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UNITED NATIONS INDUSTRIAL
DEVELOPMENT ORGANIZATION UNIDO

SUBMISSION OF THE TRANSPORT EQUIPMENT SECTOR FOR THE MALAYSIAN INDUSTRIAL PLAN

JANUARY 1985

ORGANIZATIONAL [illegible]

TRANSPORT EQUIPMENT SECTOR

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ACKNOWLEDGEMENT

We take this opportunity to thank Dr. Seongjae Yu (Chief Technical Advisor, Industrial Master Plan, MIDA) and Dr. Jang Won Suh (UNIDO - Industry Economist, Industrial Master Plan, MIDA) for their kind assistance and cooperation in expediting the study.

We also acknowledge the support and cooperation of all MIDA officials.

We thank AFM and its members for their information about the transport equipment industry.

We are also grateful to those private firms, too numerous to enumerate, for their cooperation during the course of conducting the survey study.

Lastly, we also thank all ORSB staff, particularly Ms. Eileen Tan (Senior Project Analyst) and Ms. Fiona Woo (Secretary) for their tremendous research support.

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ABBREVIATIONS USED IN THE TEXT

AACS	=	ASEAN Automotive Complementary Scheme
AAI	=	Asia Automobile Ind. Sdn. Bhd.
AMIM	=	Associated Motor Industries Sdn. Bhd.
ASSB	=	Assembly Services Sdn. Bhd.
CCB	=	Cycle and Carriage Bintang Bhd.
CAD/CAM System	=	Computer Aided Design/Computer Aided Manufacturing System
CPI	=	Consumer Price Index
DMC	=	Demand for Motorcycle
DPC	=	Demand for Passenger Car
EEC	=	European Economic Community
FMP	=	Fourth Malaysia Plan
GDP	=	Gross Domestic Product
GM	=	General Motors
GNP	=	Gross National Product
IDE	=	Institute of Developing Economies
KMA	=	Kinabalu Motor Assembly Sdn. Bhd.
KPKK	=	Kelang Pembena Kereta-Kereta Sdn. Bhd.
ME	=	Manufacturing Employment
MTR	=	Mid Term Review
MVA	=	Manufacturing Value Added
MVAC	=	Motor Vehicle Advisory Committee
NEP	=	New Economic Policy
NICS	=	Newly Industrialised Countries
OE	=	Original Equipment

ABBREVIATIONS USED IN THE TEXT

OA/GMM	=	Oriental Assemblers Sdn. Bhd. General Motors Malaysia Sdn. Bhd.
OEM	=	Original Equipment Market
PCMP	=	Progressive Car Manufacturing Programme
PTMP	=	Progressive Truck Manufacturing Programme
REM	=	Replacement Equipment Market
SMA	=	Swedish Motor Assemblies Sdn. Bhd.
SMI	=	Swedish Motor Industries Sdn. Bhd.
SRM	=	Survey Research Malaysia
TCMA	=	Tan Chong Motor Assemblies Sdn. Bhd.
TE	=	Transport Equipment
TEI	=	Transport Equipment Industry
TI	=	Tatab Industries Sdn. Bhd.
TNCS	=	Transnational Corporations
VW	=	Volkswagon

<u>Notes</u>

1. According to the MIDA Directory of Malaysian Automotive Component Manufacturers 1984, the classification of component parts is in Statistical Numbers (SN). The SN for the various automotive component parts are as follows :

SN 100 - 200	Engine Parts;
SN 200 - 400	Electrical Parts;
SN 400 - 500	Drive, Transmission and Steering Parts;
SN 500 - 600	Suspension and Brake Parts;
SN 600 - 700	Body Parts; and
SN 700 - 800	Accessories

2. The reduction in tariffs in trade between the US and Canada was introduced after the signing of the US-Canada Automotive Products Agreement in 1965.

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PART I INTRODUCTION

PART I INTRODUCTION

Based on Malaysia's revised industrial classification, the transport equipment sector encompasses 6 broad groups of industries:

Group Industry			Description
384			Manufacture of Transport
	3841	38410	Shipbuilding and Repairing
	3842	38420	Manufacture of Railroad Equipment
	3843		Manufacture of Motor Vehicle
		38431	Manufacture of Motor Vehicle bodies
		38432	Manufacture and Assembly of Motor Vehicles
		38439	Manufacture of Motor Vehicle Parts and Accessories
	3844		Manufacture of Motorcycle and Bicycles
		38441	Manufacture and Assembly of of Motor Cycles and Scooters
		38449	Manufacture and Assembly of Bicycles, Tricycles and Trishaws
	3845	38450	Manufacture of Aircraft
	3849	38490	Manufacture of Transport Equipment, n e c

This industrial masterplan sectoral study focuses on 2 major industries, namely, the manufacture of motor vehicle (3843), and motorcycles and bicycles (3844)

1.1. Definition of Industries Under Study

1.1.1 The Motor Vehicle Industry

The motor vehicle industry in Malaysia can be classified into 6 broad categories as follows:

i) motor vehicle assembly from completely knocked down (CKD) packs and locally sourced components,

ii) automotive components parts manufacture, including coach and vehicle body-building;

iii) reconditioning and reassembly of used vehicles from CKD packs as well as from completely built-up (CBU) units;

iv) importation of CBU vehicles - new and used;

v) service and repair garages; and

vi) importation of spare parts for the replacement equipment market.

The first 3 categories constitute the major industrial activity while the others are mainly trading and servicing activities.

In line with the Malaysia industrial classification, this masterplan study will concentrate on the 2 principal industries namely:

i) The motor vehicle assembly industry encompassing the assembly of passenger cars (all cc. range) and commercial vehicles (buses, coaches, lorries, vans, pick-up, trucks, trailers, and other goods carrying vehicles) from CKD packs and locally sourced components.

The Royal Customs and Excise Department's definition of a CKD vehicle is one imported in the form of parts and sub-assemblies for which the manner or degree of knock-down condition is prescribed in Schedule A of the Customs Act, 1967 and subsequent amendments. Deleted parts and sub-assemblies are usually excluded from CKD consignments.

ii) The automotive component parts manufacturing industry comprising the specialised manufacture of original equipment and/or replacement parts for motor vehicles.

There are 6 major functional categories of parts/components and accessories, namely, engine parts, electrical parts, drive, transmission and brake parts, body parts and accessories. However, apart from the discussion of technology trends in Part III, all references to production, trade and other statistics follow the MIC/SITC classifications. (Appendix 1).

Overall, the study coverage of the motor vehicle industry focuses on primary-ancillary firm development, primary firms being the assemblers/ manufacturers of the final complete motor vehicle and ancillary firms as referring to those businesses engage in the production, sub-assembly or processing services of original equipment and replacement parts for motor vehicles. Also included are the importation of completely built-up (CBU) vehicles.

Excluded in the discussion of the motor vehicle industry however are the manufacture of closely related items such as motor-cycles, self propelled agricultural machinery (tractors) construction equipment and defence equipment.

1.1.2 The Motorcycle and Bicycle Industries

The sections covering the motorcycle and bicycle industries will include both the assembly/ manufacturing operations of primary firms as well as the supporting ancillary firms. Emphasis will be on the two-wheelers i.e. motorcycles, scooters and roadster.

1.2. Historical Overview

1.2.1 The Malaysian Motor Vehicle Assembly Industry

The earliest existence of the motor vehicle industry was wheel fitment and body touch-up operations in 1926. In 1963, in line with the industrialization programme, the government recommended the move to assemble motor vehicles locally. This was in response to the Colombo Plan Report in early 1963 which identified the industry as having good potential in Malaysia.

In May 1964, the Malaysian government joined forces with the Singaporean government to accept applications for the assemble of motor vehicles and the manufacture of component parts. When Singapore separated from the Federation of Malaysia in 1965, the policy had to be reviewed as Malaysia would have to compete with Singapore in the promotion and development of the industry.

Despite the separation, findings of the international firm of industrial consultants, Artnur D. Little Inc, showed that the motor vehicle industry was still an attractive industry to venture into in terms of opportunities to increase domestic employment, income ad saving on foreign exchange. Hence, the Malaysian government decided to proceed with the development of the industry. The motor vehicle industry was officially launched in 1967 with the opening of 6 assembly plants.

To develop the motor vehicle assembly industry, protective tariffs were imposed on imported completely built up vehicles (CBUs) and dealers/distributors had to obtain import licences as from 1966. The imposition of protective tariffs, imports licensing and quota caused the importation of CBUs to decrease and CKD packs to increase.

In June 1968, a decision was made to limit the number of assembly plants and also the number of makes and models to protect the industry.

Between 1976 and 1977, 5 additional assembly plants were granted approval. This was in line with measures to meet market growth and rationalise the contract assembler's position, to establish the assembly industry in Sabah and Sarawak and disperse industries to less developed areas as well as to increase Bumiputera participation.

1.2.2 The Malaysian Component Parts Manufacturing Industry

The growth of the motor vehicle assembly provided a good base for the development of the component parts manufacturing industry. As Malaysia imported a large amount of components, the market for components was deemed to have potential. In addition, the development of the component parts industry was expected to encourage the development of other supporting ancillary and engineering industries like forging and casting, tyre making, safety glass, electrical equipment, etc.

The local content programme was initiated to encourage the local production of original equipment and hence, promote the growth of the local parts manufacturing industry. It was first suggested by the Arthur D. Little report of 1967 which advised a local content of no more than 20% of the c.i.f. value to be developed over a 5-year period. Subsequently, the Walker report recommended an expansion of local content to 40% by weight over the next 10 years beginning in 1971. A third alternative was suggested by the Malaysian Motor Vehicle Assemblers Association

(MMVAA) which stated that local content should be measured according to item, with the government determining the percentage for each item. Of the 3 reports, the government initially accepted the Walker report.

There was, however, some opposition to the weight criterion for local content as it was different from the value basis adopted by other countries. Hence, in the interest of ASEAN regional cooperation, the implementation of the local content programme was deferred. The local content policy was later revived in 1979.

At present, there is a nucleus of local component manufacturers in Malaysia. Some were originally set up in response to demands for replacement parts of imported motor vehicles before local assembly was introduced. With the introduction of local assembly, this sector continued to expand.

1.2.3 The Malaysian Motorcycle Industry

Motorcycles and scooters are also known as two-wheelers. Motorcycles are by far, more popular than scooters in Malaysia. In relation to the motor vehicle industry, the motorcycle industry is relatively small.

Although motorcycles and scooters were imported into Malaysia shortly after World War II, the first assembly plant was not established until 1967. Protective tariffs were imposed on all CBU two-wheelers in 1967, the same year in which

Lambretta, the first motorcycle assembly plant started operation. Lambretta, however, closed down shortly afterwards when a large share of its market was taken over by Vespa. The largest assembly plant presently is Boon Siew Honda and the smallest is Vespa.

1.2.4 The Malaysian Bicycle Industry

In Malaysia, the bicycle industry plays a significant role in the economy as it is the most suitable, and perhaps the cheapest mode of transport in the rural and semi-urban areas.

Despite its relatively simple technology, bicycle remained an essentially imported item until the mid 1950's. This was mainly due to lack of official encouragement for the establishment of a local industry at that time. Besides, bicycles could be imported cheaply, especially from the People's Republic of China.

Far East Metal works Company in Petaling Jaya was formed in 1959 by a number of Singaporeans to manufacture some bicycle components as well as to assemble bicycles but faced problems from dealers who replaced some components with inferior ones, so that Company has temporarily stopped assembly operation and is concentrating on the manufacture of bicycle components.

Bicycle technology was brought into Malaysia by Raleigh Cycle (M) Berhad, which started operation in 1969 and is the only existing international bicycle manufacturer in the country. It was able not only to capture a large share of the local market but also secured international export orders from other South-East Asian countries and Africa.

1.3. The Malaysian National Car

The manufacturer of the Malaysian National car, Perusahaan Otomobil Nasional Sdn. Bhd. (PROTON), was incorporated on May 5, 1983 to produce passenger cars of 1.2 litre to 1.6 litre. Initial production in 1985 is expected to be 5,500 units (out of total installed capacity of 80,000 units) and 100,200 units by 1990 (installed capacity then increasing to 120,000 units). The plant, which is located at the HICOM Industrial Estate in Shah Alam, will manufacture car bodies and assemble complete cars on an integrated basis. Total investment is estimated at $550 million.

The objectives for establishing the National Car Project are to rationalise the motorcar industry and increase the usage of locally manufactured components. Essentially, the project is intended to spearhead the development of a viable and competitive component parts industry.

With the implementation of the national car project, local content in the motor vehicle industry is expected to increase from 18% to 38%. This is because the components falling under the mandatory deletion policy will be used in the manufacture of Proton Saga, with modifications where necessary. In addition, there is a likelihood that Proton Saga will also incorporate those components currently under consideration for deletion.

Besides sourcing from outside suppliers, Proton will also be undertaking its own "in-house" production of certain critical components such as body stampings, chassis, engines and transmissions.

As Proton Saga has been targetted to meet about 50% of the total market demand for passengers cars of all types and 70% of the market demand of cars ranging from 1,000 cc to 1600 cc, Proton will be expected to require various forms of assistance. This is not only to induce demand for Proton Saga but to offset the anticipated cost penalty arising from local manufacturing. The effects and implications of this on the market share and operations of other motor vehicle assemblers will be covered in the respective sections of this report.

PART II DEVELOPMENT OBJECTIVES

PART II DEVELOPMENT OBJECTIVES

1.1 Introduction

This section of the report aims to establish some development objectives for the TE sector, particularly those related to the sub-groups under study, over the next decade (1985 to 1995). Besides the goals to achieve in the future, this section further summarises the projected targets for the industry in terms of demand, production, import/ export, investment, employment and productivity. However, the rationale and justifications of the objectives will be elaborated in details in later sections of the report (Sections 3 to 7).

1.2 The TE Sector in the Context of Overall National Development

1.2.1 The New Economic Policy (NEP)

One of the main objectives of all economic development planning in Malaysia is to achieve the two-pronged goals, viz,

(a) Eradication of poverty irrespective of race.

(b) Restructuring of society to remove imbalance in economic participation among ethnic groups.

To achieve the above objective, "redistribution with growth" is necessary. In other words, a high growth rate of national GDP, which is the prereuisite condition, is required in order to ensure that redistribution between income classes and among ethnic groups can be carried out without causing absolute loss to other Malaysians. Thus, it appears that the manufacturing sector plays an important role towards achieving the above objective. Besides having greatest potential in contributing towards rapid economic growth, diversifying the traditional primary-commodity and low-productivity agriculture dominated economy and generating jobs to absorb unemployed labour, the manufacturing sector also has potential to increase bumiputera participation.

1.2.2 Major Objectives for Industrial Development Under the FMP and MTR

The general objectives for industrial development outlined by the FMP-MTR are:

(a) to achieve the NEP objectives, particularly in respect of greater Bumiputera participation in the sector in terms of equity, employment, marketing and professional services;

(b) to disperse industries away from the urban centres to the less developed areas through the development of industrial estates and related infrastructural facilities with the aim of achieving a balanced industrial growth among regions;

(c) to expand and diversify the manufacturing base so as to generate high value added and to increase foreign exchange earnings through the development of agro- and other resource-based industries in which the country has comparative advantage;

(d) to gradually promote the establishment of high technology precision based industries with the view of upgrading the associated technical skill of Malaysian workers in such industries;

(e) to stimulate the growth of small-scale industries by providing financial and technical assistance as well as training and marketing facilities;

(f) to establish heavy industries with a view of reducing the dependence on foreign countries for the supply of machinery and intermediate inputs, exploiting forward and backward linkages in industrial development, creating spin-off effects for the growth of small and medium-scale industries and developing the technological capability of the manufacturing sector; and

(g) to promote manufactured exports on a large scale to accelerate the pace of industrialization and earn/save foreign exchange.

In light of the above broad development objectives for the manufacturing sector, thus, the specific development objectives for the TE sector should be formulated within this framework. Based on the detailed analysis of the past performance, current status and future growth potentials the problems facing the TE sector which will be discussed in the subsequent sections, the major inferences that can be drawn regarding the potential role that the TE sector can play are as follows:

- The establishment of the National Car Project (Proton) introduces large-scale, capital-intensive, modern and complex technology that will have spin-off effects in terms of providing technological transfer, promoting R & D (industrial designing) and automation (robotics), and upgrading the technical skills of Malaysian workers and promoting management culture for both the primary and ancillary industries (Objectives [d] and [f])

- By setting up the National Car Project ahead of the ASEAN countries indirectly means that Malaysia is most advanced in the automotive industry. Thus, there is potential for the country to bargain for a more significant role in the ASEAN Complementary Car Scheme. This will encourage exports of motor vehicles to the ASEAN region besides other overseas markets (Objective [g]).

- At the same time, the production of national the car also helps to reduce the number of makes and models or standardize the motor vehicle component parts. This will enhance the development of the backward linkages, viz, the component parts manufacturing industry (mainly metal and rubber product manufacturing industries) and creation of spin-off effects for the growth of small and medium-scale industries. This will help to improve income distribution as well as to provide marketing, entrepreneurial and skilled worker training facilities (Objectives [e] and [f]);

- The backward linkages of the TE sector, particularly the rubber-based industries will benefit from the potential comparative advantage which has not yet been fully exploited, especially with the abundant supply of rubber in the country (Objective [c]);

- Finally, the growth potential of TE sector will provide ample opportunities for NEP restructuring in terms of equity share ownership, employment, marketing and professional services participation (Objective [a]).

Therefore, the TE sector can be regarded as one of the priority sectors for development promotion from the viewpoint of its potential strategic role it plays within the Malaysian economy in terms of its contribution towards achieving the overall development objectives for the manufacturing sector as a whole.

1.2.3 Development Objectives for the TE Sector

Specifically, the recommendations for the TE sector over the next decade should be developed along the following short-term and long-term objectives:

Short-term Objectives

- Faster pace of technology transfer in terms of R & D Industrial designing, automation (robotics), management and technical skills, and greater local participation in equity ownership and management;

- Higher labour productivity and price and quality competitiveness for the TE industry as a whole;

- Stronger linkages between the primary industries of the TE sector and the ancillary industries.

- Greater shift towards higher value added products, especially the component parts manufacturing industry that will help further industrialize the TE industry;

- Greater shift towards standardized and mass-produced motor vehicle components and parts for both domestic and export markets.

- Greater participation of bumiputeras in terms of management and technical staff employment as well as equity ownership.

- Greater and more efficient utilization of our country's natural resource bases, particularly rubber;

- Greater import-substitution for TE sector.

  Development of an international marketing network for the component industry.

Long-term Objectives

Exports of motor vehicles and particularly component parts by capturing a share of the global market;

The estimated development targets for the industry as guidelines to mobilize efforts to achieve the above industrial development objectives are as follows:

The TE sector (excluding shipbuilding and locomotive repairs) shall achieve slightly higher output and value growth rates than the manufacturing sector as a whole. It is estimated that the its average annual growth rate of V.A. over 1985-95 will be 11.4% (at 1984 constant prices) as compared to 10.2% for the manufacturing sector (under most likely projection).

Total output value of the sector shall increase by 11.4% per annum over the next decade to achieve $3,528 million (at constant 1984 prices) or $6,522 million (at current prices) by 1995.

Employment shall increase about three-folds from 14,528 to 39,800 by 1995.

Capital investment shall increase to $875.6 million (at 1984 prices) or $1,618.4 million by 1995. It is estimated to grow at about 10% per annum over the next decade.

The share of imported transport equipment to domestic consumption shall be further reduced from 21.4% in 1981 to 8.4% by 1995, while the share of export in total domestic production shall be increased from 2.7% in 1981 to 15.1% by 1995 (at 1984 constant prices);

In order to achieve the above targets, a coherent, integrated and comprehensive development strategy, and policies and programmes are to be implemented over the next decade. The development strategy, investment plan, and policies and programmes, will be elaborated in Section V, VI & VII respectively. The detailed analysis of the current industry status and problems are presented in Section III while the detailed demand scenario forecasts are done in Section IV.

PART III CURRENT STATUS AND PROBLEMS

PART III. CURRENT STATUS AND PROBLEMS

1.0 The Transport Equipment Sector

1.1.0 Objectives

In reviewing the current status of the transport equipment sector, the following aspects will be analysed:

i. the performance of the industry in Malaysia since 1959;

ii. the relative position of the industry in Malaysia compared with various reference group countries;

iii. the inter-industry linkages;

iv. the major problems and bottlenecks; and

v. the competitiveness (or non-competitiveness) of the industry in the world market.

1.2 Overall Position in the Malaysian Manufacturing Industry

1.2.1 Overview

The overall development of the transport equipment industry (TEI) in Malaysia has been slow during the last two decades. As can be seen in Table 3.1.1, the sector only constituted 1.3% of the total manufacturing output and about 4.2% of

TABLE 3.1.1

POSITION OF THE TRANSPORT EQUIPMENT INDUSTRY (1), 1959 TO 1981

CONTRIBUTION TO	1959	1963	1968	1973	1978	1981	AVERAGE ANNUAL GROWTH RATE (%) 1968-1981	1973-1981
% TOTAL MANUFACTURING OUTPUT	1.30	0.80	2.90	2.80	2.10	2.20		
% CONTRIBUTION TO TOTAL MANUFACTURING EMPLOYMENT	4.20	1.90	2.80	2.50	2.80	2.70		
% CONTRIBUTION TO TOTAL MANUFACTURING FIXED ASSETS	N.A	N.A	3.50	4.70	2.10	2.40		
% CONTRIBUTION TO TOTAL MANUFACTURING EXPORTS (2)	N.A	0.01	0.06	0.22	0.11	0.10		
% CONTRIBUTION TO TOTAL MANUFACTURING IMPORTS (2)	N.A	5.05	6.40	9.00	8.80	7.30		
% CONTRIBUTION OF OUTPUT VALUE TO GDP								
RANKING OF TEI IN THE MANUFACTURING SECTOR IN 1981 ACCORDING TO THE CONTRIBUTION TO MANUFACTURING VALUE ADDED (MVA)	N.A	N.A	N.A	N.A	N.A	4		
RANKING OF TEI IN THE MANUFACTURING SECTOR IN 1981 ACCORDING TO THE CONTRIBUTION TO MANUFACTURING EMPLOYMENT (ME)	N.A	N.A	N.A	N.A	N.A	7		
EXPORT - IMPORT RATIO	N.A	N.A	N.A	0.03	0.02	0.014		
AVERAGE ANNUAL GROWTH RATE (%)								
OUTPUT VALUE				19.5	12.5	25.1	18.0	17.0
EMPLOYMENT				15.7	7.5	10.4	11.3	8.6
FIXED ASSETS				28.1	-	28.5	16.6	9.9
EXPORTS				N.A	3.8	10.2	N.A	6.1
IMPORTS				N.A	17.6	17.1	N.A	17.4
VALUE ADDED				18.5	19.3	20.9	19.4	19.9

NOTES : (1) EXCLUDE SHIP BUILDING AND LOCOMOTIVE REPAIRS UNLESS SPECIFIED;
(2) FIGURERS FOR 1973 - 1981 COVERS MALAYSIA

SOURCES : (1) FIGURES FOR 1959 - 1963 ARE TAKEN FROM HOFFMANN AND TAN, INDUSTRIAL GROWTH, EMPLOYMENT AND FOREIGN INVESTMENT IN PENINSULAR MALAYSIA(2)
(2) COMPILED FROM APPENDIXES
(3) BN, QUARTERLY ECONOMIC BULLETIN

manufacturing employment in 1959. In fact, during the early 1960s, the relative position of the sector in terms of both output and employment was declining.

