian Customs, which allows logistics companies to transport dutiable goods in bonded vehicles. Generally, companies transport Customs-sealed cargo, either in containers or bonded trucks, between Free Zones, bonded warehouses, customs ports, customs airports and customs stations. In 2005, a total of 1,203 licences for bonded trucks were issued. Although the initial objective of introducing bonded trucks was to transport cargo of export-oriented companies in Free Zones to exit points within the country, the practice has been extended to convey such cargo from bonded areas in Malaysia to Singapore and Thailand.

RAIL TRANSPORT SERVICES

(a) Facilities and Charges

25.38 The rail freight transportation service in Peninsular Malaysia is operated by *Keretapi Tanah Melayu Berhad* (KTMB). The company operates rail services on a metre gauge of 1,000 mm, similar to its neighbouring countries, covering a total track length of 2,262 km. KTMB provides land feeder services to its customers, as an alternative to transporting cargo via feeder ships, with connections to major ports in the country. Freight services by KTMB serve:

- five port container terminals – at Butterworth, Port Klang (Westports and Northport), Pasir Gudang and PTP;
- three inland ports – at Ipoh, Nilai and Segamat;
- four inland container depots – three at Prai, Pulau Pinang and one at Seri Setia, Selangor; and
- four freight terminals – at Butterworth, Ipoh, Padang Besar and Singapore.

KTMB also serves several freight loading and unloading facilities, owned and operated by bulk freight customers (such as cement and fertiliser companies) throughout its network.

25.39 There are two categories of rail freight business, namely, container and conventional services. Container services include maritime and landbridge services, which together contributed RM65.4 million, or 60 per cent, of the total rail cargo revenues of RM108 million in 2005, while revenues from conventional services amounted to RM42.6 million (40 per cent). KTMB also transports general cargo, such as cement, food and fuel. The cargo are

conveyed for large shippers under direct contractual arrangements, without transport intermediaries, which is the normal practice for the transport of containerised goods. The present rail freight charges on KTMB trains from Singapore to all Malaysia's destinations are cheaper than vice versa. This is to encourage exporters, both Malaysian and Singaporean, to use Malaysian ports (Table 25.11).

TABLE 25.11

CHARGES[1] FOR BOTH LADEN AND EMPTY FREIGHT CONTAINERS

To / *From*	*Butterworth (RM)*	*Port Klang (RM)*	*Singapore (RM)*
Butterworth	-	350	800
Kuala Lumpur	350	100	420
Singapore	600	450	-
Port Klang	350	-	500

Note: [1] Based on one TEU freight container loaded on a wagon

Source: *Keretapi Tanah Melayu Berhad*

(b) Double Tracking

25.40 Transportation by rail has its advantages, as it:

- provides a more cost and energy-efficient and less polluting mode of transport;
- reduces investments and operational expenditures to build and maintain roads used for the transport of goods;
- provides greater safety of high value cargo;
- reduces the damage to the road networks, arising from the impact of heavy loads; and
- lessens congestion on motor highways and in areas around ports.

25.41 Double tracking improves the capacity of rail transport to meet new demands. The present double tracking project, which stretches from Rawang to Ipoh, is expected to be completed in December 2007. This project will provide a second running track in the Western Rail Corridor, in addition to other engineering improvements, such as re-alignments and upgrading of existing running tracks. It is estimated that with double tracking, there will be an increase in route capacity on most route sections by a factor of 6 or 7, that is, from about 30 trains per day to about 200-250 trains per day. At this level, there will be adequate capacity to accommodate a projected seven-fold increase in freight

volume across the rail network by 2037. Double tracking will require the establishment of stations and rail terminal capacities. Presently, there is surplus capacity at rail loading/unloading terminals at the seaports of PTP in Johor and Westports in Port Klang, which are served by double tracks, while the existing single track at Northport in Port Klang is not able to cope with the increasing demand.

(c) Regional Links through Landbridge

25.42 Presently, there are rail links from Port Klang (Northport) to Bangsue and Lat Krabang in Thailand, which started in 1999, and from Pasir Gudang to Bangsue, which started in 2000. The links were created through collaboration between KTMB, landbridge operators and the State Railway of Thailand. There are also links from Butterworth and PTP. This indicates that there is a potential hinterland which can be developed for ports in Malaysia through the rail link. As a result of promotion by KTMB and border collaboration with Thailand, the landbridge traffic has increased by more than three-fold, from 12,082 TEUs in 1999 to 44,314 TEUs in 2005. Other areas of potential growth include:

- transportation of rice from Bangkok to Butterworth, Port Klang and Pasir Gudang;
- car carrier service for exports to and imports from Thailand and Singapore markets; and
- transhipment cargo from Bangkok to PTP.

(d) National Transport Corridor

25.43 An integrated approach to the logistics industry will be through the evolution of a 'National Transport Corridor'. The development of ports in the country has led to the concentration of population in areas around major ports, which have developed into major urban centres of business and industry. The development of the transport corridor will remove the pressure on cargo flows in areas adjacent to local ports, where there are movements of freight and people in a small, congested area. There is a need to consider the establishment of strategic logistics centres at the border areas, for example, Padang Besar in Perlis and the Second Link in Johor. Other strategic logistics centres need to be developed in areas around Ipoh in Perak, Northern Johor-Melaka and the East Coast of Peninsular Malaysia.

25.44 The development and modernisation of road networks will need to address the issue of highway construction, in respect of the direction of the main routes for the transport of freight across the country. The routes for the infrastructure for freight transport will need to be able to cope with the expansion of road freight volume, including containers and general cargo, and facilitate intermodal links, in line with the development of rail and freight

distribution centres. The evolution of these routes, also referred to as transport corridors, will contribute towards an integrated strategy for infrastructure development, to facilitate the efficient flow of freight across the country. In the long term, these corridors will need to evolve in the direction of providing a link with road networks on a regional level. Similar development on road networks, on the basis of transport corridors, has evolved at a pan European level, with routes passing through several countries in Europe. One such corridor links countries from Central Europe with Turkey, Eastern Europe and Asia.

25.45 The development of distribution parks throughout the country will be part of the infrastructure of the logistics industry. These distribution parks will usually be in places where there are large concentrations of cargo, such as near major seaports and airports or in inland locations, where there is a higher density of industrial production activities. These parks, which have evolved in various ports throughout the world, incorporate the following main features:

- they provide services, such as large scale storage and distribution facilities, and are usually attractive for both manufacturers, as well as major logistics service providers;
- they also provide a location for the consolidation of products for trade and transport. Such activities make these parks attractive for logistics service providers to link manufacturers into the global supply chains; and
- they enable transport carriers to gain access to the supply chains and create maritime and export hubs, and thus provide an attractive location for large scale related activities, such as assembly and packing, to be undertaken.

In view of the importance of the activities in these parks, it is essential that they are linked to the main national transport corridors of motorways and rail network. In this way, their location will facilitate the transport of freight to ports and airports, and thus promote the development of the international supply chains.