It was only from 1968 onwards that the relative share of the industry's manufacturing output and employment began to increase to 2.9% and 2.8% respectively. However, since the early 1970's the sector's relative position has been declining again. The reason for this is the more rapid expansion of other sectors, particularly the electronics sector, in Malaysia. In 1981, the contribution of the TE sector to manufacturing output was 2.2% while employment was 2.7%. The share to manufacturing fixed assets reached 2.4% in the same year.

In 1981, the TE sector ranked fourth after electrical machinery, food products and petroleum refineries sectors in terms of its contribution to the manufacturing value added (MVA). However, in terms of its contribution to manufacturing employment (ME), the TE sector ranked at seventh place.

The proportion of total exports and imports of TE products to the overall manufacturing sector is shown in Table 3.1.1. As can be seen, the share of imports increased steadily from 5% in 1963 to 9.0% in 1973, but subsequently declined in the late 1970s. By 1981, the TE sector accounted for 7.3% of the total manufacturing imports. In terms of exports, the contributions of the TE sector were insignificant. The sector's exports to total manufacturing exports in 1981 was 0.1% as compared to 0.01% in 1963.

The TE sectoral production index (in 1968 constant prices) has also increased significantly from the base year figure of 100 in 1963 to 948 in 1983 giving an average growth rate of 16.2%. On the whole, the average growth of the sector's production was about 60% higher than that of the manufacturing sector. (Refer to Table 3.1.2)

However, the TE sectoral growth rate over the last 15 years has been showing a declining trend. During the period, 1968 to 1975, the pace of development in the TE sector was very rapid as can be gauged from its high average annual growth rate of about 33% (as compared to 11.6% for manufacturing sector). During this period, 8 of the 11 assembly plants and many motor vehicle component parts manufacturing firms commenced operations. However, from the mid-1970s onwards, the pace of development began to slacken until in the early 1980s, the growth rate of the sector was around 5.3%.

The principal statistics (by industries under study) of the Malaysian transport equipment sector in 1981 are summarized in Table 3.1.3. In 1981 the number of establishment engaged in the various sub-sectors of the TEI (excluding shipbuilding and locomotive repairs) was 266. About 81% of the total establishments were in the motor vehicle industry (comprising motor vehicle body building, assembly operations and the manufacture of automotive component parts).

TABLE 3.1.2

PENINSULAR MALAYSIA : INDUSTRIAL PRODUCTION INDEX OF TRANSPORT EQUIPMENT INDUSTRY AND OVERALL MANUFACTURING SECTOR 1968 - 1983

YEAR	Transport Equipment	Overall Manufacturing
1968	100	100.00
1969	210.2	115.6
1970	272.5	129.8
1971	281.9	137.8
1972	268.3	156.1
1973	393.0	187.1
1974	531.4	215.8
1975	412.1	216.0
1976	416.6	256.9
1977	481.4	284.0
1978	572.6	311.9
1979	613.5	334.7
1980	852.6	362.6
1981	855.1	374.6
1982*	780.3	395.6
1983*	948.4	421.8
Growth Rate p.a		
1968-1975	32.7%	11.6%
1975-1980	15.6%	10.9%
1981-1983	5.3%	6.1%
1968-1983	16.2%	10.1%

NOTE : 1982 and 1983 Figures are Based on Revised Weightage.

SOURCE : Department of Statistics, Malaysia Industrial Survey, Various Years.

TABLE 3.1.3

PENINSULAR MALAYSIA : PRINCIPAL STATISTICS BY SUB-GROUPS OF THE TRANSPORT EQUIPMENT SECTOR (1), 1968 AND 1981

	MIC Code	No. of Establishments		Gross Input		Gross Output		Value Added		Total Employment		Salaries & Wages		Fixed Assets	
		No.	%	$'000	%	$'000	%	$'000	%	No.	%	$'000	%	$'000	%
3843 MANUFACTURE OF MOTOR VEHICLE															
Manufacture of Motor Vehicle Bodies	38431														
- 1968		44	57.1	2,674	3.5	4,360	4.8	1,819	7.7	515	14.2	1,093	14.5	497	1.6
- 1973		70	58.3	9,912	5.9	14,384	6.5	4,472	8.1	929	12.4	2,053	10.6	3,455	3.2
- 1978		39	32.8	25,312	8.4	37,567	9.4	12,255	9.2	1,222	11.3	5,030	10.1	3,455	3.2
- 1981		111	41.7	49,625	9.1	74,899	9.6	25,634	10.9	1,742	12.0	10,547	11.6	9,011	3.9
Manufacture and Assembly of Motor Vehicles	38432														
- 1968		11	14.3	62,962	82.1	66,588	73.4	12,478	52.9	2,146	59.3	3,966	52.8	27,548	88.2
- 1973		8	6.7	118,668	71.5	154,907	70.1	36,239	65.8	4,750	63.2	13,809	71.3	62,659	58.0
- 1978		10	8.4	212,867	70.4	257,388	64.7	74,521	55.9	5,886	54.6	31,076	64.3	62,659	58.0
- 1981		25	9.4	334,865	61.7	454,860	58.5	119,996	50.9	6,844	47.1	51,257	56.3	80,561	35.2
Manufacture of Motor Vehicle Parts and Accessories	38439														
- 1968		14	18.2	568	0.7	1,021	1.1	547	0.2	153	4.2	230	3.1	308	1
- 1973		14	11.7	2,211	1.3	3,806	1.7	1,596	2.9	416	5.5	733	3.8	25,077	23.2
- 1978		42	35.3	20,189	6.7	35,715	9.0	15,526	11.6	1,842	17.1	4,670	9.4	25,077	23.2
- 1981		80	30.1	59,531	10.9	98,948	12.7	39,416	16.7	3,340	23.0	15,337	16.8	84,845	37.0
3844 MANUFACTURE OF MOTORCYCLES & SCOOTERS															
Manufacture and Assembly of Motor Cycles & Parts	38441														
- 1968		-	-	-	-	-	-	-	-	-	-	-	-	-	-
- 1973		5	4.2	22,317	13.4	29,258	13.2	6,941	12.6	477	6.3	983	5.1	7,140	6.6
- 1978		11	9.2	24,858	8.2	41,181	10.4	24,323	18.2	718	6.6	4,438	8.9	7,140	6.6
- 1981		16	6.0	62,443	11.5	100,152	12.9	37,709	16.0	1,159	7.9	7,429	8.2	25,702	11.2
Manufacture and Assembly of Bicycles, Tricycles, Trishaws & Parts	38449														
- 1968		8	10.4	10,489	13.7	18,727	20.6	8,751	37.1	806	22.3	2,220	29.6	2,889	9.2
- 1973		23	19.2	12,794	7.7	18,605	8.4	5,811	10.5	944	12.6	1,781	9.2	9,636	8.9
- 1978		17	14.3	19,037	6.3	25,140	6.4	6,603	4.9	1,120	10.4	3,544	7.1	9,636	8.9
- 1981		34	12.8	36,086	6.6	48,889	6.3	12,802	5.4	1,443	9.9	6,419	7.1	29,004	12.6
TOTAL FOR DIVISION *															
- 1968		77	100.0	76,693	100.0	90,696	100.0	23,595	100.0	3,620	100.0	7,509	100.0	31,242	100.0
- 1973		120	100.0	165,902	100.0	220,960	100.0	55,059	100.0	7,516	100.0	19,359	100.0	107,967	100.0
- 1978		119	100.0	302,263	100.0	397,491	100.0	133,228	100.0	10,788	100.0	49,558	100.0	107,967	100.0
- 1981		266	100.0	542,550	100.0	777,748	100.0	235,557	100.0	14,528	100.0	90,989	100.0	229,123	100.0
TOTAL FOR MANUFACTURING SECTOR															
- 1968		9,013		N.A.		3,078,523		N.A.		130,257		266,957		890,356	
- 1973		11,060		5,350,759		7,677,687		2,236,929		297,934		586,895		2,294,646	
- 1978		4,499		13,346,247		18,548,583		5,307,336		377,718		1,359,195		5,195,265	
- 1981		17,780		25,591,191		34,486,493		8,895,302		534,145		2,614,147		9,730,327	

Note
(1) Excluding shipbuilding and locomotive repair

SOURCE : 1 Dept. of Statistics, Census of Manufacturing Industries, 1968, 1973 and 1981
2 Dept. of Statistics, Survey of Manufacturing Industries, Malaysia, 1978

The output value generated was M$777.7 million and fixed assets invested was $229.1 million while number of workers employed was 14,528. As evident from the Table, the motor vehicle industry is a major industry accounting for 81% and 82% of the TE sector's total output and employment respectively.

It was during the period 1968 to 1981 that the industry expanded substantially in terms of number of establishments, output value, fixed assets and employment. The average growth in output value was 17% while employment and fixed assets stood at 8.6% and 9.9% per annum respectively.

Table 3.1.4 presents the overall share of the TE sector in domestic production, exports and imports. As indicated in the Table, the overall TEI sector (excluding shipbuilding and locomotive repairs) is still import-oriented, particularly, motor vehicles and motor vehicle parts and accessories. This is in contrast to the manufacture of motor vehicle bodies and bicycles, tricycles and trishaws which are becoming more self-sufficient. During the period 1973 to 1981, local production as a share of domestic market consumption was quite constant being in the region of 52%-63%. Exports and imports as a share of domestic market were also fairly constant.

TABLE 3.1.4

MALAYSIA: SHARE OF DOMESTIC PRODUCTION, EXPORTS AND IMPORTS IN DOMESTIC MARKET, FOR TRANSPORT EQUIPMENT SECTOR, 1968-1981

SUB-DIVISION	GROSS OUTPUT (Y) (M$'000)	IMPORT (1) (M) (M$'000)	EXPORT (X) (M$'000)	DOMESTIC DEMAND D=Y+M-X	PRODUCTION AS % DOMESTIC MARKET	EXPORTS AS % DOMESTIC MARKET	IMPORTS AS % DOMESTIC MARKET
MOTOR VEHICLE BODIES (MIC 38431)							
1973	14,384	297	15	14,666	98.08	0.10	2.03
1978	37,567	1,002	17	38,552	97.45	0.04	2.60
1981	74,899	1,133	-	76,032	98.51	0.00	1.49
MANUFACTURE & ASSEMBLY OF MOTOR VEHICLE (MIC 38432)							
1968	66,588	12,581	7,270	71,899	92.61	10.11	17.50
1973	154,907	79,107	11,757	222,257	69.70	5.29	35.59
1978	257,388	321,189	14,083	564,494	45.60	2.49	56.90
1981	454,860	554,471	11,732	997,599	45.60	1.18	55.58
MANUFACTURE OF MOTOR VEHICLE PARTS AND ACCESSORIES (MIC 38432)							
1968	1,021	59,854	12,872	48,003	2.13	26.81	124.69
1973	3,806	44,116	2,844	45,078	8.44	6.31	97.87
1978	35,715	90,404	2,959	123,160	29.00	2.40	73.40
1981	98,948	136,918	6,627	229,239	43.16	2.89	59.73
MANUFACTURE AND ASSEMBLY OF MOTORCYCLES & SCOOTER (MIC 38441)							
1968	-	5,039	128	4,911	0.00	2.61	102.61
1978	29,258	11,258	96	40,420	72.38	0.24	27.85
1978	41,181	18,617	248	59,550	69.15	0.42	31.26
1981	100,152	29,799	6,989	122,962	81.45	5.68	24.23
MANUFACTURE AND ASSEMBLY OF BICYCLES, TRICYCLES & TRISHAWS (MIC 38449)							
1968	18,727	8,988	85	27,630	67.78	0.31	32.53
1973	18,605	13,043	1,574	30,074	61.86	5.24	43.37
1978	25,640	11,410	2,287	34,763	73.76	6.58	32.82
1981	48,889	11,888	901	59,876	81.65	1.50	19.85
TOTAL TEI (EXCLUDING SHIPBUILDING LOCOMOTIVE REPAIRS)							
1973	220,960	147,821	16,286	352,495	62.68	4.62	41.94
1978	397,491	442,622	19,594	820,519	48.44	2.39	53.94
1981	777,748	734,209	26,249	1,485,708	52.35	1.77	49.42

NOTE: EXCLUDES IMPORTS OF CKD MOTOR VEHICLES AND MOTORCYLCES

SOURCES: (1) CALCULATED FROM CENSUS OF MANUFACTURING INDUSTRIES.
SURVEY OF MANUFACTURING INDUSTRIES.
EXTERNAL TRADE STATISTICS, MALAYSIA, VARIOUS YEARS

(2) TABLES 3.1.3, 3.2.18 AND 3.3.10

1.2.2 Total Output

Table 3.1.5 shows the total output value of the transport equipment sector in Malaysia. The average growth rate over the period 1971-1981 was 22.1%, with total output in 1981 of $1.3 billion. In comparison with the output of motor vehicles and motorcycles which registered growth rates of 23.6% and 16.7% respectively, it is evident that the higher growth rate in value terms of the entire transport equipment sector could be due to general inflation and other costs increase over the period as well as the growing demand and production of higher value equipment. Despite high growth rates, the contributions to total output value of the transport equipment sector by the motor vehicle body, parts and accessories and bicycles/tricycles manufacturing industries were small, amounting to only about 18.5% in 1981.

1.2.3 Productivity and Factor Intensity

Table 3.1.6 presents the production characteristics of the various sub-groups of the TE sector and the manufacturing sector. As can be seen, the overall TE sector (excluding shipbuilding and locomotive repairs) is less capital intensive, or more labour intensive, than the manufacturing sector. In 1981, the capital per labour ratio for TE sector was M$15,770 as compared to M$18,220 for the manufacturing sector. Amongst the various sub-groups of TE sector, the capital-labour ratio ranged from M$5,170 for the motor vehicle body building industry to M$25,400 for the motor vehicle parts manufacturing industry.

TABLE 3.1.5

PENINSULAR MALAYSIA : ANNUAL OUTPUT OF TRANSPORT EQUIPMENT SECTOR, 1971 - 1982

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	AVERAGE GROWTH RATE %
Manufacture of motor vehicles body ($'000)	11,439	10,229	14,384	15,582	15,376	20,945	-	37,567	53,208	-	83,397	-	23.6%
Manufacture & assembly of motor vehicles ('000 units)	31	31	49	65	49	53	61	78	77	106	112	101	11.3%
Manufacture of parts & accessories ($'000)	1,971	2,425	3,806	8,573	14,720	23,460	-	35,715	46,428	-	103,041	-	50.1%
Manufacture of motorcycles ('000 units)	31	36	63	109	96	100	122	127	115	177	195	205	16.7%
Manufacture of bicycles, tricycles, trishaws and their parts ($'000)	6,784	12,797	18,605	20,730	15,217	19,958	-	25,640	34,418	-	52,226	-	16.4%
TOTAL - TRANSPORT EQUIPMENT	162,308	156,112	243,382	365,191	346,770	410,885	-	535,044	769,958	-	1,292,820	-	22.1

Source : Department of Statistics, Industrial Surveys, Malaysia, Various Years

TABLE 3.1.6

PENINSULAR MALAYSIA : PRODUCTION CHARACTERISTICS OF TRANSPORT INDUSTRY, 1968 - 1981

*	MIC CODE	AVERAGE FIRM SIZE L/ESTB.	AVERAGE FIRM SIZE K/ESTB. (M$'000)	K/L (M$'000)	VA/L (M$'000)	WAGES/ WORKERS (M$'000)	WAGES/V.A.	V.A./OUTPUT
MANUFACTURING OF MOTOR VEHICLE BODIES	38431							
1968		11.70	11.30	0.96	3.53	2.12	0.60	0.42
1973		13.27	49.36	3.72	4.81	2.21	0.46	0.31
1978		31.33	88.59	2.83	10.03	4.12	0.41	0.33
1981		15.69	81.18	5.17	14.72	6.05	0.41	0.34
MANUFACTURING AND ASSEMBLY OF MOTOR VEHICLES	38432							
1968		195.09						
1973		593.75	7,832.38	13.19	7.63	2.91	0.38	0.23
1978		588.60	6,265.90	10.65	12.66	5.42	0.43	0.29
1981		273.76	3,222.44	11.77	17.53	7.49	0.43	0.26
MANUFACTURE OF MOTOR VEHICLE PARTS AND ACCESSORIES	38439							
1968								
1973		29.71	1,791.21	60.28	3.84	1.76	0.46	0.42
1978		43.86	597.07	13.61	8.43	2.54	0.30	0.43
1981		41.75	1,060.38	25.40	11.80	4.59	0.39	0.40
MANUFACTURE AND ASSEMBLY OF MOTORCYCLES & PARTS	38441							
1968								
1978		95.40	1,428.00	14.97	14.55	2.06	0.14	0.74
1978		65.27	649.09	9.94	33.88	6.18	0.18	0.59
1981		72.44	1,606.38	22.18	32.54	6.41	0.20	0.38
MANUFACTURE AND ASSEMBLY OF BICYCLES, TRICYCLES, TRISHAWS & PARTS	38449							
1968								
1973		41.04	418.96	10.21	6.16	1.89	0.31	0.31
1978		65.88	566.82	8.60	5.90	3.16	0.54	0.26
1981		42.44	853.06	20.10	8.87	4.45	0.50	0.26
TOTAL FOR DIVISION *								
1968								
1973		62.63	899.73	14.36	7.33	2.58	0.35	0.25
1978		90.66	907.29	10.01	12.35	4.55	0.37	0.34
1981		54.62	861.36	15.77	16.21	6.26	0.39	0.30
TOTAL FOR MANUFACTURING SECTOR								
1968								
1973		26.94	207.47	7.70	7.81	1.97	0.25	0.30
1978		83.96	1,154.76	13.75	14.04	3.60	0.26	0.29
1981		30.04	547.26	18.22	16.65	4.89	0.29	0.26

* EXCLUDING SHIPBUILDING AND LOCOMOTIVE REPAIRS
SOURCE : COMPILED FROM TABLE 3.1.3

In terms of wages, the TE sector paid higher average wage rates than the manufacturing sector, viz, M$6,260 for TE sector as compared to $4,890 for the manufacturing sector in 1981. This indicates indirectly that the TE sector utilises more skilled labour than the manufacturing sector. However, the utilisation of skilled manpower varies greatly amongst the various sub-groups. In 1981, the bicycle, tricycle, trishaw and parts manufacturing and assembly industry paid as low as M$4,450 in average wages while the motor vehicle assembly paid an average wage rate of M$7,490. This implies indirectly that assembly operations require more skilled labour than high capital investment.

The overall labour productivity of the TE sector does not differ very much from the manufacturing sector. In 1981, the value added per worker for the TE sector was M$16,210 as compared to M$16,650 for the manufacturing sector. The highest productivity was recorded in the motorcycles and parts manufacturing and assembly industry where its value added per worker was M$32,540. In contrast, the bicycle, tricycle, trishaw and parts manufacturing and assembly industry showed the lowest labour productivity of M$8,870 which was about half that of the TE sector.

In 1981, the value added (primary inputs or payments to the primary factors such as wages and salaries, profits and capital allowances) constituted about 30% of the output value of the TE sector which was higher than the manufacturing sector (26%). This implies the slightly higher primary input usage of the sector as compared to that of the manufacturing sector.

Wages and salaries comprised about 39% of the value added for the TE sector in 1981 as compared to 29% for the manufacturing sector. In monetary terms, this means that for every dollar of value added in the TE sector, 39% is taken up by wages and salaries. The wage per value added is lowest in the motorcycle and parts manufacturing and assembly industry (20%) and highest in the non-motorised cycle industry (50%).

In addition, the capital intensity in the TE sector increased marginally from M$14,360 in 1973 to M$15,770 in 1981 representing an average annual growth rate of 1.3%. Amongst the various sub-groups, only three sub-groups showed positive growth rates in capital intensity, viz, motor vehicle body building industry (4.2%), motorcycle and parts manufacturing and assembly industry (5%) and non-motorised cycle and parts manufacturing and assembly industry (8.8%). The motor vehicle industry (comprising both motor vehicle assembly and motor vehicle parts manufacturing industry), however, had a negative rate in terms of growth in capital investment.

The high inflation rate during the past decade was indeed reflected in the increasing wage rates of the TE sector. The average annual increase in the wage rates of the TE sector during the period 1973-1981 was about 11.7% in current prices as compared to 12% in the manufacturing sector. In real terms, however, the average wage rates in the TE sector only increased about 4.7% (using CPI as the deflator).

During 1968 to 1981, the labour productivity for the TE sector increased from M$7,330 to M$16,210 representing an average annual growth rate of 10.4% in current prices. This is slightly higher than that of the manufacturing sector (9.9%). In fact, in real terms (using overall industrial production index), the labour productivity for TE sector only increased marginally (2.3%).

Value added per output and wages per value added ratios for the TE sector remained quite constant during the past decade.

1.2.4 Value Added

The production of passenger and commercial vehicles has been the main contributor of value added to the industry with a share of 28.5% of total value added of $441 million in 1981 (Table 3.1.7).

The substantial increase in value added by the industry over the past decade was in line with its rapid growth in output of 17.8% which was fueled in part by the increased local material content introduced under the Mandatory Deletion Programme. Covering a total of 17 items todate, the programme has helped to achieve a local content of close to 20% for the assembly of most models of passenger vehicles. Another 8 items are under consideration for inclusion under the programme.