AIR TRANSPORT SERVICES

25.46 The air cargo services sub-sector comprises:

- air cargo carriers and integrators;
- airport and cargo terminal operators;
- ground handlers;
- air cargo agents or airfreight forwarders; and
- airport regulators.

(a) Air Cargo Carriers and Integrators

25.47 Air cargo carriers comprise cargo carriers and air express carriers:

- the cargo carriers include airlines which operate dedicated and scheduled freighter services, for example, MASkargo. Passenger airlines, for example, Malaysia Airlines, also provide air cargo services through the belly-load of passenger aircraft; and
- major air express carriers and integrators are mainly operated by foreign companies. Some of these companies operate their own aircraft and provide door-to-door delivery services.

25.48 Presently, MASkargo provides freighter services to overseas destinations, including Hangzhou and Shanghai in the People's Republic of China, Incheon (Republic of Korea), Taiwan and various destinations in Australia. The airline has also set up other bases, including Dubai and Amsterdam. In addition, it plans to expand its services to more destinations in Europe. MASkargo accounts for the bulk of the cargo handled at Malaysian airports. The carrier handles an average volume of about 60,000 tonnes of cargo monthly. MASkargo's market share at KLIA is 56 per cent, Pulau Pinang Airport (42 per cent), Senai Airport (10 per cent), Kuching Airport (42 per cent) and Kota Kinabalu Airport (80 per cent).

25.49 In its efforts to create a niche market in the transhipment trade, MASkargo launched the I-Port Transhipment initiative in 2002. I-Port is an airport within a seaport, allowing seamless movements of cargo from regional destinations via sea to Malaysian ports, and onward deliveries to worldwide destinations by air, through MASkargo's Advanced Cargo Centre at KLIA. The cargo will be consolidated in a special 'air zone' area within the ports, placed on MAS trucks and transported to KLIA for export. Goods carried via I-Port include textile products, machinery, spare parts, gifts and footwear.

25.50 Malaysia's conducive investment environment has attracted an increasing number of foreign cargo carriers and global integrators into the Malaysian market. Integrators invest substantially in capacity planning and forecasting, as well as establishing an air cargo hub, warehouses, distribution centres and offices. Other areas they invest in include the application of leading edge technology and development of human capital. Apart from providing conventional transportation services, many international airfreight forwarders and cargo carriers also offer multimodal transportation solutions to their customers.

(b) Airports and Cargo Terminal Operators

25.51 There are five international and 15 domestic airports in Malaysia. At KLIA, a 24-hour Free Commercial Zone facility has been established, capable of handling 1 million tonnes of air cargo annually for both inbound and outbound, as well as transhipment cargo. The Advanced Cargo Centre operates within the Free Commercial Zone, supporting storage, value-added and distribution activities. Malaysian Airports Holdings Berhad, a privatised entity, manages and operates all the airports in the country, with the exception of Senai Airport in Johor and Kerteh Airport in Terengganu. The Senai Airport is operated by Senai Airport Terminal Services Sdn. Bhd., while the Kerteh Airport, by Petronas.

25.52 The Senai Airport in Johor is being developed as an airfreight hub. The airport is expected to form the air link to the container traffic at PTP, which has been designated as a transhipment centre. Given its location in Malaysia's southern growth corridor, the Senai Airport is well positioned to operate as an integral part of PTP. The development of the air cargo complex at the Senai Airport is being undertaken in two phases. The first phase, which is already operational, is capable of handling 100,000 tonnes of cargo. The second phase, which will offer an additional capacity of 200,000 tonnes, will be developed when the capacity utilisation of the first phase has reached 80,000 tonnes.

(c) Ground Handlers

25.53 There are two main suppliers of ground services and cargo handling to airlines in Malaysia. The biggest supplier is Malaysia Airlines, which provides services such as ground handling, ramp and cargo handling, in-flight catering, and aircraft checks and maintenance. The second ground handler is Kuala Lumpur Airport Services, which also provides a similar range of services.

(d) Air Cargo Agents or Airfreight Forwarders

25.54 There are more than 300 air cargo agents or airfreight forwarders in the air cargo market in Malaysia. Of these, 80 are foreign-owned. An airfreight forwarding company does not require any licensing, except where it also acts as a Customs agent. In such a situation, the company is required to have at least 51 per cent Bumiputera participation, in both equity holding and employment structure.

(e) Airport Regulators

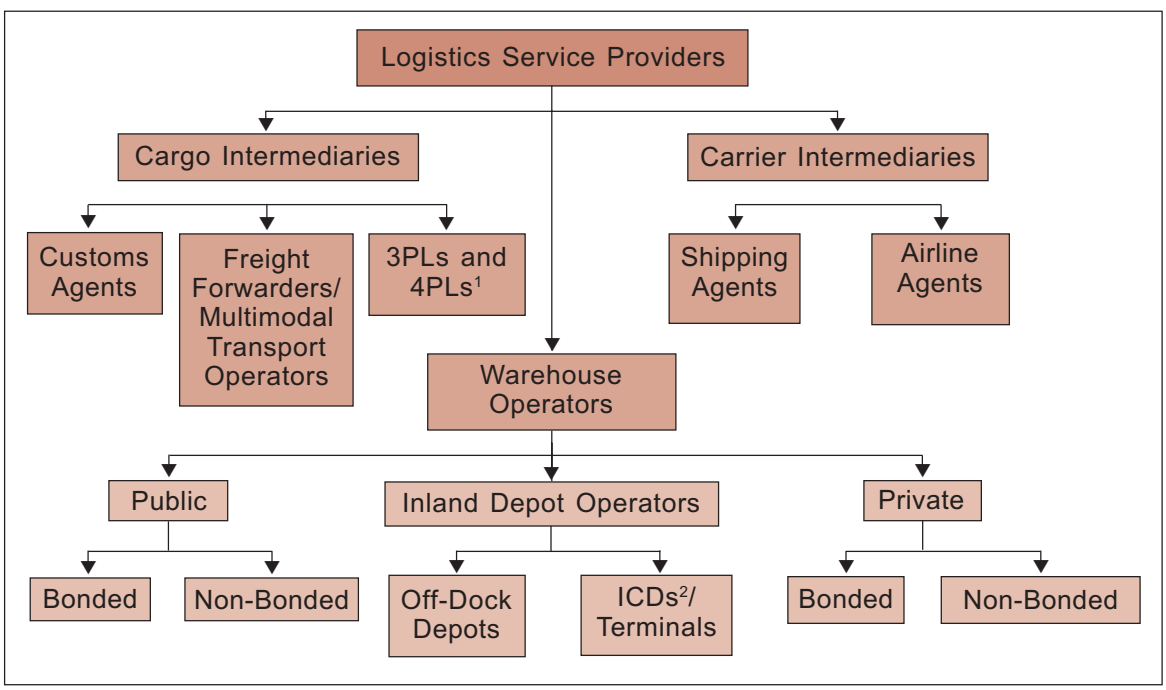
25.55 The overall responsibility for formulating policies on air transportation is under the purview of the Ministry of Transport. The Department of Civil Aviation, an agency under the ministry, regulates and fosters the development of the aviation sub-sector, as well as sets airport operating standards and certifies aircraft airworthiness.