TABLE 3.1.7

MALAYSIA : VALUE ADDED BY MAJOR SUB-CATEGORIES
IN TRANSPORT EQUIPMENT SECTOR, 1971 TO 1982

Subcategories	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	AVERAGE GROWTH RATE (%)	VALUE ADDED % 1981
Assembly of passenger & commercial vehicles	24,463	23,039	36,239	41,127	53,053	46,365	-	74,521	95,421	-	125,601	17.8%	33.0%
Assembly of motorcycles	4,098	5,101	6,941	7,010	13,179	5,166	-	24,323	20,849	-	37,709	24.9%	10.0%
Motor vehicle body	3,143	3,012	4,472	3,875	4,476	7,123	-	12,255	17,703	-	27,604	24.3%	7.0%
Bicycles	2,353	3,884	5,811	2,135	4,118	5,520	-	6,603	10,597	-	12,364	18.6%	3.0%
Motor vehicles parts & accessories	789	990	1,596	859	6,292	8,483	-	15,526	20,603	-	39,692	48.0%	10.0%
Shipbuilding, boatbuilding and repairing	3,041	4,718	7,004	7,420	9,079	25,125	-	27,496	74,117	-	137,450	51.8%	37.0%
Total	37,897	40,694	62,063	62,426	90,197	97,782	-	160,724	239,290	-	380,690	100.0%	100.0%
Index	100	107	164	165	238	258	-	424	632	-	1,005		

Shares of value added

	1977	1979	1981
1. Assembly of vehicles	65	40	33
2. Assembly of motorcycles	11	9	10
3. Motor vehicle bodies	8	7	7
4. Bicycles	6	4	3
5. Motor vehicle parts	2	9	10
6. Shipbuilding etc.	8	31	37
Total	100	100	100

Source : Department of Statistics, Industrial Surveys, Malaysia, Various Years

Similarly, the local content programme has also helped the motorcycle assembly industry to achieve a value added level of about $37.7 million contributing to 8.6% of total value added in the sector in 1981 (at local content target of 15%). Targets of 30%, 45% and 60% set for 1983, 1984 and 1985 respectively are expected to further increase the industry value added contribution to the transport equipment sector.

The industry with an increasingly significant role in the transport equipment sector is the automotive component parts and accessory manufacturing industry. Over the 1971-1981 period, the value added of this industry has grown at a rate of 48.0% per annum with a value of M$39.6 million contributing to 9.0% of total value added in the sector in 1981. The higher growth rate was achieved by increasing production of component parts for the original equipment as required by the local content programme.

1.2.5 Employment

Table 3.1.8 indicates the extent of employment in the various industries of the transport equipment sector in Malaysia. As can be seen from the table, the major portion of employment in the sector in 1982 was in the assembly of passenger and commercial vehicles. However, although the output of this industry registered a growth of about 12% over the 1971 to 1982 period, the corresponding increase was only 5.5%. This could

TABLE 3.1.8

MALAYSIA : EMPLOYMENT BY MAJOR SUB-CATEGORIES
IN TRANSPORT EQUIPMENT SECTOR, 1971 TO 1982

Subcategories	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	AVERAGE GROWTH RATE (%)
Assembly of passenger & commercial vehicles	3081	3194	5200	5584	4867	4989	5458	5835	6079	7003	6451	6205	5.5%
Assembly of motorcycles	210	220	469	530	533	542	612	549	673	942	1003	1317	15.1%
Commercial motor vehicles body	731	588	466	513	648	626	866	912	964	1176	1243	1287	8.9%
Bicycles	456	548	735	678	651	787	961	1020	1072	1496	1002	969	8.2%
Motor vehicles parts & accessories	260	334	570	652	794	979	1305	1871	2232	2867	2559	3123	26.0%
	4738	4884	7440	7957	7493	7923	9202	10187	11020	13484	12258	12901	
Shipbuilding, boatbuilding and repairing	550	923	1106	1475	1558	1966	-	2105	2282	-	6208	-	21.1%

Source : Department of Statistics, Industrial Surveys, Malaysia, Various Years

be due to the following:

- the increase in output being achieved by expansion and upgrading of assembly plant facilities with lower increase in employment; and

- the output contributed by assembly plants established later which were equipped with more modern facilities requiring less labour.

In comparison with the motor vehicle assembly industry, employment in the automotive component parts manufacturing industry has grown substantially at 26.0% per annum from a small base of 260 in 1971 to 3,123 in 1982. This upsurge in employment corresponded with the rapid increase in the number of establishments manufacturing components for the local original equipment and replacement parts markets.

In the case of the motorcycle assembly industry, the growth in employment of 15.1% corresponded closely to its output growth rate of 16.5% over the 1971 to 1982 period.

1.2.6 Foreign Equity Ownership

In 1980, the share of Malaysian equity ownership in the TE sector was slightly higher than the manufacturing sector (65.3% versus 63%) representing a total paid-up capital of M$146.5 million. This shows an improvement when compared to the situation in the mid-1970s where the majority equity shareholders comprised foreign investors (59%) (Table 3.1.9).

Amongst the foreign investors, Denmark accounted for 34% of the total foreign equity share ownership, followed by Singapore (25%), the U.K (12%) and Japan (9%). These four countries constituted 80% of the total foreign investment. Other countries included the U.S., India, Liberia and Germany F.R.. However, with the Look East Policy introduced lately in Malaysia, the 1980's situation may change. Thus, the National Car Project, with a 30% Japanese equity share ownership, and other Japanese joint-venture projects would increase the overall Japanese investment in the TEI.

1.2.7 Bumiputera Participation

The New Economic Policy's target of 30% bumiputera participation in terms of equity share ownership and employment had already been achieved in 1980 in the case of the TE sector. Table 3.1.10 shows that about 48% of the total employment in the TEI in 1980 were Bumiputera while the Chinese and Indian accounted for 40% and 11% respectively. The proportion of Bumiputera employment in the TEI was slightly higher than the total manufacturing sector of 43%.

As evident in the table, bumiputera participation in terms of employment is higher in the larger establishments. In 1980, the approved establishments having paid-up capital of more than

TABLE 3.1.9

MALAYSIA : PATTERN OF FOREIGN EQUITY OWNERSHIP, TRANSPORT EQUIPMENT INDUSTRY 1980

	As of End of 1980 (M $ Mil.)			As at End of 1975	
	Paid-up Capital	Loans	Total Fixed Assets	Paid-up Capital	Loans
TE Sector	422.4	265.4	304.1	6.6	0.15
- Foreign	146.5	12.1	96.3	3.9	-
- % Foreign	34.7	4.6	31.7	59.1	-
All Manufacturing	6,537.6	2,252.7	7,347.1	1,333.1	286.3
- Foreign	2,421.8	534.7	2,740.9	619.0	87.5
- % Foreign	37.0	23.7	37.3	46.4	30.6

Country of Origin	1980 Paid - Up Capital (M $ Mil.)	%
Denmark	49.8	34.0
Singapore	36.6	25.0
U.K.	17.6	12.0
Japan	13.4	9.1
U.S.	6.3	4.3
India	6.0	4.1
Liberia	4.9	3.3
Germany, F.R.	3.5	2.4
Sweden	3.0	2.0
Switzerland	2.1	1.4
France	1.6	1.0
Others	1.7	1.2
All	146.5	100

Source : MIDA Annual Report 1981 & 1982

TABLE 3.1.10

PENINSULAR MALAYSIA : ETHNIC COMPOSITION OF EMPLOYMENT IN THE TRANSPORT EQUIPMENT INDUSTRY 1980

	(a)				(b)	
	No. Employment		% Employment		No. Employment in MIDA Approved Firms Transport Equipment Sector	%
	All Manufacturing Industries	Transport Equipment Production	All Manufacturing Industries	Transport Equipment Production		
Malay	235,373	4,344	42.7	47.9	8,577	54.8
Chinese	250,552	3,613	45.4	39.8	4,986	31.9
Indian	63,130	1,013	11.4	11.2	1,952	12.5
Others	2,638	101	0.5	1.1	128	0.8
Total	551,693	9,071	100	100	15,643	100

Source : (a) Calculated from 1980 Population Census

(b) Calculated from MIDA Annual Report 1981. Figures pertain to firm employing 25 or more workers or having equity exceeding $250,000.

M$250,000 were employing about 55% bumiputera workers. The Chinese and the Indian workers comprised 32% and 12% of the workforce respectively.

The bumiputera equity share ownership in the TE sector is more than twice that of the manufacturing sector (39.7% versus 19.5%). In 1980, total paid-up capital amounted to M$422.4 million, of which 65% were Malaysian owned. The ethnic share was: Bumiputera 61%, Chinese 19%, Indians 0.8% and other Malaysians 20.2% (see Table 3.1.11). The high bumiputera participation is attributed to government intervention in many projects in the TE sector.

1.2.8 External Trade

The exports of products in the TE sector are insignificant mainly because the various industries are still dependent on imports and catering for the domestic market. The small volume of exports comprises mainly new motor vehicles and used vehicles re-exported to Singapore and Brunei. Other exports of transport equipment consist of boats exported on an irregular basis to the neighbouring ASEAN nations. On the other hand, the bulk of imports of TE is mainly from Japan. A summary of export and import statistics is given in Table 3.1.12 and 3.1.13 respectively.

The growth in exports of products in the TE sector has been insignificant over the last decade as compared to the corresponding 16.9% of growth

TABLE 3.1.11

CAPITAL OWNERSHIP STRUCTURE IN THE TRANSPORT EQUIPMENT INDUSTRIES 1980

	Paid - Up Capital (M $ Mil.)		Paid - Up Capital (%)	
	All Manufacturing Industries	Transport Equipment Production	All Manufacturing Industries	Transport Equipment Production
Malaysian	4,115.8	275.9	63.0	65.3
-Bumiputra	1,276.9	167.6	19.5	39.7
-Chinese	1,592.8	52.2	24.4	12.4
-Indian	46.1	2.2	0.7	0.5
-Others	1,200.0	55.9	18.4	13.2
Foreign	2,421.8	146.5	37.0	34.7
All	6,537.6	422.4	100.0	100.0

Source : Calculated from MIDA Annual Report 1981: Table V

Note: (1) Figures pertain to manufacturing firms registered with MIDA only, thus exclude small firms with less than $250,000 paid-up capital or less than 25 workers. The covered firms accounted for a total employment of 378,764 or 68.7% of all manufacturing employment according to the 1980 population census.

(2) Figures for all manufacturing exclude hotel and tourist complexes.

TABLE 3.1.12

MALAYSIA : EXPORT OF TRANSPORT EQUIPMENT INDUSTRY, 1972 - 1981

Subcategories	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Passenger Vehicles										
Quantity units	822	567	458	729	209	107	291	233	196	158
Value ($'000)	4,198.8	3,441.2	3,487.7	2,833.4	2,399.5	1,042.3	3,325.6	3,275.7	2,873.0	2,003.7
Commercial Vehicles										
Quantity units	395	252	165	340	49	13	223	276	230	183
Value ($'000)	4,284.0	6,932.7	4,415.5	9,215.9	1,512.7	269	8,956.2	8,342.2	6,031.1	6,778.4
Motorcycles										
Quantity units	158	85	941	150	53	52	59	113	477	4,610*
Value ($'000)	127.6	95.9	722.4	166.7	68.5	37.3	68.5	200.4	747.5	6,948.2
Parts & Accessories for passenger & commercial vehicles										
Value ($'000)	3,384.2	2,824.4	2,878.7	1,669.7	1,969.4	1,503.4	2,270.7	2,617.9	3,041.8	6,299.8
Cycles not motorised										
Quantity units	26,589	11,351	17,462	640	1,093	800	12,311	6,205	14,342	3,871
Value ($'000)	2,903.3	1,394.5	2,434.3	657	130.8	99.7	1,980.8	921.9	3,600.6	770.6
Parts & Accessories for motorcycles & cycles not motorised										
Value ($'000)	646.4	775	1,210.0	891.3	423.1	470.3	540.3	563.1	3,064.0	1,215.1
Locomotives										
Quantity Units	39	2	1		206	2	3	1		
Value ($'000)	205	4	10		21	30	18	[illegible]		
Railway coaches, rolling stocks, wagons										
Quantity Units	1,575	23	-	2	-	20	4	11	-	52
Value ($'000)	61	5	-	10	-	112	12	15	-	85
Parts of locomotives coaches, rolling stocks and wagons										
Value ($'000)	144	68	6	95	6		22	277	5	3
Aircrafts										
Quantity units	-	1	-	3	2	1	2	-	3	3
Value ($'000)	-	1,625	-	758	1,087.4	3,875	283	-	2,787	19
Parts of aircrafts										
Value ($'000)	9,575	1,582.2	1,080.1	2,358.6	4,744.0	5,107.2	10,324.0	9,194.6	19,366.2	4,822.0
Total ($ million)	25.53	18.75	16.74	18.66	12.36	12.55	27.8	25.41	41.52	28.94

* Mainly re-export to Japan

Source : External Trade, Department of Statistics, Malaysia

TABLE 3.1.1[illegible]

MALAYSIA : IMPORT OF TRANSPORT EQUIPMENT INDUSTRY, 1972 - 1981

SUBCATEGORIES	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Passenger Vehicles										
Quantity '000 units	38.6	57.1	79.4	50.7	63.9	94	87.7	68.3	103.5	107.6
Value ($'000)	204.6	299.5	409.2	291.3	387.5	567.2	638.3	552.3	772	862.3
Commercial Vehicles										
Quantity '000 units	8.1	10.3	17.5	14.9	13.6	15.6	17.1	24.5	53.8	34.7
Value ($'000)	81.5	104.6	212.4	176.1	187.9	223.2	331.5	348.4	734.9	663.3
Motorcycles										
Quantity '000 units	49.7	81.3	139.6	108	96.2	134.4	133.3	131.9	197.9	197.1
Value ($'000)	32.7	55.6	108.1	84.3	66.2	90.4	96.4	114.9	159.9	176.1
Parts & Accessories for passenger & commercial vehicles										
Value ($'000)	33.4	42.7	43.2	53.4	60.9	79.9	86.9	96.4	136.8	131.4
Cycles not motorised										
Quantity '000 units	11.7	20.7	21.8	34.9	60.4	86.9	15	8.8	22.6	34.8
Value ($'000)	1068	1964	2528	4128	6010	8562	1395	1196	3087	5370
Parts & Accessories for motorcycles & cycles not motorised										
Value ($'000)	12.1	15.6	18.9	17.9	18.3	18.8	13.6	21.2	22.9	26.7
Locomotives										
Quantity (units)	56	64	57	14	74	64	31	81	86	3
Value ($'000)	25,948	932	975	287	1,418	1,398	2,733	6,514	5,031	315
Railway coaches, rolling stocks, wagons										
Quantity (units)	20	49	755	22	149	164	7	122	147	68
Value ($'000)	38	78	18	2	25	11	29	20	9	4
Parts for locomotives coaches, rolling stocks and wagons										
Value ($'000)	3,506	3,900	2,940	4,023	4,271	2,013	5,448	6,938	12,667	5,757
Aircrafts										
Quantity (units)	11	13	7	6	7	15	16	18	21	17
Value ($'000)	113,389	24,460	47,662	5,001	49,809	28,671	17,697	65,890	217,182	258,961
Parts of aircrafts										
Value ($'000)	32,375	27,872	26,424	37,196	62,401	44,372	77,254	121,977	130,409	75,124
Total ($ million)	540.62	577.21	872.35	668.64	844.73	1,064.53	1,271.26	1,335.74	2,194.89	2,205.33

SOURCE : Department of Statistics, Annual Statistics of External Trade, Malaysia rate for imports. This imbalance in the growth rate of imports and exports implies that the country's trade balance in the TE sector has deteriorated over the years. In 1981, the deficit was M$ 1,898 million as compared to M$504 million in 1972 or an average annual increase of 16% in current prices (see Table 3.1.14).

As shown in Table 3.1.14, passenger cars accounted for the largest share of net imports (45%) with trade deficit of $860.3 million, followed by commercial vehicles and motorcycles with 34.0% and 6.6% respectively. These three types of motor vehicles were responsible for about 86% of the total trade deficit in the TE sector. As the imports of these items are mainly in the form of CKD packs from Japan, this implies the heavy out flow of foreign exchange to the other countries, in particular, Japan.

1.2.9 Investment

The number of approvals and total proposed capital investment compiled from MIDA annual reports are used to analyse the industrial investment trend of the TE sector. Table 3.1.15 and Chart 3.1.1 show the distribution and potential employment creation by industry of industrial projects approved over the period 1981 to 1983. During the same period the total number of approvals granted to the TE sector was 66 representing 4.3% of total approvals granted to the manufacturing sector. The total proposed capital investment in the TE sector amounted to M$565.2 million while total employment was 8,8[illegible].

TABLE 3.1.14

MALAYSIA : NET IMPORTS OF TRANSPORT EQUIPMENT INDUSTRY, 1972 TO 1981

SUBCATEGORIES	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
Passenger Vehicles										
($ Million)	200.4	296	405.7	288.5	385.1	566.2	635	549	769.1	860.3
Commercial Vehicles										
($ Million)	77.2	97.7	208	166.9	188.4	222.9	322.5	340	728.9	656.5
Motorcycles										
($ Million)	32.6	55.5	107.4	84.1	66.1	90.4	96.3	114.7	159.2	169.1
Parts & Accessories for passenger & commercial vehicles										
($ Million)	30	39.9	40.3	51.7	58.9	78.4	84.6	93.8	133.8	125.1
Cycles not motorised										
($ Million)	-1.8	0.6	0.09	3.5	5.9	9.5	-0.6	0.3	-0.5	4.6
Parts & Accessories for motorcycles & cycles not motorised										
($ Million)	11.4	14.8	17.7	12	17.9	18.3	13	20.6	19.8	25.5
Locomotives										
($ Million)	25.7	0.9	1	0.3	1.4	1.4	2.7	6.5	5	0.3
Railway coaches, rolling stocks, wagons										
($ Million)	-23	73	18	-8	25	-101	17	5	9	-81
Parts of locomotives coaches, rolling stocks and wagons										
($ Million)	3.4	3.8	2.9	3.9	4.2	2	5.4	6.7	12.7	5.8
Aircrafts										
($ Million)	113.4	22.8	47.7	3.3	3.2	-1.9	5.2	6.9	9.9	5.7
Parts of aircrafts										
($ Million)	22.8	22.9	46.6	34.8	57.6	39.3	66.9	112.8	111	70.3
Total ($ Million)	503.69	540.32	859.73	637	770.84	1007.12	1218.03	1230.73	1929.13	1897.64

SOURCE : Department of Statistics, Annual Statistics of External Trade, Malaysia, Various Years

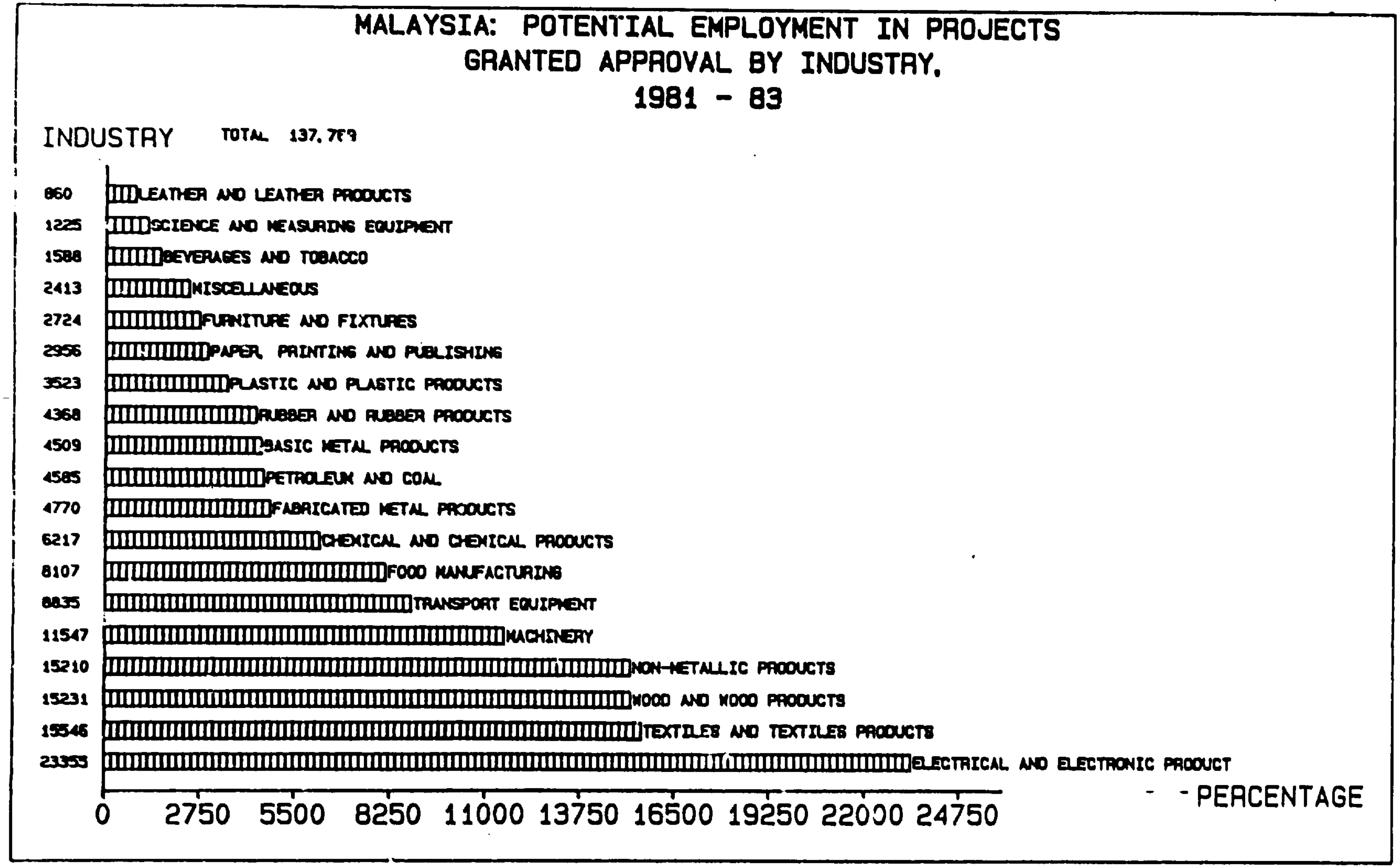
TABLE 3.1.15

MALAYSIA: PROJECT GRANTED APPROVAL BY INDUSTRY 1981-83

INDUSTRY	NUMBER OF APPROVALS					TOTAL PROPOSED CAPITAL INVESTMENT ($ MILLION)				
	1981	1982	1983	CUMULATIVE 1981-83	%	1981	1982	1983	CUMULATIVE 1981-83	%
FOOD	59	34	41	134	8.6	323.9	184.4	61.1	569.4	4.7
BEVERAGES AND TOBACCO	8	10	8	26	1.7	47.0	142.7	13.8	203.5	1.7
TEXTILES AND TEXTILE PRODUCTS	60	29	39	128	8.2	106.2	29.9	65.2	201.3	1.6
LEATHER AND LEATHER PRODUCTS	1	4	2	7	0.5	0.6	6.8	0.8	8.2	0.1
WOOD AND WOOD PRODUCTS	59	51	37	147	9.5	258.1	257.5	81.6	597.2	4.9
FURNITURE AND FIXTURES	10	12	10	32	2.1	14.7	18.3	9.0	42	0.3
PAPER, PRINTING AND PUBLISHING	18	20	15	53	3.4	248.4	38.1	14.1	300.6	2.5
CHEMICALS AND CHEMICAL PRODUCTS	56	45	23	124	8.0	371.5	2,249.6	95.9	2717	22.2
PETROLEUM AND COAL	9	15	11	35	2.3	48.6	396.9	201.5	647	5.3
RUBBER PRODUCTS	38	25	24	87	5.6	152.7	66.6	96.6	315.9	2.6
PLASTIC PRODUCTS	21	24	37	82	5.3	46.3	40.9	98.4	185.6	1.5
NON-METALLIC PRODUCTS	87	57	60	204	13.1	1,586.6	[illegible]	447.5	2408.2	19.7
BASIC METAL PRODUCTS	22	17	17	56	3.6	545.2	[illegible]	90.3	1784.6	14.6
FABRICATED METAL PRODUCTS	49	32	33	114	7.3	98.9	[illegible]	87.1	293.5	2.4
MACHINERY	17	22	31	70	4.5	150.6	107.0	317.8	575.4	4.7
ELECTRICAL AND ELECTRONICS PRODUCTS	45	46	53	144	9.3	207.2	163.6	356.4	727.2	5.9
TRANSPORT EQUIPMENT	24	11	31	66	4.3	224.2	62.5	278.5	565.2	4.6
SCIENTIFIC ANDD MEASURING EQUIPMENT	5	4	3	12	0.8	8.3	5.7	4.5	18.5	0.2
MISCELLANEOUS	7	10	4	31	2.0	9.4	33.5	34.5	77.4	0.6
TOTAL	595	468	479	1,552	100.0	4,448.4	5,434.7	2,354.6	12,237.7	100.0

SOURCE : MALAYSIAN INDUSTRIAL DEVELOPMENT AUTHORITY (MIDA)

CHART 3.1.1


MALAYSIA: POTENTIAL EMPLOYMENT IN PROJECTS
GRANTED APPROVAL BY INDUSTRY,
1981 - 83
INDUSTRY
TOTAL 137,769
860 LEATHER AND LEATHER PRODUCTS
1225 SCIENCE AND MEASURING EQUIPMENT
1588 BEVERAGES AND TOBACCO
2413 MISCELLANEOUS
2724 FURNITURE AND FIXTURES
2956 PAPER, PRINTING AND PUBLISHING
3523 PLASTIC AND PLASTIC PRODUCTS
4368 RUBBER AND RUBBER PRODUCTS
4509 BASIC METAL PRODUCTS
4585 PETROLEUM AND COAL
4770 FABRICATED METAL PRODUCTS
6217 CHEMICAL AND CHEMICAL PRODUCTS
8107 FOOD MANUFACTURING
8835 TRANSPORT EQUIPMENT
11547 MACHINERY
15210 NON-METALLIC PRODUCTS
15231 WOOD AND WOOD PRODUCTS
15546 TEXTILES AND TEXTILES PRODUCTS
23353 ELECTRICAL AND ELECTRONIC PRODUCT
0 2750 5500 8250 11000 13750 16500 19250 22000 24750
PERCENTAGE

The TE sector ranked ninth and sixth in terms of total proposed capital investment and employment respectively during the period 1981 to 1983.

The average investment since proposed for the TE sector is M$8.6 million which is slightly higher than the M$7.9 million of the total manufacturing sector. The potential capital per labour ratio is lower than total manufacturing projects (M$63,973 per worker versus $88,800 per worker). However, comparisons of the actual investment and capital per labour ratio in Table 3.1.6 show that the proposed figures are very much higher than the actual ones. This indicates the sector's potential for expansion in terms of scale of operation and capital intensity.

Table 3.1.16 shows the breakdown of fixed assets invested in the various sub-groups of the TE sector for 1973 and 1978. As can be seen from the table, total fixed assets for the TE sector (excluding shipbuilding and locomotive repairs) amounted to M$108 million in 1978. About 55% of the total assets was in the form of land and building while another 37% was invested in machinery and transport equipment. Amongst the various sub-groups, motor vehicle industry (both the assembly and the component parts manufacturing industry) is the most heavily invested industry with total fixed assets of about $88 million, of which 56% were for land and building.

TABLE 3.1.16

PENINSULAR MALAYSIA : NET VALUE OF FIXED ASSETS BY TYPE
IN TRANSPORT EQUIPMENT SECTOR, 1973 AND 1978 (M$'000)

	MIC CODE	LAND & BUILDING		TRANSPORT EQUIPMENT		MACHINERY & EQUIPMENT		OTHER CAPITAL EXPENDITURE		TOTAL FIXED ASSETS	
		1973	1978	1973	1978	1973	1978	1973	1978	1973	1978
MANUFACTURING OF MOTOR VEHICLE BODIES	38431	362	1,226	318	707	590	1,349	-	174	1268	3455
MANUFACTURING AND ASSEMBLY OF MOTOR VEHICLES	38432	19,232	37,477	595	1,207	6,583	23,147	-	797	26,409	62,659
MANUFACTURING OF MOTOR VEHICLE PARTS AND ACCESSORIES	38439	1,681	11,839	117	1,137	1,040	11,116	-	985	2,838	25,077
MANUFACTURING AND ASSEMBLY OF MOTORCYCLES & PARTS	38441	2,052	3,857	112	207	907	N.A.	-	301	3,072	7,140
MANUFACTURING AND ASSEMBLY OF BICYCLES, TRICYCLES, TRISHAWS & PARTS	38449	3,711	5,067	295	364	2,895	3,763	-	442	6,901	9,636
TOTAL FOR DIVISION		27,038	59,466	1,437	3,622	12,015	39,375	-	2,699	40,488	107,967

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, 1973
AND SURVEY OF MANUFACTURERS INDUSTRIES, 1978

1.3 Overall Position In Selected Reference Countries

Table 3.1.17 provides a comparison of the transport equipment sector's contributions to GDP, manufacturing value added, national employment and other indicators in various reference countries. Comparisons with these countries revealed that Malaysia's transport equipment sector is very small. Malaysia's position is almost similar to Reference Group I countries of Indonesia and Philippines in that the sector occupies rather unimportant positions in the national economy and the manufacturing sector. In relation to countries of Indonesia, Philippines, Singapore and India, Malaysia's transport equipment sector is positioned second and fifth in terms of contributions to total GDP and manufacturing sector value added respectively.

On the other hand, the sector is well established in the industrialized Reference Groups III and IV countries with a share in GDP between 2.0 percent and 4.5 percent and share in manufacturing value added ranging from 9.7 % to 12.0 %.

1.3.1 Total Output

Amongst the reference countries, the advanced industrial countries are ahead of their developing counterparts in terms of output value. For instance, Japan is the leading shipbuilding nation in the world while the main producers of railway equipment are the United States, West Germany, Japan and Sweden. In addition, the United States

TABLE 3.1.17

POSITIONS OF TRANSPORT EQUIPMENT SECTOR IN MALAYSIA AND REFERENCE COUNTRIES, 1981

	% CONTRIBUTION TO GDP	% CONTRIBUTION TO TOTAL MANUFACTURING SECTOR	% CONTRIBUTION TO NATIONAL EMPLOYMENT	% CONTRIBUTION TO EMPLOYMENT MANUFACTURING OF SECTOR	PRODUCTION GROWTH RATE PAST 10 YEARS	VALUE ADDED US $ MILLION
MALAYSIA ('81)	0.79%	4.69%	0.41%	3.68%	21.30%	191.40
REFERENCE GROUP I						
INDONESIA ('79)	0.22	5.32	-	3.14	61.00	110.3
PHILIPPINES ('77)	0.39	4.81	0.15	3.29	27.2	81.6
THAILAND ('77)	-	-	-	-	-	-
REFERENCE GROUP II						
BRAZIL ('77)	2.18	7.25	2.00	5.69	47.9	3,578.5
SOUTH KOREA ('79)	1.88	5.99	0.88	5.67	42.5	1,139.0
SINGAPORE ('80)	4.51	12.36	2.55	9.54	20.00	495.0
TAIWAN	-	-	-	-	-	951.3
INDIA ('77/78)	0.55	6.92	-	6.09	-	564.5
REFERENCE GROUP III						
AUSTRALIA ('80)	2.00	9.7	2.13	11.52	11.2	2,180.8
CANADA ('79)	2.78	11.48	1.83	10.2	16.4	6,308.7
REFERENCE GROUP IV						
UNITED KINGDOM ('79)	3.91	11.16	3.58	12.8	14.4	3,492.6
JAPAN ('80)	3.06	9.72	1.57	8.45	13.3	31,851.4
USA ('79)	3.64	11.63	2.15	10.62	12.8	86,500.0

SOURCE : (1) Dept. of Statistics, Census of Manufacturing Industries, Malaysia,
(2) UN, Yearbook of Industrial Statistics, Vol. I,
(3) UN, National Accounts Statistics,
(4) Ministry of Finance, Economic Report, Malaysia

is the leading manufacturer of aircraft in the world, producing 17,900 commercial passenger and cargo planes in 1979.

In the motor vehicle manufacturing/assembly industry, Japan and the United States are the largest producers in the world. In 1982, Japan produced a total of about 11 million units followed by the United States with 7 million units (excluding motorcycles and scooters). Other major producers are West Germany, United Kingdom, Sweden, Canada and Australia. Japan and the United States are also the leading manufacturers of bicycles, producing about 7 million bicycles each in 1980... Of the other reference countries, India, West Germany and the United Kingdom are also important bicycle manufacturers.

Table 3.1.18 presents the transport equipment sector's average growth rates for Malaysia and reference countries. As can be seen from the table, the highest growth rates in output value are recorded in countries of Indonesia (51.7%), Taiwan (36.0%) and South Korea (35.7%). Amongst the reference countries, Malaysia is fourth with an impressive growth rate of 25.9 percent per annum although this was achieved from a smaller output base.

1.3.2 Productivity and Factor Intensity

Some interesting production characteristics of the TEI of various countries can be observed although the data are of different years.

TABLE 3.1.18

TRANSPORT EQUIPMENT INDUSTRY'S AVERAGE ANNUAL GROWTH RATE IN MALAYSIA AND REFERENCE COUNTRIES

Country	Period	Value of Output (US$ Million)		Average Annual Growth Rate (%)
		Base Year	End Year	
I				
Malaysia	1970 - 1979	44.2	351.8	25.9
Indonesia	1970 - 1979	8.2	349.7	51.7
Philippines	1970 - 1977	103.5	457.3	23.6
II				
Singapore	1970 - 1980	107.8	954.3	24.4
S. Korea	1970 - 1979	235.6	3,667.3	35.7
Taiwan	1971 - 1980	188.7	3,009.4	36.0
India	1970 - 1978	1,166.5	2,433.1	9.6
Brazil	1970 - 1977	2,125.3	10,452.6	25.5
III				
Australia	1970 - 1980	2,419.4	7,122.8	11.4
Canada	1970 - 1979	6,992.8	24,551.8	15.0
IV				
Sweden	1970 - 1980	2,236.5	8,582.4	14.4
Japan	1970 - 1980	19,952.8	110,073.2	18.6
USA	1970 - 1980	73,650.0	218,700.0	12.8
W. Germany	1970 - 1980	13,650.0	70,913.8	18.3
United Kingdom	1970 - 1979	2,090.8	7,975.1	16.0

Source : UN, Yearbook of International Industrial Statistics, Various Years

The labour productivity in the TE sector in Malaysia is considered quite high in comparison with other reference countries. As can be seen in Table 3.1.19, the value added per worker for Malaysia in 1978 was US$5,588 which was higher than Indonesia (US$4,069 in 1979), Philippines (US$3,787 in 1977), India (US$1,586 in 1977) and the U.K. (US$3,942 in 1979). The overall labour productivity in the industrialised countries of Reference Groups III and IV was very high with value added per worker for each country ranging from US33,000 to US$41,000.

However, in monetary terms, the labour productivity in 1978 of Malaysia was only 1.22 which was the lowest as compared to other reference countries. This indicates that for every one US dollar paid to the workers there was only a return of US$1.22 value added. This means that there is only an addition of US$0.22 to be distributed in the form of profits or capital allowances. The low value added per US$ wage of Malaysia in 1978 can be attributed to the higher wage rates paid to the workers. However, the value added per US$ wage had in fact increased very rapidly to 2.91 in 1981 ranking Malaysia third among the reference countries.

Productivity in terms of value added per US$ wage was higher in most of the developing countries. The productivity of the developing countries of Malaysia (1981 figures), Indonesia and Philippines and the NICs (except India) ranged from 2.43 to 4.42. On the other hand, the value added per US$ wage in the industrialised countries of Reference Groups III and IV was between 1.57 and 2.64. The

TABLE 3.1.19

INDUSTRY GROUP : TRANSPORT EQUIPMENT

ECONOMIC INDICATOR : PRODUCTIVITY

Country	Year	Value Added (US $ Million)	Sector Employment (No.)	Value Added per Employee (US $)	Wages (US $ Million)	Wages per Employee (US $)	Value added per US $ wage
Malaysia	1981	191.398	21,321	8,997.0	65.818	3,087.0	2.91
Indonesia	1979	110.262	27,100	4,068.7	28,459.000	1,050.1	3.87
Thailand							
Philippines	1977	81.591	25,600	3,187.1	30.664	1,197.8	2.66
Singapore	1980	495.049	27,400	18,067.5	169.765	6,195.8	2.92
Australia	1980	2,180.781	133,000	16,396.8	1,386.573	10,425.4	1.57
Korea	1979	1,139.049	120,100	39,484.2	467.768	3,894.8	2.43
Japan	1980	31,851.400	873,000	36,485.0	12,071.094	13,827.1	2.64
Taiwan							
Brazil	1977	3,578.501	225,000	15,904.4	809.830	3,599.2	4.42
Canada	1979	6,308.690	190,000	33,203.6	2,978.487	15,676.2	1.99
Sweden	1979	3,888.409	116,900	33,262.7	1,897.106	16,228.4	2.05
UK	1979	3,492.847	886,000	3,942.0	2,036.199	2,298.2	1.71
U.S.A.	1979	86,550.000	2,088,000	41,451.1	41,480.000	19,865.9	2.09
W. Germany	1978	29,005.277	825,000	35,157.9	13,800.657	16,728.1	2.1
India	1977	564.481	356,000	1,585.6	346.264	972.6	1.63

SOURCE : 1) DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, 1981
2) UN, YEARBOOK OF INDUSTRIAL STATISTICS VOL. 1, 1981

higher value added per US$ wage in the developing countries was due to the lower wage level in these countries. In India, the low value added per US$ wage is attributed to the low value added per labour.

1.3.3 Employment

With the exception of the Philippines, the Malaysian TE sector's share in national employment is far below that of the other reference countries. In these countries, its share in national employment ranged between 0.9% to 3.6% in 1981 as compared to 0.4% in Malaysia. In terms of manufacturing employment, however, Malaysia's share of about 3.7% is comparable to that of the Reference Group 1 countries, namely, Indonesia and the Philippines.

1.3.4 Total Exports

Compared to the Reference Group II countries of Singapore, South Korea, Brazil and India (with TE exports comprising between 2.3% and 8.8% of total exports in 1981), the share of the industry's exports in total exports of Malaysia and Reference Group I (Indonesia, Thailand and Philippines) is relatively insignificant, ranging from 0.1% to 0.8%. With the exception of Australia, transport equipment exports constituted between 11.0% and 25.0% of total exports in the industrialized Reference Groups III and IV countries. (Refer to Table 3.1.20).

TABLE 3.1.20

TRANSPORT EQUIPMENT EXPORTS AND ITS CONTRIBUTION TO TOTAL EXPORTS AND MANUFACTURING OUTPUT

	COUNTRY	YEAR	EXPORTS (US$ MILLION)	SHARE IN TOTAL EXPORTS (%)	SHARE IN MANUFACTURING OUTPUT (%)
I	Malaysia	1981	36.0	0.31	0.23
	Indonesia	1979	15.2	0.10	0.21
	Thailand	1979	11.3	0.21	-
	Philippines	1979	36.3	0.79	-
		1977	13.8	-	0.15
II	Singapore	1980	452.5	2.33	2.96
	S. Korea	1980	1,150.1	6.58	-
		1979	1,050.4	-	1.90
	India	1979	169.1	2.42	-
	Brazil	1980	1,341.9	8.80	-
		1977	445.5	-	0.36
III	Australia	1980	510.7	2.34	0.88
	Canada	1980	10,578.4	16.76	-
		1979	10,717.1	-	6.99
IV	Sweden	1980	4,204.9	13.60	5.77
	Japan	1979	25,720.7	24.96	3.01
	USA	1980	28,583.8	13.18	-
		1979	25,542.4	-	1.47
	West Germany	1980	31,153.3	16.21	4.95
	U. Kingdom	1979	10,528.2	11.62	13.21

Source : 1) Department of Statistics, Annual Statistics of External Trade
2) Department of Statistics, Census of Manufacturing Industries, 1981
3) UN, Yearbook of International Trade Statistics
4) UN, Yearbook of Industrial Statistics, Vol. I

The TE exports and its contribution to total exports and manufacturing output are presented in Table 3.1.20. It is apparent that the TE sector does not contribute significantly to the foreign exchange earnings of both Malaysia and Reference Group I countries. On the other hand, the sector is a major contributor to the foreign exchange earnings of the industrialized Reference Groups III and IV countries.

Similarly, in relation to manufacturing output, the sector's exports are very small in Malaysia, Indonesia and Philippines ranging from 0.15% to 0.23% as compared to 0.4% to 3.0% in the case of Reference Group II countries and 0.9% to 13.0% for the Industrialized Groups III and IV countries.

1.3.5 Total Imports

Generally, most reference countries import substantial amount of transport equipment ranging from US$ 312.8 million to US$ 570.8 million for countrie of India, Thailand and the Philippines and from US$11,344.3 million to US$11,931.6 million in the cases of United Kingdom, West Germany and Canada. The USA imports the largest quantity of transport equipment amounting to US$ 30,489.5 million in 1980. Amongst the reference countries shown in Table 3.1.21 Malaysia's import value of transport equipment (being within the US$ 1,000 million mark) is comparable to countries of Indonesia, Singapore and South Korea.

TABLE 3.1.21

TRANSPORT EQUIPMENT IMPORTS AND ITS SHARE IN TOTAL IMPORTS

Country	Year	Imports (US$ Million)	Share in Total Imports (%)
Malaysia	1981	1,026.4	8.89
Indonesia	1980	1,018.1	9.40
Thailand	1979	470.3	6.57
Philippines	1980	570.8	8.63
Singapore	1980	1,650.8	6.88
S. Korea	1980	1,051.4	4.73
India	1979	312.8	3.43
Brazil	1980	841.9	3.37
Australia	1980	2,081.9	10.48
Canada	1980	11,931.6	20.68
Sweden	1980	2,261.2	6.76
Japan	1979	1,778.9	1.61
USA	1980	30,489.5	12.18
W. Germany	1980	11,692.6	6.24
U. Kingdom	1979	11,344.3	11.03

Sources : 1) Department of Statistics, Annual Statistics of External Trade, 1981

2) UN, Yearbook of International Trade Statistics, 1981

1.4 Inter-Industry Linkage of the Transport Equipment Sector

Inter-industry linkage structure is the network of intermediate products passing from one industry to another or the final products sold to consumers from both local and external sources.' The 1975 International Input-Output Table for ASEAN countries (IDE 1982, latest data available) is used to estimate the linkages between the TE sector inclusive of shipbuilding and locomotive repairs) and the other sectors in the Malaysian economy as well as the rest of the world. Tables 3.1.22 and 3.1.23 present the details of the input-output table of the TE sector.

As can be seen in Table 3.1.22, total input (or total output) in the TEI amounted to $154.5 million. Inter-industry purchases of raw materials and services from other sectors in the national economy, and imported materials accounted for 40% and 27% of the total input value respectively. Import duties and tax, and freight and insurance amounted to $7.4 million (5%). Value added (primary inputs or payments to the primary factors such as wages and salaries, and profits) was estimated at $44.1 million (29% of total input cost).. Labour cost forms about 30% of the value added or 9% of the total output value.

Transport equipment, rubber product and metal product industries constituted about 68% or $42 million of the total inter-industry purchases. This indicates that the TE sector itself is dependent on its ancillary industries within the TE

TABLE 3.1.22

INPUT STRUCTURE OF TRANSPORT EQUIPMENT SECTOR, MALAYSIA 1975

CODE NUMBER	SECTOR	INPUT TABLE (US $000)	COEFFICIENT
	a) INPUT FROM INDUSTRIES		
AN 004	FORESTRY	5	0.000
AN 007	OTHER MINING	5	0.000
AN 009	TEXTILE, LEATHER & ITS PRODUCTS	1,100	0.007
AN 010	LUMBER & WOODEN PRODUCTS	876	0.006
AN 011	PULP, PAPER & PRINTING	71	0.001
AN 012	CHEMICAL PRODUCTS	757	0.005
AN 013	PETROLEUM & ITS PRODUCTS	1,327	0.009
AN 014	RUBBER PRODUCTS	13,647	0.088
AN 015	NON-METALLIC MINERAL PRODUCTS	213	0.001
AN 016	METAL PRODUCTS	9,070	0.059
AN 017	MACHINERY	1,986	0.013
AN 018	TRANSPORT EQUIPMENT	19,302	0.125
AN 019	OTHER MANUFACTURING PRODUCTS	555	0.004
AN 020	ELECTRICITY, GAS & WATER SUPPLY	1,061	0.007
AN 021	CONSTRUCTION	327	0.002
AN 022	TRADE & TRANSPORT	9,523	0.062
AN 023	SERVICES	1,654	0.011
AN 290	SUB-TOTAL INPUTS FROM INDUSTRIES	61,479	0.398
	b) IMPORTS		
AI 290	INDONESIA	[illegible]	0.000
AP 290	PHILIPPINE	[illegible]	0.000
AS 290	SINGAPORE	1,399	0.009
AT 290	THAILAND	68	0.000
AJ 290	JAPAN	17,842	0.116
AU 290	U.S.A.	3,933	0.026
CW 004	IMPORT ELSEWHERE	18,702	0.118
	SUB-TOTAL IMPORTS	41,491	0.269
BF 001	c) FREIGHT & INSURANCE	1,483	0.010
DT 001	d) IMPORT DUTIES & TAX	5,914	0.083
ET 290	GRAND TOTAL	110367	0.714
	e) PRIMARY INPUTS		
VV 301	WAGE & SALARY	13,434	0.087
VV 302	OPERATING SURPLUS	22,010	0.142
VV 303	DEPRECIATION	6,296	0.041
VV 304	INDIRECT TAXES LESS DEPRECIATION	2,373	0.015
VV 309	VALUE ADDED TOTAL	44,113	0.286
XX 600	TOTAL INPUT	154,480	1.000

SOURCE : Institute of Developing Economic, Input - Output-Table for ASEAN Countries, Japan, 1982.