INTEGRATED LOGISTICS SERVICES

25.56 The principal transport modes are supported, either directly or indirectly, by a range of logistics service providers, often referred to as transport intermediaries. The services provided by these intermediaries have become increasingly specialised and are usually undertaken by major international companies, linked with transport services on a global level. In Malaysia, a number of integrated logistics service providers have emerged, providing a range of logistics services. There are also independent providers of these services and activities, such as warehousing, storage, trade facilitation and cargo management, which are important for an efficient supply chain (Chart 25.2).

CHART 25.2

STRUCTURE OF LOGISTICS SERVICE PROVIDERS IN MALAYSIA



Notes: [1] Refer to third party and fourth party logistics providers
[2] Refer to inland container depots

Source: Ministry of International Trade and Industry

(a) Cargo Intermediaries

25.57 Cargo intermediaries provide a range of services in the handling of cargo and usually act on behalf of cargo owners.

(i) Freight Forwarders

25.58 Freight forwarders usually procure space on ships or airlines, on behalf of cargo owners, when exporting or importing goods. They also provide a range of services, which include booking of cargo space, documentation, trucking

and warehousing. The incorporation and operation of these freight forwarders are not regulated by the Government. Presently, it is estimated that there are 1,500 freight forwarders in Malaysia. For goods to be cleared through the Customs, these freight forwarders need to use the services of the customs agents. The larger freight forwarders are international companies, which have global networks and provide a wide range of services to shippers which have global operations. Some of these companies provide non-vessel operating common carriers, which involve the operators issuing their own bills of lading.

(ii) Customs Agents

25.59 There are a total of 2,790 customs agents, licensed by the Customs Department. Under the Customs Act 1967, exporters, importers or customs agents are allowed to clear goods through the Customs offices at exit or entry points in the country. To become a customs agent, the company must be at least 51 per cent owned by Bumiputera interests. New licence holders will need to undergo special courses on processes and procedures in handling cargo, conducted by the Customs Department.

(iii) Multimodal Transport Operators

25.60 The freight forwarding industry also covers another category of companies, called multimodal transport operators. As at December 2005, there were 32 such companies, registered with the Ministry of Finance. Multimodal transport operators are authorised to act as approved freight forwarders to handle the export and import of cargo for Government agencies and Government-linked companies (GLCs). A number of these operators are capable of providing a full range of logistics services.

(iv) Third and Fourth Party Logistics Providers

25.61 3PLs and 4PLs in the logistics industry provide complete domestic and international logistics services to their clients. They have an extensive global coverage and are located in major trading ports around the world, with collaborations with core transport providers, such as shipping companies, road hauliers, rail operators and airline freight operators. They are in a position to fully provide integrated 'door-to-door' logistics services.

25.62 Shipping companies are increasingly engaged in providing integrated logistics services, similar to those provided by 3PLs and 4PLs. This is to take advantage of the increasing economies of scale in their operations, arising from the ownership of larger vessels, as well as expansion of networks. These shipping companies may either be competitors to existing freight forwarders, 3PLs and 4PLs, or, in some cases, may collaborate with them. Since they are able to offer cargo consolidation services, freight forwarders provide the cargo base for shipping lines offering scheduled services.

25.63 Malaysian-owned logistics service providers, which offer integrated logistics services, are eligible to apply for tax incentives under the Promotion of Investments Act, 1986. The promoted integrated services include freight forwarding, warehousing, transportation and other value-added activities, such as distribution, supply chain management, procurement and packaging.

(b) Carrier Intermediaries

25.64 Carrier intermediaries usually provide a range of services to carriers. They act as local agents for carriers calling at local ports and airports. They also link up with cargo owners, while still acting on behalf of carriers.

(i) Shipping Agents

25.65 Shipping agents are generally companies which act for shipping lines. They provide services such as ship husbanding (provision of supplies and maintenance), bunkering (process of supplying fuel to the ship), tallying (verifying the cargo loaded onto the vessel against the manifest) and stevedoring (loading or unloading the cargo of a ship), and related services for ships at ports. Shipping agents need to be licensed by the Customs Department. The equity requirement for this category of intermediaries had been liberalised in 1994, allowing up to 70 per cent foreign equity. The objective was to attract more foreign shipping lines to call at Port Klang, as part of the strategy to make the port a regional load centre. It is a common practice among foreign shipping lines to be represented by shipping agents in which they hold substantial interest.

(ii) Airline Agents

25.66 Airline agents are general sales agents, acting on behalf of airlines calling at local airports. They are engaged in activities such as the appointment of air cargo agents and general support services for airlines at airports.

(c) Warehouse Operators

25.67 Warehouse operators provide facilities and services in various forms, ranging from small off-dock depots to large-scale warehouse and distribution centres.

(i) Public and Private Warehousing Operators

25.68 A warehouse operator can provide public or private warehousing services, bonded or non-bonded. All bonded warehouse services are licensed under the Customs Act 1967. Under the act, public bonded warehouses need to have at least 30 per cent Bumiputera equity. As at the end of 2005, there were 197 public bonded warehouses and 140 private bonded warehouses in the country. Non-bonded warehouses are not regulated and are fragmented, in terms of size and location.

(ii) Inland Depot Operators

25.69 Inland depot operators provide a wide range of services, such as the storage of cargo, consolidation and bulk-breaking of cargo and other related services. Container haulage companies, shipping companies and railway and port operators can also establish inland depots to provide more integrated services to their customers.

INLAND WATERWAYS

25.70 Inland waterways, as a transport mode, is yet to be developed in the country. There is potential to develop this mode to support the movement of goods from upstream hinterland areas. The role of inland waterways is relevant to traditional ports in several areas in Sabah and Sarawak, where a network of river systems for goods exists. The feasibility of this transport mode needs to be assessed, including possible implications, in terms of public sector investments and private sector participation.

SECTION IV APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY

25.71 Logistics covers both the flows of goods and information. The process of planning, implementing and controlling the flow and storage of goods from the point of origin to the point of consumption requires timely and accessible information. ICT is an important enabler to the logistics industry, to improve the efficiency and effectiveness of logistics services. The introduction of electronics data interchange (EDI) services has led to improvement in the productivity of the logistics industry. Cargo turnaround time had been reduced from about five days in 1994 to three days in 2005. However, the process of Customs clearance is still not totally paperless.

(a) Global Trends

25.72 Efforts have been undertaken by the logistics industry to address concerns on security, cost escalations and technology obsolescence. Investments in information technology (IT) will be driven by the need to improve efficiency, through the utilisation of IT in supply chain management and the application of new technologies, such as radio frequency identification device tags and related wireless technology. In addition, there will also be investments driven by security requirements, for example, the USA-led Container Security Initiative and the requirement under the International Ship and Port Facility Security Code of the International Maritime Organisation.