TABLE 3.1.23

OUTPUT STRUCTURE OF TRANSPORT EQUIPMENT SECTOR, MALAYSIA 1975

CODE NUMBER	SECTOR	OUTPUT TABLE (US $000)	COEFFICIENT
	a) OUTPUT FROM INDUSTRIES		
AM 001			
AM 002	PADDY	86	0.001
AM 003	OTHER AGRICULTURE	1,167	0.008
AM 004	LIVESTOCK	82	0.001
AM 005	FORESTRY	42	0.000
AM 007	FISHERY	434	0.003
AM 008	OTHER MINING	508	0.003
AM 009	FOOD, BEVERAGE & TOBACCO	1,016	0.007
AM 010	TEXTILE, LEATHER & ITS PRODUCTS	300	0.002
AM 011	LUMBER & WOODEN PRODUCTS	1,106	0.007
AM 012	PULP, PAPER & PRINTING	402	0.003
AM 013	CHEMICAL PRODUCTS	318	0.002
AM 014	PETROLEUM & ITS PRODUCTS	138	0.001
AM 015	RUBBER PRODUCTS	323	0.002
AM 021	NON-METALLIC MINERAL PRODUCTS	498	0.003
AM 016	METAL PRODUCTS	606	0.004
AM 017	MACHINERY	1,147	0.007
AM 018	TRANSPORT EQUIPMENT	19,302	0.125
AM 019	OTHER MANUFACTURING PRODUCTS	113	0.001
AM 020	ELECTRICITY, GAS & WATER SUPPLY	56	0.000
AM 021	CONSTRUCTION	402	0.003
AM 022	TRADE & TRANSPORT	19,337	0.125
AM 023	SERVICES	2,200	0.014
AM 290	SUB-TOTAL OF INTERMEDIATE OUTPUT TO INDUSTRIES	49,583	0.321
	b) EXPORTS OF INTERMEDIATE GOODS		
AI 290	INDONESIA	494	0.003
AP 290	PHILIPPINE	-	-
AS 290	SINGAPORE	1,718	0.011
AT 290	THAILAND	56	0.000
AJ 290	JAPAN	-	-
AK 290	KOREA	-	-
AU 290	U.S.A.	-	-
	SUB-TOTAL EXPORTS OF INTERMEDIATE GOODS	2,268	0.014
ST 290	TOTAL INTERMEDIATE OUTPUT LOCAL CONSUMPTION OF FINAL GOODS	51,851	0.336
	c) EXPORTS OF FINAL DEMAND		
FI 309	INDONESIA	541	0.004
FM 309	MALAYSIA	78,965	0.511
FP 309	PHILIPPINES	-	-
FS 309	SINGAPORE	984	0.006
FT 309	THAILAND	180	0.001
FJ 309	JAPAN	-	-
FK 309	KOREA	-	-
FJ 309	U.S.A.	-	-
GW 320	REST OF THE WORLD	27,571	0.179
WX 400	CHANGE IN TRANSIT STOCK	(5,612)	(0.036)
XX 600	TOTAL OUTPUT	154,480	1.000

SOURCE : Institute of Developing Economies, Input - Output Table for ASEAN Countries, Japan, 1982

sector. As a substantial portion of motor vehicle parts and accessories are made from rubber or metal products, it is not surprising to find large contributions in the inter-industry purchases.

Energy consumption does not have a high coefficient in the input structure of the TEI sector. As can be seen in the table, only an insignificant amount of $1.3 million or less than 2% was from the petroleum and other product sector (mainly fuel oil), and electricity, gas and water supply. This illustrates the low energy-dependency of the TE sector as compared to other sectors such as the non-metallic mineral sector which consumed about 16% of the total output value.

The industry also incurs high trade and transport service cost accounting for slightly more than 6% of the total input cost (or 15% of the input cost from industries).

There is very little inter-industry linkage between other sectors, viz, forestry, mining, textile, wood products, pulp, paper and printing, chemical products, non-metallic mineral products, and the construction sector.

The bulk of raw materials or component imports come from Japan ($17.8 million or 43% of total imports), followed by the U.S (9.5%) and Singapore (3.4%).

The output structure of the TE industry is shown in Table 3.1.23. As indicated in the table, intermediate products amounted to $51.8 million while the rest of the output comprised end products satisfying final demand. In terms of contribution to total output value, intermediate products and end-products constitute 34% and 70% respectively. In addition, there was a negative change in transit stock which amounted to $5.6 million (or 4% of total output value).

About 80% of the the intermediate products were delivered to the TE sector and the trade and transport sector. An amount of $2.3 million or less than 5% of the intermediate products (1.4% of the total output value) were exported. The major importers of Malaysian TE products are Singapore (76%) and Indonesia (22%).

The major portion of the final products was consumed locally which accounted for 51% of the total output value or 73% of the final demand. Exports of final products are mainly to Singapore (3.4%), Indonesia (1.8%), Thailand (0.6%) and the remainder to the rest of the world.

The Inverse Table Coefficients for the TE sector in Malaysia for 1975 is presented in Table 3.1.24. The multiplier effect for the TE sector is estimated at 2.1 times. This indicates that every $1 million increase in the TE sector will generate $2.1 million of total output value of which $1.64 million is generated within the national economy and $0.464 million is expected to be "leaked" out of the country in the form of import demand. The direct impact to the TEI itself is estimated at $1.14 million. For rubber and metal product industry, the contribution is $0.106 million and $0.081 million respectively. The amount to trade and transport sector is $0.091 million. The

TABLE 3.1.24

INVERSE TABLE MULTIPLIER FOR TRANSPORT EQUIPMENT SECTOR, MALAYSIA 1975

CODE NUMBER	SECTORS	COEFFICIENT
AM 001	PADDY	0.000
AM 002	OTHER AGRICULTURE	0.053
AM 003	LIVESTOCK	0.000
AM 004	FORESTRY	0.003
AM 005	FISHERY	0.000
AM 006	CRUDE PETROLEUM & NATURAL GAS	0.000
AM 007	OTHER MINING	0.026
AM 008	FOOD, BEVERAGE & TOBACCO	0.004
AM 009	TEXTILE, LEATHER & ITS PRODUCTS	-0.013
AM 010	LUMBER & WOODEN PRODUCTS	0.009
AM 011	PULP, PAPER & PRINTING	0.002
AM 012	CHEMICAL PRODUCTS	0.010
AM 013	PETROLEUM & ITS PRODUCTS	0.022
AM 014	RUBBER PRODUCTS	0.106
AM 015	NON-METALLIC MINERAL PRODUCTS	0.003
AM 016	METAL PRODUCTS	0.081
AM 017	MACHINERY	0.017
AM 018	TRANSPORT EQUIPMENT	1.144
AM 019	OTHER MANUFACTURING PRODUCTS	0.006
AM 020	ELECTRICITY, GAS & WATER SUPPLY	0.012
AM 021	CONSTRUCTION	0.004
AM 022	TRADE & TRANSPORT	0.091
AM 023	SERVICES	0.031
AM 290	SUB-TOTAL	1.638

	b) IMPORTS OF INTERMEDIATE GOODS	
AI 290	INDONESIA	0.003
AP 290	PHILIPPINES	0.001
AS 290	SINGAPORE	0.021
AT 290	THAILAND	0.002
AJ 290	JAPAN	0.362
AK 290	KOREA	0.001
AU 290	U.S.A.	0.074
	SUB-TOTAL	0.464
ET 290	GRAND TOTAL	2.101

SOURCE : Institute of Developing Economies, Input - Output Table for ASEAN Countries, Japan, 1982

outflow of foreign exchange to other countries includes Japan ($0.362 million), the U.S. ($0.074 million) and Singapore ($0.021 million).

1.4.1 Comparison of Inter-industry Linkages Of Selected Countries

The input coefficient (for both local and imported raw material input) does not vary considerably amongst developing countries (ASEAN) and the industrialised countries. In 1975 the input coefficient for Malaysia was 0.67 as compared to 0.48 for Indonesia, 0.67 for Philippines, 0.65 for Thailand, 0.67 for South Korea, 0.63 for the U.S., 0.54 for Singapore and 0.68 for Japan. This contrasts with the findings of Hoffman and Tan (1980) where the input coefficient for developing countries is higher than the developed counterparts. This discrepancy can be attributed to the conceptualisation and computation problems. Because of this, we could only make tentative conclusions from the data above.

However, an interesting point should be noted from Table 3.1.25. The developing countries in the ASEAN region generally use less inter-industry purchases (coefficient between 0.2 to 0.45) than the industrialised countries of Japan, the U.S and Korea (coefficient between 0.45 to 0.67). This indicates that the developing countries import a lot of their raw materials or inputs, namely in the form of intermediate or semi-finished goods) from other countries, particularly, Japan and the U.S. On the other hand, imports of the industrialised

TABLE 3.1.25

INPUT STRUCTURE OF TRANSPORT EQUIPMENT SECTOR

	MALAYSIA M18	INDONESIA I18	PHILIPPINES P18	SINGAPORE S18	THAILAND T18	JAPAN J18	KOREA U18	U.S.
009	0.007	0.0006	0.0003	0.0001	0.0064	0.0025	0.0024	0.0139
013	0.009	0.0038	0.0056	0.0005	0.0122	0.0019	0.0098	0.0046
014	0.088	0.0377	0.0109	0.0111	0.0996	0.0347	0.0213	0.0144
016	0.059	0.0069	0.0340	0.0512	0.0307	0.1217	0.1086	0.1890
017	0.013	0.0055	0.0041	0.0033	0.0448	0.0990	0.0476	0.0978
018	0.125	0.0405	0.1280	0.0062	0.0594	0.2211	0.0912	0.1011
020	0.007	0.0053	0.0008	0.0003	0.0090	0.0078	0.0115	0.0060
022	0.062	0.0016	0.2081	0.1326	0.0978	0.0606	0.0852	0.0650
023	0.011	0.0135	0.0166	0.0020	0.0137	0.0715	0.0394	0.0500
290	0.398	0.2099	0.4475	0.2236	0.4040	0.6638	0.4529	0.5844
290 S	0.151	0.2023	0.1603	0.2352	0.1736	0.0062	0.1659	0.0128
CW 290	0.118	0.0636	0.0619	0.0829	0.0690	0.0051	0.0468	0.0364
BF 001	0.010	0.0137	0.0088	0.0190	0.0078	0.0004	0.0115	0.0010
DT 001	0.038	0.1209	0.0691	0.0018	0.0755	0.0004	0.0190	0.0030
VV 309	0.286	0.3516	0.2521	0.4375	0.2702	0.3240	0.3039	0.3623

NOTES :

009 - TEXTILE, LEATHER & ITS PRODUCTS
013 - PETROLEUM & ITS PRODUCTS
014 - RUBBER PRODUCTS
016 - METAL PRODUCTS
017 - MACHINERY
018 - TRANSPORT EQUIPMENT
020 - ELECTRICITY, GAS & WATER SUPPLY
022 - TRADE & TRANSPORT
023 - SERVICES
290 - SUB-TOTAL OF INPUT FROM INDUSTRIES
290 S - IMPORTS FROM ASEAN, JAPAN & U.S.A. & KOREA
CW 290 - IMPORTS FROM ELSEWHERE
BF 001 - FREIGHT & INSURANCE
DT 001 - IMPORT DUTIES & TAX
VV 309 - VALUE ADDED TOTAL (PRIMARY INPUT)

SOURCE : INSTITUTE OF DEVELOPING ECONOMIES, <u>INPUT-OUTPUT TABLE FOR ASEAN COUNTRIES</u>, JAPAN, 1982 countries, such as Japan and the U.S. only represent a negligible coefficient of less than 0.05.

Primary input or value added (including salaries and wages, depreciation and profits) is slightly higher in the developed countries than the ASEAN countries (excepting Singapore and Indonesia).

The final demand of the industry in the selected countries (except Japan) comprises more than half of the total output value. The major portion of the final products is consumed locally, with Japan, Korea and the U.S. exp rting about 26%, 17% and 14% of the total output value respectively. Exports of both final and intermediate products from the developing countries are quite insignificant (Table 3.1.26).

A comparison of the forward and backward inter-industry linkages for Malaysia's TE sector with the selected countries is illustrated in Table 3.1.27. Amongst the selected countries, Japan has the highest linkage coefficient of 2.92, followed by the U.S (2.06) and Korea (2.01). On the other hand, the linkage coefficient is the lowest in Malaysia, indicating that the inter-industry linkage is relatively weaker than other countries. This implies that the transport equipment sector in Malaysia in 1975 is still relatively undeveloped compared to other selected countries.

On the other hand, backward linkage is stonger than the forward linkage in most countries with the exception of Japan. This means that the TEI creates

TABLE 3.1.26

OUTPUT STRUCTURE OF TRANSPORT EQUIPMENT SECTOR

	MALAYSIA M18	INDONESIA I18	PHILIPPINES P18	SINGAPORE S18	THAILAND T18	JAPAN J18	KOREA U18	U.S.
002	0.008	0.0018	0.0001	0.0000	0.0044	0.0000	0.0007	0.0002
008	0.007	0.0052	0.0011	0.0002	0.0054	0.0000	0.0047	0.0006
010	0.007	0.0003	0.0002	0.0001	0.0054	0.0000	0.0004	0.0001
017	0.007	0.0004	0.0003	0.0033	0.0018	0.0007	0.0020	0.0035
018	0.125	0.0405	0.1280	0.0062	0.0594	0.2211	0.0916	0.1011
022	0.125	0.2127	0.1787	0.0197	0.1702	0.1999	0.1047	0.0182
023	0.014	0.0121	0.0252	0.0428	0.0212	0.0137	0.0140	0.0352
290	0.321	0.3207	0.3509	0.2010	0.3207	0.4533	0.2547	0.1667
290S	0.014	0.0002	0.0001	0.0230	0.0003	0.0202	0.0009	0.0040
F309	0.511	0.6738	0.6184	0.5231	0.6384	0.2697	0.5604	0.6838
F309S	0.011	0.0000	0.0003	0.0684	0.0003	0.0583	0.0029	0.0039
GW320	0.179	0.0042	0.0042	0.0819	0.0367	0.1971	0.1715	0.1414
HX400	(0.036)	0.0006	0.0258	0.1023	0.0036	0.0013	0.0096	0.0002

NOTES:
002 - OTHER AGRICULTURE
008 - FOOD, BEVERAGES & TOBACCO
010 - LUMBER & WOODEN PRODUCTS
017 - MACHINERY
018 - TRANSPORT EQUIPMENT
022 - TRADE & TRANSPORT
023 - SERVICES
290 - SUB-TOTAL OF INTERMEDIATE PRODUCTS TO INDUSTRIES
290S - EXPORT TO ASEAN, JAPAN, KOREA & U.S.A.
F309 - LOCAL DEMAND
F309S - EXPORT OF FINAL DEMAND TO ASEAN, JAPAN, KOREA & U.S.
GW320 - EXPORT OF FINAL DEMAND TO THE REST OF THE WORLD
HX400 - CHANGE IN IN-TRANSIT STOCK

SOURCE : INSTITUTE OF DEVELOPING ECONOMIES, INPUT - OUTPUT TABLE FOR ASEAN COUNTRIES, JAPAN, 1982

TABLE 3.1.27

LINKAGE COEFFICIENT FOR MALAYSIA'S TRANSPORT EQUIPMENT SECTOR & OTHER SELECTED REFERENCE COUNTRIES, 1975

COUNTRY	TRANSPORT EQUIPMENT SECTOR LINKAGE COEFFICIENT			ALL	
	BACKWARD (ALPHA)	FORWARD (BETA)	TOTAL	ALPHA	BETA
MALAYSIA	1.163	0.674	1.837	0.874	0.826
INDONESIA	1.081	0.757	1.838	0.886	0.840
PHILIPPINES	1.215	0.695	1.910	0.952	0.867
SINGAPORE	1.114	0.786	1.900	1.040	0.850
THAILAND	1.193	0.711	1.904	0.910	0.850
JAPAN	1.435	1.483	2.918	1.159	1.559
KOREA	1.334	0.679	2.013	1.075	0.925
U.S.A.	1.218	0.837	2.055	1.104	1.284

SOURCE : Institute of Developing Economies, Input - Output Table for ASEAN Countries, Japan, 1982

demand for the required inputs via backward linkages, for instance through the motor vehicle parts and accessories. The forward linkage will be in the trade and transport industry.

The inverse table multiplier for the manufacturing sector is presented in Table 3.1.28. In 1975, the average multiplier effect for the manufacturing sector in Malaysia was estimated at 1.79 times, of which 13% of the output generated was leaked out to other countries in the form of imports of raw materials or intermediate goods. This leakage was rather high as compared to other industrialised countries of Japan (3.4%) and the U.S (1.2%). It was also observed that Korea had higher leakage than Malaysia in 1975. However, this scenario for Korea will be changed, especially with the recent vast development in the manufacturing sector.

Amongst the industries in the manufacturing sector in Japan, the TE sector experienced the highest multiplier effect of 2.6 times with a minimal leakage effect of 1.7%. In the case of the U.S, the TE sector ranked second after food, beverage and tobacco industry. Although the multiplier effect of the Malaysia's TE sector was the highest amongst all the industries of the manufacturing sector, the relatively higher leakage had resulted in the lower output generated within the national economy.

As can be seen in Table 3.1.29, the impact of the multiplier effect on the TE sector was seen in the TEI itself which ranged from 1.01 times (Singapore) to 1.3 times (Japan). The effect of backward linkages on the rubber product manufacturing

TABLE 3.1.28

INVERSE TABLE MULTIPLIER FOR MANUFACTURING SECTOR, 1975

CODE	SECTORS	KOREA			JAPAN			U.S.			MALAYSIA		
		(A)	(B)	A/B(100)	(A)	(B)	A/B(100)	(A)	(B)	A/B(100)	(A)	(B)	A/B(100)
008	Food, Beverage and Tobacco	1.960	2.210	88.69	2.243	2.385	94.05	2.948	2.967	99.36	1.846	1.933	95.50
009	Textile, Leather and Products their of	2.209	2.703	81.72	2.416	2.504	96.49	2.074	2.107	98.43	1.628	2.031	80.16
010	Lumber and Wooden Products	1.541	2.275	67.74	2.123	2.314	91.75	1.887	1.905	99.06	1.579	1.649	95.76
011	Pulp, Paper and Printing	1.875	2.235	83.89	2.380	2.450	97.14	1.886	1.895	99.53	1.439	1.776	81.02
012	Chemical Products	1.837	2.355	78.00	2.404	2.488	96.62	1.971	1.987	99.19	1.776	2.062	86.13
013	Petroleum and Its product	1.231	1.312	93.83	1.294	1.450	89.24	2.476	2.490	99.44	1.060	1.082	97.97
014	Rubber Products	1.917	2.519	76.10	2.229	2.305	96.70	1.975	1.997	98.90	1.755	1.843	95.23
015	Non-metallic Mineral Products	1.886	2.021	93.32	2.124	2.187	97.12	1.868	1.879	99.41	1.492	1.655	90.15
016	Metal Products	2.091	2.846	73.47	2.561	2.626	97.52	2.099	2.144	97.90	1.712	1.863	91.89
017	Machinery	1.771	2.399	73.82	2.408	2.458	97.96	1.871	1.911	97.91	1.518	1.959	77.49
018	Transport Equipment	1.801	2.409	74.76	2.546	2.592	98.26	2.149	2.200	97.68	1.637	2.100	77.95
019	Other Manufacturing Products	1.919	2.413	79.53	2.341	2.394	97.79	1.825	1.848	98.76	1.304	1.549	84.18
	Average Manufacturing	1.837	2.308	80.41	2.256	2.346	95.88	2.086	2.111	98.80	1.562	1.792	87.79

Notes: (A) Within the National Economy
(B) Total multiplier effects inclusive of those 'leaked' out of the economy

Source: Institute of Developing Economies, Input-Output Table for ASEAN Countries, Japan, 1982.

TABLE 3.1.29

INVERSE TABLE MULTIPLIER FOR TRANSPORT EQUIPMENT SECTOR FOR SELECTED COUNTRIES, 1975

CODE	SECTOR	COEFFICIENT							
		Malaysia	Indonesia	Philippines	Singapore	Thailand	Japan	Korea	U.S.
014	Rubber Products	0.106	0.048	0.016	0.017	0.116	0.050	0.026	0.018
016	Metal Products	0.081	0.009	0.050	0.058	0.047	0.351	0.208	0.328
018	Transport Equipment	1.144	1.048	1.153	1.011	1.069	1.30	1.103	1.115
022	Trade & Transport	0.091	0.206	0.489	0.160	0.143	0.155	0.144	0.126
Others	Others	0.216	-	-	0.098	0.268	0.69	0.32	0.562
290	Local Industries	1.638	1.311	1.708	1.344	1.643	2.546	1.801	2.149
290	Leakage in the form of imports	0.46	0.642	0.488	0.678	0.513	0.046	0.608	0.051
ET290	Total	2.101	1.953	2.196	2.012	2.156	2.592	2.409	2.200

Source: Institute of Developing Economies, Input-Ouput Table for ASEAN Countries, Japan, 1982 industry was highest in Thailand (0.116), followed by Malaysia (0.106). The effect of forward linkages on the transport and trade service industry, on the other hand, seems to be rather undeveloped in Malaysia compared to other countries.

Although the data are rather outdated, it is evident that an import substitution policy is vital to further expansion of the industry. For instance, in the case of the assembly of motor vehicles, a larger proportion of local content should be incorporated into the vehicles, thus, reducing the outflow of foreign exchange. A further expansion in the manufacture of motor vehicle parts and accessories is further recommended. An expansion of the industry will generate a larger increase in the demand for inputs and thus induce the expansion of other industries, especially the transport equipment related industries, comprising the rubber and metal product industries. Since Malaysia is the main rubber producing countries and enjoys comparative advantage in terms of abundant supply of rubber and cheaper prices, the backward linkages of the rubber industry should be further promoted.