25.73 Major IT-related developments within the logistics industry include:

- outsourcing of IT-related services, from IT infrastructure, such as networks, data centres and call centres, to enterprise applications (such as transportation and warehouse management systems and cargo portals). Logistics companies have become providers of business process outsourcing (BPO) to other industries. The management of IT is outsourced to external service providers;
- emergence of 4PLs - prime contractors which monitor and coordinate the activities of multiple 3PLs across the supply chain; and
- improvements to existing systems and operations:
  - use of IT to enhance supply chain management;
  - application of technologies to optimise the business value of IT within the logistics operations; and
  - working with external service providers in transforming business operations.

(b) Supply Chain Management and Collaboration

25.74 Although individual segments of the supply chain operate relatively efficiently on their own, there is room to improve efficiency through better integration of the overall supply chain. An integrated supply chain will allow shippers to hold lower inventories and minimise transport, labour and capital costs.

25.75 The services of logistics portals, with track and trace capabilities, are designed for various target groups within the logistics community. These portals, which are less costly and more efficient, provide the connectivity required by small and medium enterprises (SMEs) which cannot afford customised systems. The adoption of technologies, such as radio frequency identification device, wireless fidelity (Wi-Fi) and global positioning system (GPS), will add predictive intelligence to the supply chain. This will enable timely reactions to events, for example, forecasting the occurrence of bottlenecks and delays, which will allow companies to initiate appropriate responses.

(c) Forecast of Spending and Investments on Information and Communication Technology

25.76 Expected major features of spending and investments on ICT, up to 2007[3], include:

- overall global investments on ICT are expected to grow at an annual rate of 4.2 per cent;

[3] Source: Garner Inc. USA, a leading provider of research and analysis on global information technology Industry.

- global expenditures on ICT for logistics services are expected to grow at an annual rate of 4 per cent to US$19.2 billion; and

- within the logistics services segment, ICT services, software and telecommunications products or services are expected to grow between 6.9 - 7.3 per cent per annum.

(d) Virtual Logistics Hub

25.77 Malaysia will strive for value-added supply chain management and support services, which cater to the needs of a broader regional hinterland. This will enable Malaysia to position itself as a virtual hub, with the knowledge and skills to manage and control information, as well as process and payment flows across regional supply chains.

SECTION V HUMAN RESOURCE REQUIREMENTS

25.78 The Ministry of Human Resources is the main Government agency which oversees matters on human resource development (HRD) across industries, including the logistics industry. *Pembangunan Sumber Manusia Berhad* (PSMB), established under the ministry, facilitates the upgrading of the skills of the workforce in the private sector. During the period 1996-2005, a total of 3,530 companies in the services sector registered with PSMB, of which 689 (19.5 per cent) were logistics companies. Training programmes developed by *Majlis Latihan Vokasional Kebangsaan* (MLVK), in consultation with industry, include courses for executives of providers of services in commercial transport operations and forwarding operations, and coordinators of forwarding documentation. However, response by the industry to these programmes has not been encouraging, due to the absence of a requirement for such qualifications in the job market and the lack of regulations or bylaws requiring the personnel concerned to undergo such training for competency certification. Within the national education system, there are limited programmes on transport and logistics offered by public and private universities, at both diploma and degree levels. Most programmes offered by institutions of higher learning cater for working adults, where entry requirement takes working experience into consideration.

25.79 Other organisations or institutions which have undertaken initiatives on HRD for the logistics industry include:

- Malaysia Institute of Transport, under *Universiti Institut Teknologi Mara*, which focuses on research and consultancy in areas such as transport and logistics, transport planning and highway engineering. The institute has been appointed as the examining body for the Chartered Institute of Logistics and Transport for Malaysia and the Asia Pacific region;

- Chartered Institute of Logistics and Transport, which provides courses for professional qualifications and awards recognition for transport and logistics practitioners;
- *Akademi Laut Malaysia* (ALAM), which provides training for seafarers, as well as shore-related maritime transport courses;
- Maritime Institute of Malaysia, which focuses on research in the maritime industry; and
- the Ministry of Science, Technology and Innovation, which has included logistics as one of the priority areas eligible for research grants.

25.80 Presently, there is a lack of interest among the workforce to be employed in the industry. For example, according to *Universiti Institut Teknologi Mara*, only 60 per cent of its transport graduates are prepared to work in transport and logistics related organisations. In general, graduates in transport and logistics lack practical skills and abilities required by the industry. There is a need for industry to provide special programmes to fill the skills gap.

SECTION VI FINANCING

25.81 During the Eighth Malaysia Plan, 2001-2005, the Government allocated RM30.9 billion for the development of the transport sub-sector, including roads, urban transport, rail, ports and airports, as well as related logistics chain. In addition, fiscal and financial support is also provided to the private sector to encourage participation in certain activities in transport.

25.82 The Government provides financial support to companies involved in shipping through the Malaysian Shipping Finance Fund. The fund is aimed at encouraging business ventures in international shipping, expanding the national merchant fleet and addressing the deficit in the national BOP, arising from the outflow of freight payments. An allocation of RM1.3 billion for the fund had been fully utilised. The fund comprised two facilities - Ship Financing Facility and Shipping Venture Fund, amounting to RM800 million and RM500 million, respectively. The Ship Financing Facility provided funds to 34 companies for the acquisition of more than 40 ships, as well as the upgrading and repairing of facilities of eight shipyards. The Government also provided support for the development of Westports in Selangor and PTP in Johor, in the form of grants, soft loans, sovereign guarantees, preferential interest rates and moratorium on repayments. Apart from the Government financial support, shipping companies need to depend on commercial sources for additional funding. Commercial banks are, however, less responsive in providing the necessary financial support to the shipping companies.

SECTION VII REGIONAL COOPERATION IN LOGISTICS

(a) Association of Southeast Asian Nations

25.83 Global seaborne trade in 2004 amounted to 6.7 billion tonnes. The Association of Southeast Asian Nations (ASEAN) share of the global seaborne trade was 6.8 per cent. Shares of other regional groupings in the global seaborne trade were:

- Gulf Cooperation Council countries, 15.4 per cent;
- EU countries, 15 per cent;
- North American Free Trade Association (NAFTA) countries, 10 per cent;
- the Common Market of the Southern Cone (MERCUSOR) countries, 6.2 per cent; and
- Common Market for Eastern and Southern Africa (COMESA) countries, 1.5 per cent.

25.84 In terms of container traffic, ports in the ASEAN region handled 22.1 million TEUs in 1996, which increased to 43.1 million TEUs in 2003. The volume for 2003 accounted for 14.2 per cent of the world throughput, which amounted to 303 million TEUs. In anticipation of the expected increase in trade in container shipments, there are major initiatives in the region to upgrade ports with container handling facilities, in line with the global demand for such facilities.