1.5 Summary of Major Problems and Issues Identified

Having reviewed the TE sector's past development trends, current performance and status and future technological trend as well as the factor endowment potentials/limitations and current government promotional policies, this sub-section summarizes the major problems and issues affecting the industry.

1.5.1. Low Contribution to Manufacturing Output

Malaysia's TE sector occupies a rather unimportant position in the manufacturing sector compared to other reference countries, particularly those in the industrialised countries and NICs. In 1981, it contributed about 4.7% to the manufacturing sector (Section 3.1).

1.5.2 Low Contribution to Manufacturing/World Exports

The TE sector as a whole generates relatively low export earnings compared to most other countries, especially those in the industrialised countries and NIC reference groups. In 1981, TE (excluding shipbuilding and locomotive repairs) exports amounted to M$26.25 million and its contribution to total manufacturing exports was only 0.1%. In terms of its contribution to world exports, it accounted for about 0.006% in 1980 (Section 3.1 and 4.1).

1.5.3 Continued Import-dependence For Most Of The TE Sub-Group Products

The overall Malaysia's TE sector (excluding shipbuilding and locomotive repairs) is still import-dependent, particularly, industries related to motor vehicles, parts and accessories, and motorcycles. However, the manufacture of motor vehicle bodies and non-motorised cycles are becoming more self-sufficient. During the past decade, TE imports as a share of domestic market consumption has remained quite constant in the region of 72% to 76%. In absolute terms, the volume of imports has increased more than three-folds between 1973 and 1981 (in current prices).

1.5.4 Limited Domestic Market

The small domestic market does not provide the desired base-load volume for competitive local production of motor vehicles and component parts. The market is further fragmented into CKD (several makes and models) and CBU supplies and between passenger cars and commercial vehicles. Both local motor vehicle assemblers and component manufacturers alike have been unable to achieve economies of scale in production. In fact, the low volume of production has given rise to the problems currently plaguing the industry, viz, high production costs, excess plant capacity and lack of labour specialisation. The implications to the motor vehicle parts manufacturing industry are as follows:

- Less efficient production methods due to the production of small lots. The outcome is lower yield ratio and productivity;

- More frequent idle or down time required in the manufacturing process due to the necessity to adjust plant and machinery and sometimes labour to meet the particular needs of each model;

- Higher tooling costs in terms of moulds and jigs and testing gauges. All these tools are specially developed and made for a particular model;

- Higher inventory costs due to higher level of raw material and finished goods required to cater for a wider variety of models.

1.5.5 Recent Global Recession

In addition to the small domestic market, the slow economic growth which was resulted from the recent global recession also affected the automotive industry badly. The demand for automotive component parts is a derived demand which depends on the demand for motor vehicles. Since the demand for motor vehicles has slowed down, the demand for components follows a similar path.

1.5.6 Difficulty In Penetrating Overseas Market

Like most of the developing countries, Malaysia also faces problem in penetrating the overseas market, particularly the developed countries. This has particularly made it difficult with the high tariff protection, quotas and other forms of non-tariff barriers such as prohibitions and voluntary restraints that have been set in most countries. In the newly industrialized countries and other ASEAN countries, the heavy protection on the indigeneous auto industry and the local content policies have further compounded the above problem.

1.5.7 Low Internal Forward and Backward Linkage

Amongst the ASEAN countries, NICs of R.O.Korea and the industrialized countries (Japan, R.O. Korea and the U.S.), Malaysia has the lowest backward and forward linkages (with coefficient of 1.84), indicating that the TE sector in Malaysia is relatively undeveloped compared to other countries. The lower backward and forward linkage coefficient are due to leakage in terms of import of raw materials and CKD packs from overseas. Although the multiplier effects of TE sector is about 2.1 times, about 22% of the output generated is expected to be "leaked" out of the country in the form of import demand. Although the leakage effect on the transport equipment sector in Malaysia is relatively lower than that of the other ASEAN countries, but at the international standard, it is about 9 to 10 times higher than the U.S. and Japan.

1.5.8 Low Labour Productivity

The labour productivity in the overall TE sector is slightly lower than the manufacturing sector. Amongst the TE sub-groups, the lowest labour productivity is seen in the non-motorised cycle manufacturing industry, followed by motor vehicle body building industry. Although the other sub-groups have higher labour productivity than the manufacturing sector, the smaller firms that use traditional techniques and which operate at small scale production is less than efficient under prevailing technological options available.

1.5.9 Low capital intensity

The overall TE sector (excluding shipbuilding and locomotive repairs) is relatively less capital intensive than the manufacturing sector. Capital intensity is rather uneven amongst the various TE sub-groups and the different firm sizes. In 1981, the capital-labour ratio of TE sector ranged from M$5,170 for the motor vehicle body building industry to M$25,400 for the motor vehicle parts manufacturing industry. The higher labour intensity is usually recorded in the smaller establishments with less than 50 workers. This can be attributed to the shortage of capital faced by the smaller establishments (due to the difficulty in securing financial assistance from financial institutions) which hinder any further expansion of existing plants.

1.5.10 Lack of International Competitiveness

Although the TE sector in Malaysia enjoys lower raw material cost (comprising mainly rubber) and labour cost, it suffers comparative disadvantage in the form of high prices of imported raw materials (iron and steel products) and low labour productivity. Amongst the TE sub-groups, the motor vehicle body building industry and the motor vehicle assembly industry are still not international competitive with social profitability (or DRC/SER) coefficients of 3.12 and 1.15 respectively.

1.5.11 Stiff Competition amongst importers of automotive components and local suppliers

Local suppliers of motor vehicle parts are facing stiff competition with the importer counterparts. This is due largely to the preference of consumers for imported items.

1.5.12 Shortage of high level manpower, and skilled and semi-skilled labour

There is acute shortage of skilled and semi-skilled labour, particularly in occupation covering mechanics, maintenance workers, fitters, toolmakers, die makers, machine operators, assemblers and technicians. The industry also faces problems in recruiting professionals, especially engineers with relevant experience, as the majority of engineering graduates tend to be absorbed either into the public sector or the manufacturing industries other than the TEI. Besides, the ratio of engineering graduates to arts graduates is relatively lower than the other industrialised countries, especially Japan.

1.5.13 Problems relating to technological development in the TE sector

There are generally shortage of technical and manpower skills, machine tools, in particular high precision and high volume manufacturing machine tools, as well as quality control techniques and machinery. The lack and shortage of these facilities are the main bottlenecks to technological development in the industry. In addition, the low volume of production (both annual production and average batch size of production run) and the lack of capital formation are affecting the choice of technology by local firms in Malaysia.

1.5.14 Insufficient Standardization and Quality Control

There is a lack of product standardization and quality control for most of the automotive products produced by the TE sector in Malaysia. The poor quality control of the products is due to the outdated plant, lack of sophisticated/computerised testing machines and statistical quality control techniques, and the relatively crude production technology used.

1.5.15 Lack of Market Research and Indigenous Technological R & D

There is almost absence of market research and R&D industrial designing in Malaysia, especially in the development of new products and upgrading of qualities of products. Almost all technological development is based on on importation of foreign technologies or through joint-ventures.

1.5.16 Inconsistencies amongst the local content guidelines and programmes

The inconsistencies amongst the guidelines and programmes has caused inefficiencies and retard the acceleration of localisation. Owing to the multiplicity of objectives and the absence of private sector representation in the MVAC, the policy guidelines and instruments regulating the industry have not been able to achieve their practical realisation. The unitended effects are as follows:

- Reluntance of the government to adjust the policy implementation approach to the changing situation.

  The motor vehicle component localisation promotion is still based on a two-page "Revised Guidelines for Mandatory CKD Deletion" put together since June 1978, to reflect the industry make-up at that time. These guidelines are very rigid and not flexible enough to accommodate contigencies arising at the present time. Improvement in the guidelines is required to encourage the proper developments of the industry.

- Absence of a policy guideline on target phases that determines the percentage or proportion of components to be localised in the case of four-wheelers.

- Absence of a definite weighting system to determine the level of local content used for four-wheelers.

- Long processing time for deleted items. This discourages investors for setting up large establishments in Malaysia.

- Some component parts manufacturers, particularly, those components with only a single manufacturer, enjoy monopoly status from the high tariff protection.

1.5.17 <u>No clear guidelines, programmes and policies pertaining to the National Car Project</u>

In view of the National Car Project, the local assemblers face problems in developing their own long-term plans and strategies to adjust to the new situation due to lack of information. Some of the questions posed are:

- Clarification of policies relating to the existing automotive industry pertaining to the co-existence and cooperation in the manufacturing sector or the future role of the existing local assemblers and the component parts manufacturers;

- Measures to be taken to stimulate demand for motor vehicles so as to support both the local assemblers and Proton;

- Future market share of motor vehicles for the private sector and Proton;

- Clarification of policies relating to the exports of motor vehicles and parts;

- Protective measures to be given to the national cars;

- Forms of "compensation" to be given to the private sector, especially those companies that are affected by the National Car Project;

- Future role of Proton towards commercial vehicles and other c.c. range of passenger cars.

1.5.18 Failure to overcome the obstacles facing the ASEAN Automotive Complementary Scheme

The ASEAN Automotive Complementary Scheme (AACS) was established to enable member countries to benefit from economies of scale as well as strong commitment to regional industrial cooperation. However, some of the drawbacks are as follows:

- Each of the five ASEAN countries involved have different political reasons for establishing an automotive industry, for instance:

Philippines	-	light engineering skills;
Singapore	-	high skilled level and export-oriented;
Indonesia	-	growth of labour-intensive industries; and
Malaysia	-	minimizing production costs

- The level of development in the motor vehicle industry in the ASEAN region is rather uneven. For instance, the automotive industry of Philippines is far ahead of its neighbouring countries while that of Indonesia is far behind. This uneven distribution in the existing number and type of component manufacturing establishments has given rise to problems relating to the allocation of components and distribution of benefits.

- The automotive ancillary firms in the ASEAN countries was developed along a similar path, resulting in duplication of production facilities. For example, tyres, batteries and exhaust systems were produced in all the ASEAN countries. This results in overdeveloped of certain components, especially regional production of high frequency replacement automotive parts.

- The above problems have resulted in delaying the implementation of the AACs. This exhausted the patience of some ASEAN countries which finally decided to develop their own automotive industry.

1.5.19 Ineffectiveness of some of the existing incentive schemes and promotional policies

The effectiveness of the existing incentive schemes and promotional policies have already been evaluated in section 3 and some of their major weaknesses are summarized below:

- High tariff structure on CKD cars

  At present, taxes already make up about 83% of the landed cost of the CKD packs or 40% of the selling price of a common model of passenger cars within 1300c.c. range which is among the highest in world. However, the proposed increase in import duty on cars has further increased the selling price by 7% of the previous year price.

- Ineffectiveness of the Government Protection

  Some industrial sub-groups of the TE sector, for instance the motor vehicle body building industry and motor vehicle assembly industry, which enjoy high effective rate of protection (EPR) are still experiencing comparative disadvantage. This is mainly due to the inefficiencies resulting from the high dependency on the government protection. These industries also benefited from the high EPRs in the form of high gross rate of returns and the tax burden is mainly passed on to the consumers. More emphasis should be placed on industries that have comparative advantage (see factor endowment). For instance, the low and underdeclared price of imported components from Taiwan, Hong Kong, Thailand and Japan should be looked into.

Low Loan-value added ratio

Malaysia's TE sector has a lower loan-value added ratio than other reference countries. During the period 1973 to 1979, the loan-value added ratio of R.O. Korea was about three times larger than that of Malaysia. Amongst the various sub-groups of TE sector, there is uneven distribution of loan-value added which varies from 0 (motor vehicle bodies) to 5.1 (motor vehicle parts and accessories). This discrimination has resulted in the relatively different pace of development in the sub-groups of the TE sector.

Problems Facing the Non-Motorized Cycle Industry

Amongst the major problems faced by local non-motorised cycle industry are:

- lack of government protection (e.g. no export incentives, smuggling of bicycles and parts into Malaysia, multiplicity of taxes);

- high input costs (e.g. high prices of imported parts, high freight and energy costs, etc.);

- limited and stagnant domestic market (this has resulted in the diseconomies of scale in production and higher prices compared to the other countries, such as Taiwan and China).

2.0 The Motor Vehicle Industry

This section focuses on the overall motor vehicle industry comprising motor.vehicle assembly, motor vehicle components manufacturing and manufacturing of motor vehicle bodies.

The production of motor vehicle is the largest industry sub-group within the TE sector in terms of output value. In 1981, the output value of this industry sub-group was $628.7 million with employment of 11,926 and fixed assets of 174.4 million.

Total sales of the motor vehicle industry and its contribution to the manufacturing sector between 1975 and 1983 are presented in Table 3.2.1. It is evident from the table that total sales value in the motor vehicle industry has increased from $160.1 million in 1975 to $418.3 million in 1983. The motor vehicle assembly industry constitutes 58% of total sales value of the manufacturing sector, in 1983.

However, as a result of the rapid growth of the manufacturing sector over the period, the overall contribution of the motor vehicle industry to the manufacturing sector and total GDP has, in fact, declined from 2.0% and 0.79% in 1975 to 1.63% and 0.62% in 1983 respectively.

TABLE 3.2.1

TOTAL OUTPUT : CONTRIBUTION OF THE AUTOMOTIVE INDUSTRY TO THE MANUFACTURING SECTOR AND TOTAL GDP, 1975 TO 1983

	1975	1976	1977	1978	1979	1980	1981	1982	1983
. Total Sales Value of Automotive Industry ($ Million)	160.1	180.2	192.0	245.8	298.5	403.3	389.6	451.3	418.3
- Motor Vehicle Assembly Industry	138.3	150.5	156.6	186.7	224.3	278.3	259.4	295.4	244.2
- Motor Vehicle Parts, Accessories & Bodies	21.8	29.7	35.4	59.1	74.2	125.0	130.2	155.9	174.1
. Contribution of Automotive Industry to Manufacturing Sector (%)	2.00	1.75	1.60	1.81	1.78	1.96	1.64	1.91	1.63
- Motor Vehicle Assembly Industry	1.73	1.47	1.31	1.38	1.34	1.35	1.09	1.25	0.95
- Motor Vehicle Parts, Accessories & Bodies	0.27	0.28	0.29	0.43	0.44	0.61	0.55	0.66	0.68
. Contribution of Automotive Industry to Total GDP in Current Prices (%)	0.79	0.64	0.59	0.68	0.67	0.78	0.69	0.74	0.62
- Motor Vehicle Assembly Industry	0.68	0.54	0.48	0.51	0.51	0.54	0.46	0.48	0.36
- Motor Vehicle Parts, Accessories & Bodies	0.11	0.10	0.11	0.17	0.16	0.24	0.23	0.26	0.26

Source . Department of Statistics, Malaysia, Various Years and Monthly Industrial Statistics

Chart 3.2.1 provides a graphic illustration of the sales growth rates of motor vehicles and motor vehicle parts/accessories vis-a-vis that of the manufacturing sector between 1971 and 1983.

As shown in Table 3.2.2, total employment in the motor vehicle industry increased from 6,268 in 1975 to 10,630 in 1983 bringing its total contribution to employment in the manufacturing sector to 3.16%. Slightly over half of the employment in the industry are in motor vehicle assembly. In terms of national employment, the contribution of the motor vehicle industry is insignificant, accounting for 0.2% in 1983.

2.1 The Motor Vehicle Assembly Industry

2.1.1 Malaysian Industrial Structure

Unlike other industries where there is a large number of establishments, the motor vehicle asssembly industry is dominated by only 25 establishments. About 68% of the establishments are geographically located in the more developed areas of Selangor, Federal Territory and Johore. In 1981, these 3 states generated about 95% and 97% of total revenue and employment in the industry respectively. The smaller establishments are located in Kedah, Penang, Perak, Negri Sembilan, Pahang and Trengganu (Table 3.2.3).

However, only 13 of the 25 establishments have been granted approval to assembly passenger cars and commercial vehicles. The entry of new firms is greatly restricted by the government. Table 3.2.4

Chart 3.2.1

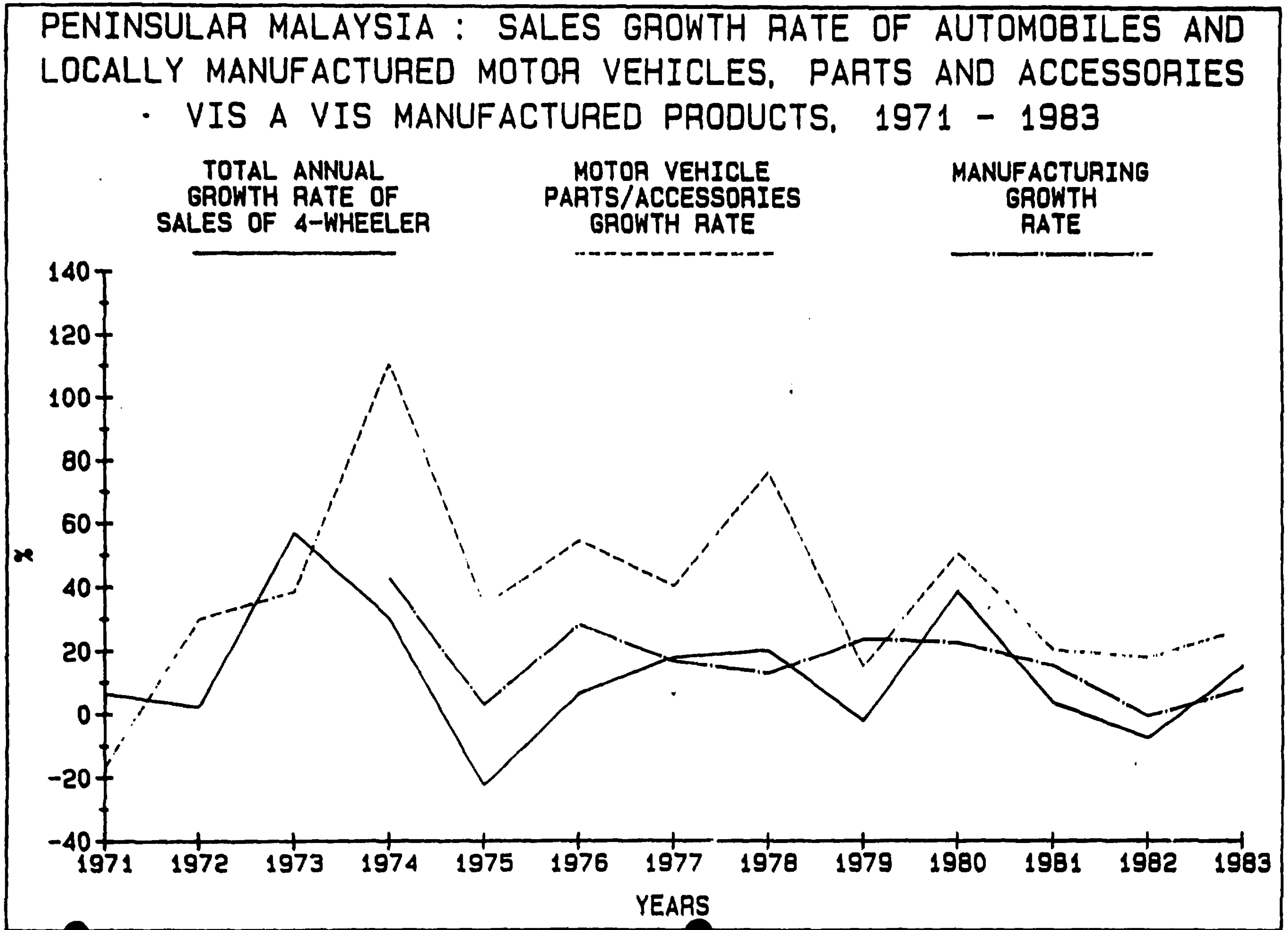

PENINSULAR MALAYSIA : SALES GROWTH RATE OF AUTOMOBILES AND LOCALLY MANUFACTURED MOTOR VEHICLES, PARTS AND ACCESSORIES VIS A VIS MANUFACTURED PRODUCTS, 1971 - 1983
TOTAL ANNUAL GROWTH RATE OF SALES OF 4-WHEELER
MOTOR VEHICLE PARTS/ACCESSORIES GROWTH RATE
MANUFACTURING GROWTH RATE
140
120
100
80
60
40
20
0
-20
-40
%
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
YEARS

TABLE 3.2.2

EMPLOYMENT CONTRIBUTION OF THE AUTOMOTIVE INDUSTRY
THE MANUFACTURING SECTOR AND NATIONAL EMPLOYMENT, 1975 TO 1983

	1975	1976	1977	1978	1979	1980	1981	1982	1983
. Total Employment in Automotive Industry	6,268	6,553	7,695	8,583	9,239	11,375	10,221	10,573	10,630
- Motor Vehicle Assembly Industry	4,864	4,989	5,570	5,835	6,079	7,364	6,451	6,205	5,767
- Motor Vehicle Parts, Accessories & Bodies	1,404	1,564	2,125	2,748	3,160	4,011	3,770	4,568	4,863
. Contribution of Automotive Industry to Employment in Manufacturing Sector	2.95	2.70	2.92	2.95	2.98	3.54	3.15	3.80	3.16
- Motor Vehicle Assembly Industry	2.29	2.05	2.11	2.01	1.97	2.30	1.99	1.92	1.71
- Motor Vehicle Parts, Accessories & Bodies	0.66	0.65	0.81	0.94	1.01	1.24	1.16	1.88	1.44
. Contribution of Automotive Industry To National Employment	0.16	0.15	0.17	0.19	0.20	0.24	0.20	0.21	0.20

Source : Department of Statistics, Malaysia, Various Years and Monthly Industrial Statistics

TABLE 3.2.3

PENINSULAR MALAYSIA : REGIONAL DISTRIBUTION OF MOTOR VEHICLE ASSEMBLY INDUSTRY (MIC 38432), 1981

STATES	NO. OF ESTBLISHMENT		TOTAL REVENUE		TOTAL EMPLOYMENT		SALARIES & WAGES	
	NO.	%	NO.	%	NO.	%	NO.	%
JOHORE	4	16.00%	46,856,898	9.35%	1,600	16.94%	9,896,457	19.24%
SELANGOR	9	36.00%	343,644,301	68.58%	4,046	64.18%	33,529,703	65.20%
WILAYAH PERSEKUTUAN	4	16.00%	86,174,578	17.20%	987	15.66%	6,650,716	12.93%
KEDAH/PENANG/PERAK	3	12.00%	1,074,633	0.21%	63	1.00%	209,223	0.41%
N.S./PAHANG/TRENGGANU	5	20.00%	23,347,711	4.66%	140	2.22%	1,142,036	2.22%
TOTAL FOR DIVISION	25	100.00%	501,098,121	100.00%	6,844	100.00%	51,428,135	100.00%

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, PEN. MALAYSIA, 1981

TABLE 3.2.4

MALAYSIA : LIST OF APPROVED MOTOR VEHICLE ASSEMBLY PLANTS

Assembler	Location of Plant	Date of Operation	Types of Vehicles Assembled
OPERATION			
1. Cycle & Carriage Bintang Bhd (CCB)	Petaling Jaya Selangor	April 1967	CV[a]
2. Swedish Motor Assemblies Sdn Bhd (SMA)	Shah Alam Selangor	October 1967	PC + CV
3. Kelang Pembena Kereta-Kereta Sdn Bhd (KPKK)	Tampoi Johore	December 1967	PC[b]
4. Assembly Services Sdn Bhd (ASSB)	Shah Alam Selangor	March 1968	PC + CV
5. Associated Motor Industries (M) Sdn Bhd (AMIM)	Shah Alam Selangor	April 1968	PC + CV
6. Oriental Assemblers Sdn Bhd/ General Motors Malaysia Sdn Bhd(OA/GMM)	Tampoi Johore	May, 1968	PC + CV
7. Asia Automobile Ind. Sdn Bhd (AAI)	Petaling Jaya Selangor	September 1968	PC + CV
8. Sarawak Motor Industries Sdn Bhd (SMI)	Kuching Sarawak	April 1974	PC + CV + 2W[c]
9. Tan Chong Motor Assemblies Sdn Bhd (TCMA)	Segambut Selangor	October 1976	PC + CV
10. Tatab Industries Sdn Bhd (TI)	Peramu Industrial Estate, Pekan, Pahang	April 1977	CV
11. Kinabalu Motor Assembly Sdn Bhd (KMA)	SEDCO Industrial Estate Sabah	January 1979	PC + CV + 2W
NON-OPERATION			
12. Sumbangan Subang Motor Sdn Bhd/B.G. Motors Sdn Bhd (SSM/BGM)		1974	CV
13. United Assembly Services Sdn Bhd/Syt. Pemasang Motor-Motor Pahang (UAS/PMMP)		Not yet in Production	PC + CV + 2W

Source : MIDA

Note : (a) Commercial vehicles (b) Passenger cars (c) Two-wheelers, i.e. motorcycles and scooters.

provides a listing of the 13 assembly plants approved by MIDA to assemble passenger cars and commercial vehicles. Of the 11 assembly plants currently in operation, 2 are assembling passenger cars only and 1 commercial vehicles only. With the exception of Sarawak Motor Industries Sdn Bhd (SMI) and Kinabalu Motor Assembly Sdn Bhd (KMA), all the assembly plants are located in the Peninsular. Cycle & Carriage Bintang Berhad (CCB) is the only assembler organized as a public listed company while all the others are operating as private limited companies.