25.85 The ASEAN Transport Policy Agenda was formulated to enhance cooperation in transport development in the region for the period 2005-2010. The policy is aimed at promoting cross border transport facilitation, efficient 'door-to-door' cargo transport and harmonising trade and transport documentation. The policy coverage includes the need to improve the land transport infrastructure and the development of land transport trade corridors. It is envisaged that there will be efficient interface locations to promote inter-modal trade, through the creation of logistics distri-centres, with links by road, rail and inland waterways to ports and airports. A major initiative of the policy is the formulation of the ASEAN Transport Action Plan, 2005-2010, to enhance the role of the transport networks in the production and distribution of goods, as well as the provision of services.

25.86 Cooperation in maritime transport (covering ports and shipping) in ASEAN involves the development of a maritime policy to cover, among others, transhipment, enhancement of the competitiveness of ASEAN ports, further liberalisation of maritime transport services and integration of maritime transport in the international logistics chain. A medium-term policy and development framework for maritime transport has been formulated, which will serve as the guiding document for ASEAN cooperation in this area for the period 2003-2008.

25.87 Rules will need to be put in place, at the national level of the ASEAN member countries, which facilitate the international haulage of goods by road, similar to those adopted elsewhere, for example, the International Convention for the International Transport of Goods by Road, applicable in Europe. These rules for the transport of goods across frontiers define the duties and obligations of carriers and cargo owners, in terms of, for example, liability in the event of loss, damage or short delivery of goods when conveyed from one country to another. In the case of ASEAN, such rules will provide confidence to traders to enter into cross border sales contracts. Traders in different ASEAN countries will be in a position to know that their transport contracts with carriers will be treated in a uniform way in the region. Such uniform rules on road haulage are not in place presently. The governments of the ASEAN countries will need to take the initiative towards adopting such uniform rules.

(b) Organisation of the Islamic Conference

25.88 The Organisation of the Islamic Conference (OIC) is working on proposals for the development of international trade relations among its member countries. There are opportunities in international logistics and transport, through cooperation among ports and logistics service providers, for example, in creating regional warehouses and distribution centres for various goods, including *halal* products.

SECTION VIII CHALLENGES

25.89 The cross border flow of foreign investments has altered world trade patterns. Manufacturers are increasingly outsourcing their transport and logistics activities, reflecting their strategies to maintain lower inventories, as well as meet customer demand without disruptions in supply. The changing trade patterns and increasing demand of shippers have put pressures on transport and logistics service providers to minimise costs and enhance their operational efficiency. Globalisation has also led to the evolution of the international supply chains and altered the structure of the logistics industry.

(a) Shipping Services - Integrating the Domestic Logistics Industry into the International Supply Chains

25.90 To enable the local logistics industry to participate effectively in the international supply chains, the industry needs to keep pace with global developments. In respect of shipping services, structural changes which have been taking place and which pose challenges to the local logistics industry include:

- integration by shipping companies of their services into the production and manufacturing operations of their customers on a global scale;

- provision of related transport and logistics services, in addition to shipping, on an integrated basis; and
- shift in the mode of shipping services, from the traditional 'port-to-port' to 'door-to-door' approach.

25.91 The increasing competition in the provision of shipping services and the globalisation of trade are exerting pressures on ports to reduce terminal costs and improve operational efficiency. Globalisation has also influenced the coverage of services provided by ports. Major international ports are acquiring interests in other foreign ports and linking up their operations globally. Similarly, Malaysian ports will need to consider such a strategy, through mergers and acquisitions, strategic partnerships and outward investments, to enable them to sustain their operations, as well as expand their share in international trade.

25.92 There is a need to deal with the deficit in the transportation services account in the BOP, which widened to RM15.7 billion, as at the end of 2005. This reflected not only the dependence on foreign transport services, but also lack of strong domestic capacity in providing the transport services, as part of the logistics industry. Measures need to be instituted to narrow this deficit, by reducing the dependence on imports and expanding exports of logistics services. Presently, foreign shipping lines account for the bulk of the supply of transportation services for the carriage of Malaysia's international trade. There is a need to enhance Malaysia's shipping capacity, to be able to increase the level of participation in this transport business. Apart from enhancing the transport capacity, it will also provide spin-off benefits, in terms of contributing towards the greater supply of skilled workforce and addressing the widening deficit in the transportation services account in the BOP.

(b) Freight Fowarding - Competitive Value-Added Services

25.93 Presently, in the Malaysian logistics industry, more foreign-owned companies are in the high end value-added service of freight forwarding, while local companies are more involved in the lower end service of customs clearance. More Malaysian companies will need to be encouraged to venture into higher value-added services of freight forwarding, including warehousing and distribution.

(c) International Trading Practices - Free on Board versus Cost Insurance Freight

25.94 Traditionally, Malaysian traders have exported on free on board (FOB) and imported on cost insurance freight (CIF) terms. As a result, activities related to transportation and insurance are controlled by foreign buyers and suppliers, which have led to the widening of the deficit in the transportation services

account of the BOP. There is a need to shift the current practices, to enable the economy to benefit from direct participation in the trading value chain. This will include, among others, the utilisation of Malaysian based logistics (shipping and airfreight) and insurance services. An important advantage will be the ability of Malaysian shippers or consignees to have control over the pricing of their goods and services in international trade. In addition, it is likely to create a strong demand for logistics and transport capacity provided by Malaysian companies. This will lead to the strengthening and growth of the existing Malaysian trading community.

(d) Security

25.95 Efforts to improve the efficiency and facilitate the integration of the logistics services need to be accompanied by measures to address the security of the international transportation system. The main security concern relates to containerised shipment which, once sealed, move from 'point-to-point' through various modes with minimum inspection. The introduction of the International Ship and Port Facility Security Code at all Malaysian ports, as required by the International Maritime Organisation, has minimised the security risk of container shipments through Malaysian ports. Similar security measures need to be introduced along the entire value chain, to secure the movement of exports and imports from and to Malaysia.

(e) Road Transport Services - Inter-Agency Coordination and More Effective Regulatory Environment

25.96 Presently, a number of ministries and agencies are involved in licensing and regulating the various road transport services. There is a need for greater coordination among the ministries and agencies involved to streamline the rules and regulations. The users of road transport services view the provision of the services as being fragmented. With the liberalisation of the issuance of container haulage licences since 2002, an assessment needs to be made on industry requirements, in terms of supply and demand, to ensure a healthy environment for the haulage operators.

25.97 There is a lack of rules on road safety and competency of drivers, particularly the liability of carriers in the event of damage, loss or delay to cargo. Associations in certain other countries have formulated rules and regulations governing road haulage. The associations provide their members with a standard set of rules relating to their duties and obligations when they transport goods by road vehicles within their countries. These rules will guide dispute resolution between carriers, consignors and consignees within the framework of the legal system of the countries concerned. These practices, based on set rules, provide the basis for professional relationships, as well as ensure a high quality of services by the industry. In this respect, the associations will need to assume a more proactive role in educating their

members and drafting similar rules and regulations to ensure a high level of quality and professionalism of the services provided by their members. The associations will also need to expand their membership base and strengthen their organisational capability to enable a more effective representation of the interests and concerns of their members to the Government.