As of 1983, total equity investments in the motor vehicle industry stands at $143.9 million, of which 73.2% is Malaysian owned (with 30.3% belonging to Bumiputera). A breakdown of equity structure by assembly plant is provided in Table 3.2.5. The highest levels of equity investments are found in Cycle & Carrriage Bintang Bhd and Sarawak Motor Industries Sdn Bhd which have paid-up capitals of $59.5 million and $29.5 million respectively. SMI also happens to be the assembler having the highest level of Bumiputera equity participation (at 82%).

Total employment in the assembly industry in 1982 stood at 7,900 of which 6,500 (or 82%) were direct and indirect factory workers. Bumiputeras constituted 54% of total employment in the industry. Breakdowns of employment by assembly plant and employment category are shown in Table 3.2.6. Assembly Services Sdn Bhd (ASSB) had the largest number of employees in 1982, totalling 1,856 of which 74% were bumiputeras.

TABLE 3.2.5

MALAYSIA : EQUITY STRUCTURE IN THE AUTOMOBILE ASSEMBLY INDUSTRY, 1983

PLANTS	AUTHORISED CAPITAL (M$'000)	PAID-UP CAPITAL (M$'000)	OWNERSHIP (%)		
				MALAYSIAN	
			FOREIGN	BUMIPUTRA	OTHER MALAYSIAN
ASSEMBLY SERVICES	10,000.0	7,500.0	15.0	33.0	52.0
ASIA AUTOMOBILES INDUSTRY	4,400.0	4,400.0	80.0	-	20.0
ASSOCIATED MOTOR	100,000.0	10,000.0	49.0	-	51.0
C & C BINTANG	100,000.0	59,500.0	49.0	15.0	36.0
K. PEM. KERETA	8,000.0	7,000.0	-	-	100.0
KINABALU MOTOR ASSEMBLY	30,000.0	7,000.0	-	68.5	31.5
ORIENTAL ASSEMBLY	20,000.0	6,346.0	-	-	100.0
SARAWAK MOTOR	200,000.0	29,500.0	-	82.0	18.0
SWEDISH MOTOR ASSEMBLY	10,000.0	6,000.0	50.0	-	50.0
TAN CHONG & SONS CO	10,000.0	1,000.0	-	-	100.0
TATAR INDUSTRIES	10,000.0	5,699.0	29.0	60.0	11.0
TOTAL	502,400.0	143,945.0	26.8	30.3	42.9

Source : MMVAA

TABLE 3.2.6

MALAYSIA : EMPLOYMENT IN THE AUTOMOBILE INDUSTRY BY CATEGORY, 1982

	MANAGEMENT & EXECUTIVE		SUPERVISOR & TECHNICAL		CLERICAL		GENERAL SERVICES		SUB-TOTAL		DIRECT FACTORY WORKER		INDIRECT FACTORY WORKER		TOTAL	
	TOTAL	BUMI	TOTAL	BUMI	TOTAL	BUMI	TOTAL	BUMI	TOTAL	BUMI	TOTAL	BUMI	TOTAL	BUMI	TOTAL	BUMI
ASSB	17	4	115	39	69	27	61	43	267	113	1,183	984	431	273	1,856	1,370
AAI	11	1	36	4	31	4	16	9	94	18	310	112	23	18	427	148
AMI	10	2	61	21	69	30	-	-	140	53	505	318	168	100	813	471
CCB	31	-	6	-	40	-	15	-	92	-	162	-	54	-	308	-
KPKK	13	-	63	-	40	-	-	-	116	-	428	-	168	-	712	-
KMA	2	2	7	4	4	4	3	1	16	13	34	28	35	34	85	76
OA/SB	12	3	31	8	24	7	4	3	71	21	573	448	603	455	1,247	924
SMI	12	1	37	27	26	9	35	33	110	70	195	163	39	36	344	269
SMA	11	3	12	4	15	3	10	9	48	19	153	105	66	34	267	158
TCM	43	6	69	17	76	18	43	28	231	69	583	240	228	91	1,042	400
TI	1	-	20	10	8	3	4	2	33	15	69	59	17	16	119	90
TOTAL	163	22	457	134	402	105	191	130	1,213	391	4,195	2,459	1,812	1,057	7,220	3,905

SOURCE : MALAYSIAN MOTOR VEHICLE ASSEMBLERS ASSOCIATION

2.1.2 Factor Intensity and Productivity

The production characteristics of the motor vehicle assembly industry are shown in Table 3.2.7. The industry is relatively less capital intensive than the other industries under study as well as the overall manufacturing sector. In 1981, the capital to labour ratio of the motor vehicle assembly industry was \$11,770 per worker as compared to \$19,330 for the other industries under study and \$18,220 for the overall manufacturing sector.

The less capital intensive structure of the industry is compensated by the relatively higher utilisation of labour skill. This is indicated by the higher wage rates paid by the industry (\$7,490 per worker as compared to \$5,170 and \$4,890 for other transport equipment industries and the total manufacturing sector respectively). It is evident from the analysis that the industry is more labour intensive with requirements for highly skilled workers.

Labour productivity in the motor vehicle industry is relatively higher than the TEI and manufacturing sector (\$17,530 per worker as compared to \$15,040 and \$16,650 for the TEI and manufacturing sector respectively). It appears that the utilisation of less capital in the motor vehicle assembly industry has not hampered overall productivity.

It is interesting to note that the capital intensity in the industry has declined over the years (see Table 3.2.7). The capital-labour ratio decreased from \$12,840 per worker in 1968 to \$11,770 in 1981. The drop in capital intensity in

TABLE 3.2.7

PENINSULAR MALAYSIA : PRODUCTION CHARACTERISTICS OF MOTOR VEHICLE INDUSTRY, 1968 - 1981

YEAR	L/ESTB.	K/ESTB. ($'000)	K/L ($'000)	VA/L ($'000)	W/L ($)	W/VA ($)	VA/O ($)
(a) MOTOR VEHICLE ASSEMBLY (MIC 38432)							
1968	195.09	2,504.36	12.84	3.53	2.12	0.60	0.42
1973	593.75	7,832.38	13.19	7.63	2.91	0.38	0.23
1978	588.60	6,265.90	10.65	12.66	5.42	0.43	0.29
1981	273.76	3,222.44	11.77	17.53	7.49	0.43	0.26
(b) ALL TEI UNDER STUDY (1) EXCEPT MOTOR VEHICLE ASSEMBLY							
1968	22.33	55.97	2.51	7.54	2.40	0.32	0.46
1973	24.70	404.53	16.38	6.80	2.01	0.29	0.28
1978	44.97	415.67	9.24	11.98	3.61	0.30	0.42
1981	31.88	616.44	19.33	15.04	5.17	0.34	0.36
(c) ALL MANUFACTURING							
1968	14.45	98.78	6.84	N.A.	2.05	N.A.	0.09
1973	26.94	207.47	7.70	7.81	1.97	0.25	0.30
1978	83.96	1,154.76	13.75	14.04	3.60	0.26	0.29
1981	30.04	547.26	18.22	16.65	4.89	0.29	0.26

NOTE : (1) TRANSPORT EQUIPMENT SUB-SECTORS UNDERSTUDY ARE MIC 38431, 38432, 38439, 38441, 38449 AND 38450

SOURCES : CALCULATED FROM CENSUS OF MANUFACTURING INDUSTRIES, 1968, 1973 & 1981 AND (SURVEY OF MANUFACTURING INDUSTRIES, 1978) the industry during the 1968 to 1981 period could be attributed to the slower rate of capital utilization as compared to the increasing use of labour. The capital intensities in both the TEI (excluding motor vehicle assembly) and overall manufacturing sector, however, have increased rapidly over the same period.

In contrast, the average wage rates of the industry have increased more rapidly than that of the TEI and overall manufacturing sector during the 1968-1981 period (9.4% per annum in real terms against 5.3% and 6.2% respectively). In 1981, the average wage rate in the motor vehicle assembly industry was $7,490 per worker as compared to $2,120 in 1968, representing an increase of 10.2% per annum in current prices.

In addition, over the 14 year period, the increase in average real wage rates exceeded that of real labour productivity (9.4% vs 4.7% growth rate per annum). This indicates that the efficiency of labour has declined in real terms although in current prices, it has increased faster than the wage rates.

Tables 3.2.8 and 3.2.9 show the breakdown of production statistics by employment size. It is evident that the larger establishments (with employment size of 50 to 500) are relatively more capital intensive and higher labour productivity than the smaller establishments. The average wage rates paid by the larger establishments are relatively higher than the smaller ones.

TABLE 3.2.8

PENINSULAR MALAYSIA : PRODUCTION CHARACTERISTICS OF MOTOR VEHICLE ASSEMBLY INDUSTRY (MIC 38432), 1981

EMPLOYMENT SIZE	AVERAGE FIRM SIZE L/ESTB.	AVERAGE FIRM SIZE K/ESTB.	AVERAGE FIRM SIZE K/L ($'000)	V.A./L ($'000)	WAGES/ WORKER ($'000)	WAGES/ V.A. ($'000)	V.A./ OUTPUT
< 5	2.50	20.57	8.23	7.97	4.87	0.61	0.55
5 - 49	18.08	168.69	9.33	16.32	4.77	0.29	0.30
50 - 199	116.00	3,370.16	29.05	30.34	7.16	0.24	0.22
200 - 499	327.33	8,128.49	24.83	33.44	8.81	0.26	0.14
> 500	1,078.00	9,440.31	8.76	14.15	7.38	0.52	0.43
TOTAL FOR DIVISION	273.76	3,222.46	11.77	17.53	7.49	0.43	0.26
TOTAL FOR ALL MANUFACTURING	30.04	547.26	18.22	16.65	4.89	0.29	0.26

SOURCE : CALCULATED FROM TABLE 3.2.9

TABLE 3.2.9

PRINCIPAL STATISTICS (INCL. VALUE ADDED) OF MOTOR VEHICLE ASSEMBLY INDUSTRY (MIC 38432) BY EMPLOYMENT SIZE GROUP, 1981

EMPLOYMENT SIZE	ESTABLISHMENT		OUTPUT ($'000)		INPUT ($'000)		VALUE ADDED ($'000)		TOTAL EMPLOYMENT		WAGES ($'000)		FIXED ASSET ($'000)	
	NO.	(%)	NO.	(%)	NO.	(%)	NO.	(%)	NO.	(%)	NO.	(%)	NO.	(%)
< 5	2	8.00%	73	0.02%	33	0.01%	40	0.03%	5	0.07%	24	0.05%	41	0.05%
5 - 49	13	52.00%	12,740	2.80%	8,904	2.66%	3,836	3.20%	235	3.43%	1,121	2.19%	2,193	2.72%
50 - 199	2	8.00%	31,479	6.92%	24,441	7.30%	7,039	5.87%	232	3.39%	1,661	3.24%	6,740	8.37%
200 - 499	3	12.00%	231,186	50.83%	198,346	59.23%	32,839	27.37%	982	14.35%	8,654	16.88%	24,386	30.27%
> 500	5	20.00%	179,383	39.44%	103,141	30.80%	76,242	63.54%	5,390	78.76%	39,798	77.64%	47,202	58.59%
SUB-GROUP TOTAL	25	100.00%	454,861	100.00%	334,865	100.00%	119,996	100.00%	6,844	100.00%	51,257	100.00%	80,562	100.00%
TOTAL MANUFACTURING	17,780		34,486,493		25,591,191		8,895,302		534,145		2,614,142		9,730,327	

SOURCE : Department of Statistics, Census of Manufacturing Industries, Peninsular Malaysia, 1981

A detailed analysis of factor intensity and labour productivity by assembly plants in Peninsular Malaysia is presented in Table 3.2.10.

It can be seen that amongst the nine assembly plants, Swedish Motor Assembles Sdn Bhd (SMA) recorded the highest investment labour ratio ($100,000 per worker) in 1980, followed by Cycle and Carriage Bintang Bhd (CCB) and Asia Automobile Industries Sdn Bhd (AAI). The high investment labour ratio can be attributed to the high working capital required, the relatively low level of capacity utilization and low labour input.

On the other hand, Assembly Services Sdn Bhd (ASSB) recorded the lowest investment labour ratio or highest labour intensity ($23,000 per worker as compared to the overall average of $56,000). It is noted that ASSB is the largest employer of labour. In 1980, it accounted for 36% of the total employment in the industry. Although it is the largest plant in terms of investment, however, its relatively large labour force has somewhat increased its overall labour intensity.

Labour productivity (output per labour) varies substantially at the plant level. Plants with labour productivity higher than the overall average are Tan Chong Assemblies (31 vehicles per labour), Oriental Assemblers (20 vehicles per labour) and Associated Motor Industries (17 vehicles per labour). These are the plants assembling the popular Japanese makes of passenger cars, such as Datsun, Honda and Mazda.

TABLE 3.2.10

PENINSULAR MALAYSIA : ECONOMIC INDICATORS OF LOCAL MOTOR VEHICLE PLANTS, 1975, 1977 AND 1980

NAME OF FIRMS		OUTPUT (O) PASSENGER CARS	COMMERCIAL VEHICLES	TOTAL OUTPUT	EMPLOYMENT (L) DIRECT WORKERS	INDIRECT WORKERS	TOTAL	TOTAL INVESTMENT ($ mil) (I)	ECONOMIC INDICATORS K/L ($)	O/L	K/O ($)
AAI	1975	7,237	542	7,779	441	71	512	24.80	48,000	15.3	3,200
	1977	6,960	680	7,640	432	63	495	25.20	51,000	15.5	3,300
	1980	6,937	520	7,457	358	85	443	29.70	67,000	16.8	4,000
AMIM	1975	7,082	2,004	9,086	972	135	1,107	38.10	34,000	8.2	4,200
	1977	8,593	2,278	10,871	1,029	156	1,185	40.20	34,000	9.2	3,700
	1980	2,397	1,523	3,920	444	301	745	43.50	58,000	5.3	11,100
ASSB	1975	9,128	4,021	13,149	1,142	154	1,296	45.50	35,000	10.1	3,500
	1977	14,102	2,940	17,042	1,441	176	1,617	54.90	34,000	10.5	3,200
	1980	22,678	4,800	27,478	2,187	287	2,474	56.30	23,000	11.1	2,000
CCB	1975	-	1,270	1,270	157	75	232	12.50	54,000	5.5	9,800
	1977	-	1,148	1,148	151	79	230	14.30	62,000	5.0	12,500
	1980	-	2,019	2,019	116	184	300	20.40	68,000	6.7	10,100
OA/GMR	1975	2,960	669	3,629	350	65	415	15.20	37,000	8.7	4,200
	1977	3,029	485	3,514	355	63	418	15.60	32,000	8.4	4,400
	1980	8,543	1,003	9,546	399	76	475	24.10	51,000	20.1	2,500
KPKK	1975	5,715	-	5,715	608	64	672	23.40	35,000	8.5	4,000
	1977	7,981	-	7,981	742	72	814	27.50	34,000	9.8	3,400
	1980	12,619	-	12,619	764	188	952	37.6	39,000	13.3	3,000
SMA	1975	6,429	1,326	7,755	637	94	731	26.20	36,000	10.6	3,400
	1977	1,510	682	2,192	356	48	404	18.40	46,000	5.4	8,400
	1980	2,954	38	2,992	225	49	274	26.30	100,000	10.9	8800
TCMA	1975	-	-	-	-	-	-	-	-	-	-
	1977	9,681	1,009	10,690	361	46	407	32.50	80,000	26.3	3,000
	1980	23,393	7,855	31,248	325	191	1,016	47.00	46,000	30.8	1,500
TT	1975	-	-	-	-	-	-	-	-	-	-
	1977	-	-	-	-	-	-	-	-	-	-
	1980	-	1,045	1,045	104	100	204	11.50	56,000	5.1	11,000
TOTAL	1975	38,551	9,832	48,383	4,307	658	4,965	185.70	37,000	9.7	3,800
AVERAGE	1977	51,864	9,222	61,086	4,867	703	5,570	278.60	41,000	11.0	3,700
	1980	79,521	18,803	98,324	5,427	1,461	6,883	296.40	56,000	13.3	3,000
AVERAGE ANNUAL GROWTH RATE (%) 1975-1980		15.58	13.84	15.24	4.71	17.30	6.75	9.80	8.64	6.52	-4.62

NOTE : (1) Total investment includes fixed assets in terms of current replacement cost and working capital

SOURCE : MMVAA

In contrast, relatively low labour productivity were recorded in firms assembling either commercial vehicles or the continental makes of cars. Plants falling within this category are Tatab Industries, Associated Motor Industries and Cycle & Carriage Bintang with 5.1, 5.3 and 6.7 vehicles per labour respectively.

The overall average investment per unit output shows that there has been an improvement in the capital productivity over time. The investment output ratio was $3,000 per vehicle in 1980 as compared to $3,800 in 1975. The investment output ratio depends on the volume of output and the type of vehicles produced (passenger cars versus commercial vehicles).

A comparison can be made between plants producing commercial vehicles and passenger cars. As can be seen in Table 3.2.10 , Cycle & Carriage Bintang and Tatab Industries specialise in producing commercial vehicles and Kelang Pembena assembles passenger cars. In 1980, the capital productivity of KPKK was more than three times higher than that of CCB and TI ($3,000 as against $10,100 and $11,000 respectively). This shows that plants assembling commercial vehicles require more capital investment than plant assembling only passenger cars.

2.1.3 Production Trend

The production trend and composition of passenger cars and commercial vehicles over a period of 14 years are shown in Tables 3.2.11 and 3.2.12 respectively.

TABLE 3.2.11

PENINSULAR MALAYSIA : PRODUCTION OF PASSENGER CARS BY ENGINE SIZE, 1970 - 1983

YEAR	PASSENGER CAR PRODUCTION (NUMBER)					
	1600 C.C AND BELOW	%	1600 C.C AND ABOVE	%	ALL CLASSES	%
1970	16,322	77.88%	4,635	22.12%	20,957	100.00%
1971	18,449	78.41%	5,079	21.59%	23,528	100.00%
1972	19,863	80.41%	4,840	19.59%	24,703	100.00%
1973	33,666	81.43%	7,679	18.57%	41,345	100.00%
1974	41,310	78.10%	11,581	21.90%	52,891	100.00%
1975	31,866	81.33%	7,313	18.67%	39,179	100.00%
1976	36,477	82.47%	7,754	17.53%	44,231	100.00%
1977	46,054	82.90%	9,503	17.10%	55,557	100.00%
1978	51,382	82.48%	10,916	17.52%	62,298	100.00%
1970	41,728	70.05%	17,842	29.95%	59,570	100.00%
1980	58,351	73.63%	20,898	26.37%	79,249	100.00%
1981	65,920	76.28%	20,498	23.72%	86,418	100.00%
1982	63,452	75.88%	20,165	24.12%	83,617	100.00%
1983	72,378	74.30%	25,029	25.70%	97,407	100.00%
AVERAGE ANNUAL GROWTH RATE (%)						
1980		14.32%		9.55%		13.33%
1981		12.86%		23.37%		15.13%
1982		7.44%		6.20%		7.12%
1983		12.14%		13.85%		12.55%

SOURCE : DEPARTMENT OF STATISTICS, MONTHLY STATISTICAL BULLETIN, PENINSULAR MALAYSIA, VARIOUS YEARS

TABLE 3.2.12

PENINSULAR MALAYSIA : PRODUCTION OF ASSEMBLED COMMERCIAL VEHICLES, 1970 - 1983

YEAR	PRODUCTION (UNITS)									
	LORRIES		VANS		BUSES		OTHER COMMERCIAL VEHICLE		TOTAL	
		%		%		%		%		%
1970	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	7,688	100.00%
1971	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	6,973	100.00%
1972	2,285	37.33%	2,769	45.24%	75	1.23%	992	16.21%	6,121	100.00%
1973	3,707	49.89%	2,542	34.21%	99	1.33%	1,082	14.56%	7,430	100.00%
1974	5,692	50.27%	3,219	28.43%	182	1.61%	2,230	19.69%	11,323	100.00%
1975	3,814	41.05%	3,102	33.39%	242	2.60%	2,132	22.95%	9,290	100.00%
1976	3,387	41.73%	2,273	28.00%	457	5.63%	2,000	24.64%	8,117	100.00%
1977	4,305	46.25%	3,243	34.84%	446	4.79%	1,314	14.12%	9,308	100.00%
1978	5,148	44.36%	4,103	35.36%	770	6.64%	1,583	13.64%	11,604	100.00%
1979	6,803	48.50%	4,000	28.52%	599	4.27%	2,625	18.71%	14,027	100.00%
1980	10,437	47.85%	6,810	31.22%	583	2.67%	3,984	18.26%	21,814	100.00%
1981	9,606	48.32%	6,752	33.96%	702	3.53%	2,822	14.19%	19,882	100.00%
1982	6,478	40.94%	5,850	36.97%	691	4.37%	2,806	17.73%	15,825	100.00%
1983	6,491	31.88%	10,667	52.39%	688	3.38%	2,514	12.35%	20,360	100.00%
AVERAGE ANNUAL GROWTH RATE (%)										
1972 - 1975	18.62		3.86		47.77		29.05		14.92	
1975 - 1980	22.3		17.03		19.22		13.32		18.62	
1980 - 1983	-14.64		16.14		5.68		-14.23		-2.27	
1972 - 1983	9.96		13.04		22.32		8.82		11.54	

SOURCE : DEPARTMENT OF STATISTICS, MONTHLY STATISTICAL BULLETIN, PENINSULAR MALAYSIA

More than 70% of the total passenger cars are 1600 c.c and below. Production of passenger cars increased from 20,900 units in 1970 to 97,000 units in 1983 representing an average growth rate of 12.6% over the 14 year period. A slightly higher growth rate is seen in passenger cars above 1600 c.c range. In the early 1980s, all the different categories of passenger cars experienced slower growth rates, indicating that the industry was affected by the global recession.