(f) Rail Transport Services - Efficient Multimodal Transport and Modal Shift

25.98 Key development challenges faced by rail freight transportation include:

- expansion of double-track rail lines to increase the capacity and operational effectiveness;
- modal shift from road to rail transport to reduce congestion in ports and remove pressure on roads; and
- development of efficient terminal facilities to promote the evolution of multimodal transport of goods, as well as facilitate the evolution of the national transport corridor.

25.99 The global trend is towards increasing the share of the rail transportation of the freight market. Rail freight transportation accounts for 40 per cent of the freight market for countries in Central and Eastern Europe and the USA, and 8 per cent for countries in the EU. In comparison, rail freight transportation in Malaysia accounts for only 4.8 per cent of the freight market. Accordingly, there is a need to design strategies and policies for the land mode, which will encourage the modal shift towards rail freight transportation. An important implication of the policy on modal shift will be the need to identify and facilitate the creation of efficient terminal facilities in inland locations in various parts of the country. These locations will facilitate the interchange between road and rail and support the creation of the national transport corridor.

(g) Airfreight Transport Services - Quality of Services and Delivery System

25.100 A major challenge is to increase air cargo through local airports and reduce the leakage of such cargo through neighbouring airports. It is estimated that about 25-30 per cent of airfreight throughput are channelled through neighbouring airports. Contributory factors include:

- local importers normally have no control over how the goods are shipped by the exporters, as long as the delivery schedule is met;
- exporters may outsource the logistics service to integrated logistics service providers, which may consider it more convenient to ship the goods through the neighbouring airports;
- for just-in-time manufacturing, parts are delivered in small quantities and at short intervals, and the delivery schedule for each batch is time

definite. Exporters prefer to ship through other airports, which have higher connectivities and frequencies to major destinations than KLIA; and

- Singapore-owned manufacturing companies based in Malaysia prefer to export their goods through Singapore port and airport.

To optimise the use of local airports, there is a need to increase their connectivities to strategic destinations. There is also a need to enhance the efficiency in the clearance of goods by the Customs Department.

25.101 While the logistics costs in Malaysia are lower than those of its neighbours, the level of efficiency of Malaysia's cargo clearance system needs to be further improved. Although customs processes have been enhanced since October 2004, other Government agencies and key operators of the cargo clearance system also need to improve their own processes to enhance the overall efficiency. Examples of areas which need improvement:

- approval processes involving other Government agencies, where applicable, which are necessary for effective and efficient cargo clearance; and

- bank operations, involving electronic fund transfers (EFT). Banks do not process EFT submissions after 7 p.m. (as at 2005).

(h) E-Logistics and Infostructure - More Efficient Development

25.102 Challenges related to the development of e-logistics and infostructure include the need:

- to streamline the overall customs clearance processing system by phasing out the current practice of 'face-to-face' clearance requirement to a more efficient interactive electronic system;

- to establish a web-based, national e-logistics infrastructure, including ensuring an adequate supply of e-enabled logistics service providers, which will provide complete supply chain connectivity for the freight logistics industry, going beyond EDI and customs clearance; and

- for comprehensive infostructure planning, involving all stakeholders in the logistics industry, to create a healthy virtual marketplace and efficient transport system. There is also a need to streamline barcode protocols, to be in line with global practices.

(i) Human Resource Requirements - Competent and Experienced Workforce

25.103 There is a lack of qualified workforce in the logistics industry. The industry needs to be supported in its activities by not only competent and experienced personnel, but also those who are able to perform the various functions and activities according to international standards.

(i) Rail Transport Services - Enhancement of Skills

25.104 Developments in railway technologies, such as computerised technology, new motive power design, automation and new power traction units, will require the enhancement of skills of the existing workforce, including train drivers, shunters and signalling supervisors. Due to multimodal operations, the skills in freight forwarding processes are also required.

(ii) Road Transport Services - Awareness and Competency in New Technologies

25.105 Technological improvements in truck design and ancillary equipment require the acquisition of new skills in road transport services. Drivers need to be trained to be competent in handling new technologies in road transport. There is a need to introduce a standard competency certification programme to enable drivers to acquire and upgrade their skills.

(iii) Shipping Services - Skilled and Knowledgeable Workforce

25.106 The main challenge in developing the workforce in the shipping industry is the need to attract and retain potential talents. Shipping companies encounter difficulties in recruiting and retaining Malaysians to work on their ships. In other areas, such as ship management, chartering and liner shipping operations, and the lack of a skilled and knowledgeable workforce poses a constraint for the adoption of international best practices.

(iv) Ports and Terminals - Standard Certification

25.107 There is presently no standard certification for operators of port equipment. Ports develop their own competency training certification for such personnel. There is a need to develop standard certification procedures for the personnel involved in port operations. For example, there is a need for an adequate supply of certified personnel to handle dangerous cargo in ports and terminals.

(v) Freight Forwarding, Airfreighting and Customs Brokering - Knowledge on Rules and Regulations

25.108 Lack of knowledge on rules and regulations on international cargo movements, public relations, marketing and communication skills are the main concerns of freight forwarders, airfreighters and customs agents. There is a need to create a professional accreditation body to oversee the logistics service providers, such as freight forwarders and customs agents, to ensure that the standard of their services meets international logistics requirements.

(j) Sabah and Sarawak - Higher Logistics Costs

25.109 The lower level of industrialisation and higher costs of doing business in Sabah and Sarawak are attributed to, among others, inefficient shipping operations, in terms of high costs and limited international linkages, and high road transportation and airfreight charges.

(i) High Shipping Costs

25.110 Factors accounting for high shipping costs include:

- shipping charges on inbound seafreight are almost twice as high, compared with the return journey, owing to the lack of cargo volume;
- lack of direct shipping services, linking Sabah and Sarawak to international markets, has led to delays in the shipment of cargo to and from these two states. Consequently, shipping costs from Sabah and Sarawak to overseas destinations are higher, compared with those from Peninsular Malaysia;
- ship operators in Sabah impose congestion surcharge on shippers, due to longer turnaround time arising from delays in port services; and
- double handling of cargo imported into Sabah and Sarawak via ports in Peninsular Malaysia, due to low cargo volume to be imported directly from overseas destinations.

(ii) Limited International Linkages

25.111 Under the present Cabotage Policy, foreign flagged ships are not allowed to operate shipping services between domestic ports in Malaysia. This restriction has hampered the integration of domestic routes with the network of services of international shipping lines. However, the liberalisation of the policy can adversely affect domestic shipping companies, in view of their limited capacity to compete with foreign ships. To minimise the impact of such competition, there may be a need, where appropriate, to limit the participation of foreign shipping companies with international links to operate between the national load centre in Port Klang and the regional load centre in Port of Bintulu.

25.112 Sabah and Sarawak have not been able to create large cargo volume and progress towards integration into the international shipping network. The states have the potential to generate a critical mass of cargo from within Brunei, Indonesia, Malaysia, the Philippines - East Asia Growth Area (BIMP-EAGA) region, using Port of Bintulu as the regional load centre for direct shipments of both exports to and imports from overseas markets. The expansion and integration of business activities in the two states can lead to an overall reduction of freight charges and improve the efficiency of local shipping companies.

(iii) Road and Air Services

25.113 Road transportation costs in Sabah and Sarawak are influenced by factors such as hilly terrain, higher rate of depreciation of lorries and poor road conditions. In respect of air services, airfreight rates for cargo exported from Sabah and Sarawak are higher than those from Peninsular Malaysia, largely due to a low volume of air cargo.

SECTION IX STRATEGIES AND POLICIES

TARGETS

25.114 During the IMP3 period, Malaysia's total merchandise trade is expected to reach RM2.8 trillion by 2020, through the expansion of traditional markets of the USA and the EU, and the diversification into growth markets of East and West Asia. In line with this target, the logistics industry is projected to expand:

- total marine cargo by three-fold, from 252.6 million tonnes in 2005 to 751 million tonnes in 2020;
- the volume of air cargo trade by more than two-fold, from 1 million tonnes in 2005 to 2.4 million tonnes in 2020; and
- the cargo volume by railway freight by almost five-fold, from 4 million tonnes in 2005 to 18.6 million tonnes in 2020.

STRATEGIC THRUSTS

25.115 To promote the development of the logistics industry, as well as strengthen its role in the economy, six strategic thrusts have been set:

(1) creating an efficient and competitive logistics industry to support Malaysia's industrialisation efforts;

(2) developing the industry in particular transport modes to operate in a competitive international environment;

(3) expanding and upgrading the capacity of the industry to enhance its participation in the global supply chains;

(4) intensifying the application of new ICT in the industry;

(5) ensuring an adequate supply of competent workforce to meet the long term requirements of the industry; and

(6) strengthening the institutional support through inter-ministry and agency coordination in the planning, implementation and monitoring of policies and measures affecting the industry.

(1) CREATING AN EFFICIENT AND COMPETITIVE LOGISTICS INDUSTRY

25.116 Measures to create an efficient and competitive logistics industry include:

(i) Strengthening the Capacities and Capabilities of the Service Providers and Adopting New Practices by the Malaysian International Trading Community

25.117 Measures to strengthen the capacities and capabilities of the service providers and encouraging the Malaysian international trading community to adopt new practices include:

- encouraging logistics service providers to enhance their capacities and capabilities in providing competitive services to Malaysian shippers and consignees throughout the value chain ('door-to-door' services); and

- encouraging the shift in trading practices by the Malaysian international trading community towards exporting on CIF basis and importing on FOB. A more conducive trading and investment environment will be created to promote such a shift in the trading practices among shippers and consignees.

(ii) Support by Government-Linked Companies

25.118 GLCs will be encouraged to utilise and support the national capacities in shipping, air transportation, railways and integrated logistics in meeting their international trade and transport requirements.

(iii) Equity Liberalisation

25.119 A more conducive environment will be created to attract MNCs to make Malaysia part of their global supply chains, through allowing a higher level of foreign equity for the following international logistics service providers:

- container shipping companies offering integrated inter-modal services on a 'door-to-door' basis;

- non-vessel operating common carriers providing services of cargo consolidation or integrated logistics for small shippers; and

- professional logistics service providers, such as 3PLs and 4PLs, which operate on the basis of outsourcing of shippers' logistics requirements.

(iv) Assistance Programmes for Shipping Operators

25.120 Assistance will be considered for various activities undertaken by shipping operators and other related service providers. The activities include:

- consolidation and expansion of the capacities, as well as mergers and acquisitions, of shipping operators;
- building, expansion, repair, upgrading and refurbishment of Malaysian ships; and
- consolidations, mergers and acquisitions of the fragmented logistics service providers, such as transport operators, freight forwarders and warehouse operators.

In addition, port terminal operators will be encouraged to extend the present discounts on port charges enjoyed by shipping lines to freight forwarders and non-vessel operating common carriers, which are involved in value-added activities on cargo consolidated from regional markets for transhipment at Malaysian ports.

(v) Increasing the National Shipping Capacity

25.121 Efforts will be undertaken to encourage and support Malaysian shipping lines to leverage upon their current strengths in certain segments and enhance their capacity to participate in both containerised and non-containerised shipping activities. The efforts include encouraging:

- the acquisition or chartering of specialised tankers suitable for the carriage of certain products, for example, palm oil; or
- strategic alliances and cooperation with foreign shipping companies handling containerised cargo.

(vi) Professional Accreditation Body

25.122 A professional accreditation body will be established for freight forwarders and customs agents to ensure that the quality of their services meets international requirements.

(vii) Enhancing the International Logistics Links to and from Sabah and Sarawak

25.123 Measures to enhance the international logistics links to and from Sabah and Sarawak include:

- developing the necessary infrastructure and creating a suitable operating environment, in support of Port of Bintulu as a regional load centre, to attract a critical mass of cargo from within Sabah and Sarawak;

- considering allowing a limited entry of foreign shipping companies to operate between the national load centre in Port Klang and the designated regional load centre in Bintulu in Sarawak. This will contribute towards expanding the network of shipping connectivities and reducing the cost of transportation of cargo from and to Sabah and Sarawak; and
- considering allowing international logistics service providers to operate in Sabah and Sarawak to stimulate the growth in cargo volume and attract a network of international transport links. This will also support the development of Port of Bintulu as a regional load centre.

(2) DEVELOPING PARTICULAR TRANSPORT MODES TO OPERATE IN A COMPETITIVE INTERNATIONAL ENVIRONMENT

(i) Multimodal Transport Modes

25.124 The Government will continue to enhance multimodal transport modes, through rail and inland waterways, to relieve the pressure of congestion of haulage traffic on roads. Strategies to be formulated include minimising the impact of the shift on the business of road haulage companies. An assessment of the financial, infrastructural, regulatory and legal implications will be undertaken. In this respect, the present scope of the double tracking project for the national rail network will be reviewed, to include:

- the development of integrated terminal facilities in various locations in the country; and
- improvement of inter-modal linkages with road and sea, through the development of tracks, rolling stock and integrated cargo terminals, linking the entire transport network to the main ports with direct international connections.

This initiative will be private-sector driven. Companies will be encouraged to enter into direct operations with railfreight services, in partnership with KTMB, and operate container terminals at rail terminals.

(ii) National Transport Corridors

25.125 The development of the national transport corridors, with facilities for efficient and effective inter-modal transfers of goods, will be explored. The movement of freight along these corridors will also be strategically linked to the development of distribution parks, which will offer storage, distribution, cargo consolidation and other specialist services for products in the international supply chain. These distribution parks will be equipped with dedicated infrastructure and facilities to attract both domestic and international logistics service providers. The development areas will cover the proposed South Johor Economic Region, which includes the creation of a logistics hub, linking two international seaports (PTP and Port of Pasir Gudang) and an international airport (Senai Airport).

(iii) Inland Waterways

25.126 The feasibility of using inland waterways in areas with large rivers, as a viable alternative in the transportation of goods, will be explored. The study will also take into consideration the potential benefits of the development to be derived by the surrounding hinterland areas.

(3) IMPROVING THE CAPACITY OF THE INDUSTRY TO ENHANCE ITS PARTICIPATION IN THE GLOBAL SUPPLY CHAINS

25.127 Measures to improve the capacity of the industry to enhance its participation in the global supply chains include:

- encouraging local port and airport operators, as well as those involved in providing related services, to expand their operations globally. They will be encouraged to form strategic partnerships, including through equity participation and technical collaborations with their industry partners worldwide. Such cross border initiatives will be supported by a package of assistance and facilities;

- streamlining and further harmonising regulations and rules to facilitate trade with ASEAN. A supportive regulatory framework will be adopted to facilitate the operations of carriers, consignors and consignees. Trade facilitation processes and procedures will be further improved to facilitate the flow of cross border trade;

- providing greater emphasis on the promotion of growth areas, such as inland depots, specialised and high technology warehousing facilities, regional logistics operations and virtual logistics hub. These growth areas will be promoted when the strategic logistics centres and the national transport corridors have been identified and developed;

- encouraging Malaysian-owned logistics providers, including container hauliers, 3PLs, 4PLs, freight forwarders and shipping agents, which have the capacities and resources, to explore export opportunities, as well as outward investments. Assistance will be considered for such companies; and

- encouraging MASkargo to expand its connectivity to Southeast Asia and beyond. Measures to be undertaken include:

  - increasing destinations and flights to the People's Republic of China and beyond;

  - shifting the frequency of flights to new cargo operating emerging markets;

- reviewing the locations of cargo operations, in line with international trends; and

- expanding business opportunities in rail-air and sea-air inter-modal transhipments.

(4) INTENSIFYING THE APPLICATION OF NEW INFORMATION AND COMMUNICATION TECHNOLOGY

25.128 To expedite the clearance of cargo at the ports and airports, the Government will consider a more immediate implementation of the paperless customs transactions nationwide. This will be achieved through a more interactive web-centric e-logistics system to enhance trade facilitation, linking all logistics service providers with the Customs Department, ports, terminals, banks, exporters and importers. The role of relevant Government agencies involved in the cargo clearance process will be further improved through the application of new technologies. This will expedite the evolution of a 'single window', which will promote an efficient interface for the regulatory and business activities in the logistics industry.

25.129 Initiatives in enhancing TFP will contribute towards the growth of the industry. The initiatives will include intensifying the application of ICT and promoting a higher level of professionalism in the workforce, as well as improving the service quality. A greater application of ICT will be achieved through improvements in the present systems of EDI and electronic fund transfer services, and the introduction of new technologies, such as voice recognition technology, radio frequency identification device, WiFi and global positioning system.

25.130 Efforts will be undertaken to enhance value-added supply chain management and support services, which cater for the needs of a broader regional hinterland. This will enable Malaysia to position itself as a virtual logistics hub, with the knowledge and skills to manage and control information, as well as track processes and manage payment flows across regional supply chains.

(5) ENSURING AN ADEQUATE SUPPLY OF COMPETENT WORKFORCE

25.131 An adequate, competent and experienced workforce will be made available to meet the requirements of the industry. The capabilities of the workforce will be enhanced, through, among others, re-training and life-long learning of the personnel, to meet short and long term needs of the industry in specific areas of technical, commercial and operational skills. Links with international institutions will be established to provide opportunities for the enhancement of the skills and capabilities of the Malaysian workforce to reach international standards.

(6) STRENGTHENING THE INSTITUTIONAL SUPPORT

(i) Establishment of National Logistics Development Council

25.132 The Government will consider establishing a National Logistics Development Council. The council will have the objectives to:

- provide leadership and focal point for the overall coordination on strategies, policies, regulations and rules related to the industry;
- monitor programmes and activities of the relevant ministries and agencies, including the state authorities, involved in the development of the industry; and
- ensure that the development of the industry is in line with the overall strategic thrusts of the IMP3.

25.133 The council will comprise representatives from the relevant ministries, departments and agencies, as well as trade and industry associations, and academia. The main responsibilities of the council include:

- assessing the implications arising from developments at the global level, which may affect domestic operations of the industry;
- resolving competing interests among the stakeholders and addressing issues which may arise in a wider national context;
- developing a comprehensive database on the requirements of the industry, with emphasis on the relationship of transport to the domestic and international supply chains;
- creating a conducive environment to promote the development of a more outward oriented Malaysian international trading community. Efforts to be undertaken include encouraging the community to adopt new trading practices, including the emphasis on the shift towards exporting CIF and importing FOB;
- undertaking a comprehensive review of the Cabotage Policy and its implications on the domestic shipping industry, in terms of both the structure and the regulatory framework;
- initiating research on logistics, including development trends on ICT, transport issues for specific commodities, logistics issues faced by SMEs and efficiency indicators for logistics operators and regulators; and

- developing and monitoring human resource programmes for the industry, including the training and upgrading of professionals and funding arrangements for the programmes.

(ii) Establishment of Supply Chain and Logistics Centre

25.134 To support the functions and activities of the National Logistics Development Council, the Government will establish an independent research body, namely, Supply Chain and Logistics Centre. The centre will undertake research projects to be assigned by the council in the field of transport and logistics, including:

- extension of the double tracking project nationwide;
- shift towards multimodal transportation networks;
- development of national transport corridors;
- development and location of distribution parks;
- evolution of institutional and regulatory framework for international logistics; and
- development of a professionally qualified workforce for international logistics.

The centre will also identify new research areas affecting investments and inter-modal trade. The centre will be funded by the Government, with contributions from the private sector. Related private sector associations and members of the academia will be involved in the research work of the centre, including secondment of experienced staff in specific areas of research.

(iii) Regulations and Rules

25.135 The Government will consider introducing and enforcing a standard set of regulations and rules on the duties and obligations of road hauliers. These rules will also provide the mechanism for the settlement of disputes among carriers, consignors and consignees. In addition, safety rules will be strengthened and enforcement of the rules on the operations and maintenance of road hauliers will be enhanced. In view of the current concern on transportation security, efforts will be made to put in place container security measures in all segments of the logistics supply chain, such as airports, ports, shipping and the inland transport systems. These measures will include applying the latest technology available in the industry to secure container integrity in international trade.

(iv) Licensing Policies on Road Transport

25.136 To enhance the efficiency and competitiveness of the road transport services, the Government will review the present policies governing the services. The review will include:

- streamlining road tax charges between container and conventional trucks;
- studying rules on the movement of cargo carrying trucks between Malaysia and neighbouring countries; and
- reviewing conditions for vehicle permits which may affect the efficiency and competitiveness of the road transport services.

(v) Foreign Experts

25.137 To facilitate capacity building efforts of domestic logistics service providers, such as ship owners; air, sea, and railfreight forwarders; ship management; and port and terminal operators, a more liberal employment policy will be considered. The policy will facilitate the entry and employment of foreign experts, where there is a lack of local expertise.