In the case of commercial vehicles, its average annual growth rate is slightly slower than that of passenger cars. Production of commercial vehicles increased from 7,668 units in 1970 to 20,360 units in 1983, with buses accounting for the bulk of the increase. Production of buses increased from 75 units in 1972 to 688 units in 1983 representing a growth rate of 22.3% per annum. The recession has had an adverse impact on the assembly of commercial vehicles. During the period 1980 to 1983, production of commercial vehicles declined at a rate of 2.3% per annum. The worst affected type of vehicle is lorry with an average annual decline of 14.6% for the period 1980 to 1983.

2.1.4 Production By Plant

In Malaysia, the total production of motor vehicles in 1983 was 118,500 units, representing an average output per plant of 12,528 units for passenger cars and 1,824 units for commercial vehicles. In 1980, average output per plant worked out to be 10,050 for passenger cars and 2,644 for commercial vehicles. An indication of all these compared with that of other countries can be seen from Table 3.2.13.

As can be seen from Table 3.1.13, Malaysia's average plant production volume is low by World standards. The 1980 plant output ranged from 79 units to 23,393 units for passenger cars and 36 units to 7,855 units for commercial vehicles. The problem is further compounded by the low uneconomic level of capacity utilization and wide product mix. Table 3.2.14 presents a summary of output and capacity utilization by assembly plant in 1983.

The two largest assembly plants in terms of output are Tan Chong Motor Assemblers Sdn Bhd and Assembly Services Sdn Bhd producing 68,577 units (or 58% of total output in 1983) at capacity utilization of 84% and 78% respectively. On the other hand, the smallest assembler, Tatab Industries Sdn Bhd, with output of 149 units is operating at only 10% capacity. Other assembly plants, in particular, Associated Motor Industries (M) Sdn Bhd, Kelang Pembena Kereta Kereta Sdn Bhd, Oriental Assemblers Sdn Bhd and Asia Automobile Industries Sdn Bhd are producing motor vehicles in the range of 7,000 units to 13,500 units at 66% to 95% utilization levels. The smaller assembly plants producing 5,000 units and less include Sarawak Motor Industries Sdn Bhd and Swedish Motor Assemblies Sdn Bhd which have relatively high utilization level of 84% and 73% respectively.

TABLE 3.2.15

MEAN AND MEDIAN OUTPUT RANGE * OF
AUTOMOBILE PLANTS IN SELECTED COUNTRIES, 1980

	Total		P.C.		C.V.	
	Mean	Range	Mean	Range	Mean	Range
Malaysia	9,473	1,045 - 31,248	10,050	79- 23,393	2,644	36- 7,855
India	12,282	51- 31,768	7,634	6- 21,752	9,674	1,235- 31,768
Japan	1,003,898	812- 3,293,344	782,012	87,830- 2,303,284	364,070	812- 990,060
Korea	20,156	1,220- 60,356	14,306	315- 39,701	12,743	528- 20,655
Australia	52,750	3,000- 110,000	60,666	4,000- 98,000	7,250	2,000- 12,000
Canada	171,787	2,071- 766,970	169,355	3,077- 512,330	75,360	2,071- 254,640

Source : Compiled from World Motor Vehicle Data, 1981 Edition

* Refers to output of smallest and largest automobile plant

TABLE 3.2.14

PRODUCTION SUMMARY OF MOTOR VEHICLE ASSEMBLY PLANTS * 1983

	Ranking (By Output)	Output (Units)	Capacity Utilised (%)
TCMA	1	35,833	84
ASSB	2	32,724	78
AMI	3	13,032	67
OASB	4	10,281	77
KPKK	5	9,220	95
AAI	6	7,254	66
SMA	7	5,120	73
SMI	8	2,549	84
CCB	9	1,389	57
KMA	10	315	16
TATA	11	149	10

Source : Malaysian Motor Vehicle Assemblies Association

* See Appendix 4 for details

2.1.5 Product Mix

Table 3.2.15 shows the principal products produced by the motor vehicle industry in 1978 and 1981. In 1981, passenger cars within the 1000 c.c. and 1600 c.c. range represent the largest product in terms of ex-factory value of production (33%), followed by passenger cars above 1600 c.c range (26.8%), lorries (25.1%) and vans (7.8%). Passenger cars below 1000 c.c, buses and coaches, trailers and others represented less than 15% of the total output value.

However, the product mix in 1978 was slightly different from 1981. Passenger cars less than 1,000 c.c accounted for 10.8% in 1978 as compared to 0.3% in 1981. In 1978, pickups and trucks represented 1.5% and 4.0% respectively. However, in 1981 there was no production on pickups and trucks.

If the above production figures are further disaggregated by make and model, the resulting output levels would be even smaller. This is due to the fact that the motor vehicle industry comprising only 11 operating plants has a wide product mix. As at 1983, there are 22 makes, 105 models of passenger cars and commercial vehicles being approved for local assembly. (See Appendix 2).

However, only an average of 36 models of passenger cars (41 models of commercial vehicles) from 16 makes are being assembled in a typical month. From this, only about 10 models from 7 makes of passenger cars and 10 models from 5 makes of commercial vehicles comprise the top 80% of the total volume assembled locally.

TABLE 3.2.15

PENINSULAR MALAYSIA : PRINCIPAL PRODUCT MIX OF MOTOR VEHICLE ASSEMBLY (MIC 38432), 1978 AND 1981

PRODUCTS	MIC CODE	1978 EX-FACTORY VALUE OF PRODUCTION	1978 %	1981 EX-FACTORY VALUE OF PRODUCTION	1981 %
PASSENGER CARS 1000 C.C. <= C.C. <= 1600 C.C.	38432-02	64,158,235	32.50%	91,449,023	33.08%
LORRIES	38432-04	57,247,175	29.00%	69,470,595	25.13%
PASSENGER CARS >= 1600 C.C.	38432-03	31,510,911	15.96%	73,939,364	26.75%
PASSENGER CARS <= 1000 C.C.	38432-01	21,300,991	10.79%	846,289	0.31%
BUSES AND COACHES	38432-06	9,100,530	4.61%	8,921,389	3.23%
PICKUPS	38432-10	2,987,996	1.51%	0	0.00%
VANS	38432-05	1,204,450	0.61%	21,652,704	7.83%
TRUCKS	38432-09	7,842,960	3.97%	0	0.00%
TRAILERS	38432-07	730,306	0.37%	3,339,529	1.21%
OTHERS		1,297,125	0.66%	6,794,951	2.46%
TOTAL		197,380,679	100.00%	276,413,844	100.00%

SOURCE : DEPARTMENT OF STATISTICS, SURVEY OF MANUFACTURING INDUSTRIES, 1978

There are some plants which are assembling similar makes and models in 1983 as shown in Table 3.2.16. Since then, however, the number of plants with such duplicating efforts is reduced with the phasing out of some motor vehicle models.

2.1.6 Production By Engine Size

Appendix 3 provides a breakdown of motor vehicle output by engine size between 1980 and 1983. As evident, the bulk (84%) of motor vehicles assembled in 1983 was concentrated within the 1200 cc to 1600 cc range, an increase of 40% over the percentage composition in 1980. This reflects the gearing-up of assembly plants over the period to cater to the increasing demand for smaller and more fuel efficient cars amongst the Malaysian populace particularly in the wake of the increasing prices of imported CBUs.

In the case of commercial vehicles, trucks of 3 tons and below are popular, accounting for 43% of total commercial vehicle output in 1983.

2.1.7 Input Materials Usage Costs

The main activity of the industry is assembly services. The assembly plants import CKD packs and incorporate the local components into the packs. As can be seen in Table 3.2.17, in 1978 (the latest year for which comprehensive data are available) the cost of CKD packs constitutes about 80 percent of the material cost. Other input materials include

TABLE 3.2.16

SIMILAR MAKES & MODELS BY ASSEMBLY PLANT, 1983

Makes	Models	Assembly Plant
Daihatsu	Charade	ASSB
	Charmant	SMA
	Trucks	ASSB
Toyota	Vans, pick-ups, Trucks	ASSB
	Land Cruiser and Trucks	SMI
Isuzu	Pick-up, Flatdeck	OASB
	Truck, ELF & Others	KMA
Landrover	Jeep 88	ASSB
	Jeep 109	AMI

Source : Malaysian Motor Vehicle Assemblers Association

TABLE 3.2.17

PENINSULAR MALAYSIA : INPUT MATERIALS USED IN THE MOTOR VEHICLE ASSEMBLY INDUSTRY, 1973 AND 1978

TYPES OF INPUTS	1973 ($MILLION)	1978 ($MILLION)	1973 %	1978 %
CKD PACKS FOR COMMERCIAL AND PASSENGER VEHICLES	93.74	154.48	83.98	78.09
ACCESSORIES & PARTS	-	6.04	-	3.05
PAINTS	3.30	5.92	2.96	2.99
BATTERIES	1.47	4.34	1.32	2.20
SEALER ADHESIVES, WINDSCREEN	-	1.10	-	0.56
TYRES	10.38	20.81	9.30	10.52
OTHERS	2.73	5.13	2.44	2.59
TOTAL	111.62	197.83	100.00	100.00

SOURCES : CALCULATED FROM CENSUS OF MANUFACTURING INDUSTRIES, 1973 AND SURVEY OF MANUFACTURING INDUSTRIES, 1978 tyres (10.5%), accessories and parts (3.05%), paints (3%), batteries (2.2%), and sealer adhesives and windscreen (0.6%).

The composition of input materials has changed over the years. More local content has been incorporated into the CKD packs in 1978 as compared to 1973. The CKD pack component of total cost was reduced from 84% in 1973 to 78% in 1978 due to the implementation of localization policies.

Overall, the input material represents 94% of the total input costs. Other inputs include water, lubricated fuel, electricity (2.6%), and other supplies (3.5%).

In 1981 the average ex-factory price of a locally assembled passenger car was about $12,272 which was higher than average CBU car (average c.i.f $11,653). However, the difference will be greater if a comparison is made between the same model.

According to some studies (Odaka, 1982), the ex-factory prices of locally assembled motor vehicles are higher than the c.i.f prices of imported CBU equivalents by a range of 20% to 80%, depending on the motor vehicle make and model. The main reasons for the relatively high assembly costs are the low production volume (and broad product mix giving rise to diseconomies of scale), increasing costs of imported CKD packs, and the high costs of local components (which assemblers under the CKD deletion programme must comply with or be penalized).

A major factor contributing to the high costs of locally-manufactured components is their high content of imported raw materials (the proportion can be as high as 50% to 80%) which are subject to 5% surtax and 10% sales tax and in some cases are subject to 25% import duty if exemption is not given. In addition, the costs of these imported raw materials are dependent on production costs overseas, freight charges, insurance and foreign exchange rates which have all increased over the past few years. A more detailed study on component parts manufacturing is contained in the next section.

2.1.8 External Trade

Table 3.2.18 shows the exports and imports of different categories of motor vehicles. As can be seen, the import values of motor vehicles increased from $176.3 million in 1968 to $1,372.9 million in 1983, representing an average annual growth rate of 17.1%. The bulk of the imports came from CKD packs which constituted about 68% of total imports in 1983.

However, the export/import ratio is very negligible representing 4.1% in 1968 and 2.2% in 1983.

The major exporter of CKD passenger cars to Malaysia in 1983 were Japan (83%), Republic of Germany (10.5%) and Sweden (5.6%). For CBU passenger cars, about 59% originated from Japan, 30% from Republic of Germany, 5.7% from UK. Other exporters of CBU cars to Malaysia were Australia,

TABLE 3.2.18

MALAYSIA: EXPORTS AND IMPORTS OF MOTOR VEHICLES, 1968-1983

DESCRIPTION	SITC CODE	1968 EXPORT $ f.o.b	1968 IMPORT $ c.i.f	1973 EXPORT $ f.o.b	1973 IMPORT $ c.i.f	1978 EXPORT $ f.o.b	1978 IMPORT $ c.i.f	1981 EXPORT $ f.o.b	1981 IMPORT $ c.i.f	1983 EXPORT $ f.o.b	1983 IMPORT $ c.i.f
PASSENGER CARS DUAL PURPOSE CKD	78103100	-	-	-	-	-	7,300	-	62,405,645	1,800	49,372,000
PASSENGER CARS DUAL PURPOSE CBU	78103200	-	-	-	-	-	-	239,986	36,589,654	481,397	387,322
PASSENGER CARS CKD	78101000	-	124,789,888	38,972	271,615,452	34,000	507,023,006	56,230	687,948,744	55,336	779,322,355
PASSENGER CARS CBU - NEW	78102100	-	-	1,312,111	22,426,546	1,691,670	97,013,875	1,034,835	132,751,267	4,818,597	52,728,893
PASSENGER CARS CBU - OLD	78102900	-	2,613,747	2,090,154	5,199,410	1,599,899	34,280,640	912,597	41,581,628	2,061,133	32,079,615
MOTOR BUSES CKD	78311000	5,087	1,507,301	-	445,464	-	18,267,278	-	28,247,645	-	1,210,789
MOTOR BUSES CBU - NEW	78312100	-	-	162,571	1,140,771	675,200	10,941,476	70,000	10,285,276	353,160	4,042,340
MOTOR BUSES CBU - OLD	78312900	35,579	135,028	26,000	140,462	35,400	1,336,906	26,500	1,440,628	178,500	286,022
AMBULANCE	78211000	-	-	-	231,184	-	97,029	-	1,662,920	-	752,138
MOTOR VEHICLE FOR TRANSPORTATION OF GOODS OR MATERIALS CKD	78212000	3,594,173	37,453,448	35,757	69,888,689	525,000	148,692,200	54,360	259,739,632	-	148,324,028
" - CBU - NEW	78213100	-	-	1,213,326	21,393,395	3,278,018	116,845,417	3,420,912	167,786,420	6,946,166	110,815,942
" - CBU - OLD	78213200	2,526,846	2,522,185	954,306	3,623,769	382,317	17,699,176	401,733	41,263,157	3,500,514	17,634,916
OTHERS	78219000 &	-	-	-	-	166,507	1,765,045	146,051	181,709	14,921	666,797
	78319000	-	-	-	-	-	-	-	-	-	-
SPECIAL PURPOSE MOTOR, LORRIES & VANS	78220000	595,590	1,973,583	4,522,438	7,878,921	3,753,830	14,436,288	1,783,456	42,440,742	7,116,183	87,760,234
TRAILERS	78611000	125,347	2,079,377	667,514	3,209,651	1,525,824	-	1,797,412	12,215,651	3,440,798	6,351,837
	78612000	-	-	-	-	-	-	-	-	-	-
	78681000	-	-	-	-	-	-	-	-	-	-
TRUCKS	74411100	336,389	3,111,148	171,282	10,918,686	203,225	22,461,507	938,376	41,660,523	572,080	38,967,411
	74411900	50,920	144,610	544,439	2,672,387	72,032	3,013,650	214,508	13,341,324	115,365	7,885,981
CHASSIS FITTED WITH ENGINE	78412000 to	-	353	18,283	270,914	139,977	1,289,299	635,360	11,290,935	106,500	34,549,918
	78415000	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-
TOTAL		7,269,931	176,330,668	11,757,153	421,055,701	14,082,899	995,178,097	11,732,316	1,592,813,500	29,761,443	1,372,938,538

SOURCE : DEPARTMENT OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, MALAYSIA, VARIOUS YEARS

France, Italy and Sweden which accounted for about 4% of total imports of CBU cars in 1983. (Table 3.2.19).

2.1.9 World Motor Vehicle Registration and Ownership

World registration of motor vehicles (four wheelers) increased at an average rate of 4.7% per annum from 327.8 billion in 1976 to 432.1 billion in 1982. Passenger car registration constituted 78% of total motor vehicle registration. A breakdown of world motor vehicle registration by country is presented in Table 3.2.20. As evident from the table, countries in Reference Group IV (namely United Kingdom, Japan and U.S.A.) accounted for over half the world motor vehicle registration.

For Malaysia, motor vehicle registration of 1.3 million in 1982 was comparable, if not higher, than other ASEAN countries like Indonesia and Thailand. The average increase in Malaysian registered motor vehicles over the 1976 to 1982 period was 12.1% per annum. Since 1982, total registered motor vehicles had further increased to approximately 1.5 million in 1983. Annual new motor vehicle registrations (which are equivalent to sales of new motor vehicles in the country) for the ten year period from 1973 to 1983 are shown in Table 3.2.21. As can be seen from the table, new registrations of passenger cars (the bulk or 80% of which are in Peninsular Malaysia) have been increasing at an average rate of 8.8% per annum as compared to the 5.5% annual growth rate of commercial vehicles.

TABLE 3.2.19

MALAYSIA : IMPORTS OF PASSENGER CARS BY COUNTRY OF ORIGIN, 1974 AND 1983

COUNTRY OF ORIGIN	PASSENGER CAR, CKD				PASSENGER CAR, CBU NEW			
	1974		1983		1974		1983	
	VALUE	%	VALUE	%	VALUE	%	VALUE	%
AUSTRALIA	11,850,765	2.97%	-	-	467,473	1.10%	672,751	1.28%
CANADA INCLUDING NEWFOUNDLAND	-	-	-	-	11,078	0.03%	-	-
CHINA (MAINLAND)	-	-	-	-	14.673	0.03%	-	-
CZECHOSLOVAKIA	-	-	-	-	5,012	-	-	-
FRANCE INCLUDING MONACO	46,803,072	11.73%	-	-	1,458,140	3.53%	425,691	0.81%
GERMANY REPUBLIC	58,272,519	14.60%	81,874,901	10.51%	6,396,271	15.08%	16,162,668	30.65%
HONG KONG	-	-	-	-	18,000	0.04%	-	-
INDIA ETC.	-	-	-	-	79,168	0.19%	-	-
ITALY INCLUDING SAN MARINA	28,266,611	7.08%	3,986,690	0.51%	3,018,685	7.12%	338,855	0.64%
JAPAN	169,148,500	42.39%	649,535,745	83.35%	26,014,488	61.34%	31,042,295	58.87%
NEW ZEALAND	-	-	-	-	11,191	0.03%	-	-
SINGAPORE	-	-	-	-	50,938	0.12%	-	-
SWEDEN	13,339,872	3.34%	43,926,019	5.64%	1,014,157	2.39%	814,338	1.54%
SPAIN	431,583	0.11%	-	-	-	-	-	-
UNITED KINGDOM	70,950,593	17.78%	-	-	3,393,733	8.00%	3,009,190	5.71%
U.S.A. ETC.	-	-	-	-	416,733	0.98%	-	-
OTHERS	-	-	-	-	-	-	263,105	0.50%
TOTAL	399,063,515	100.00%	779,322,355	100.00%	42,409,740	100.00%	52,728,893	100.00%

SOURCE : DEPARTMENT OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, MALAYSIA, 1974 AND 1983

TABLE 3.2.20

AUTOMOBILE REGISTRATIONS BY COUNTRIES, 1982, 1979 AND 1976 ('000 UNITS)

	1982 TOTAL	1982 P.C.	1982 C.V.	1979 TOTAL	1979 P.C.	1979 C.V.	1976 TOTAL	1976 P.C.	1976 C.V.	AV. TOTAL GROWTH RATES (%) 1976 - 1982
MALAYSIA	1,295	1,050.6	244.4	876.5	697.1	179.4	652.8	519.2	133.6	12.1
REFERENCE GROUP I										
INDONESIA	1,424.4	722.4	702.0	890.0	540.0	350.0	614.6	383.1	231.5	15.0
PHILIPPINES	900.0	500.0	400.0	791.9	453.3	338.5	671.9	399.6	272.3	5.0
THAILAND	900.0	420.0	480.0	730.8	369.8	361.0	529.6	296.0	233.6	9.2
REFERENCE GROUP II										
BRAZIL	10,049.6	8,075.2	1,974.5	9,423.7	7,503.9	1,919.8	7,429.0	5,829.0	1,600.0	5.2
SOUTH KOREA	562.0	267.6	294.4	384.5	184.9	199.7	229.3	99.1	130.2	16.1
SINGAPORE	273.4	175.1	98.3	208.8	146.4	62.4	194.8	148.5	46.3	5.8
TAIWAN	655.0	575.0	80.0	379.9	314.3	65.6	230.3	160.0	71.3	19.0
REFERENCE GROUP III										
AUSTRALIA	7,565.3	6,021.0	1,544.3	7,030.2	5,642.2	1,388.0	6,207.9	5,010.1	1,197.8	3.4
CANADA	13,932.0	10,818.0	3,114.0	12,800.0	10,080.0	2,720.0	11,028.0	8,870.0	2,158.0	4.0
REFERENCE GROUP IV										
UNITED KINGDOM	17,512.9	15,632.7	1,880.2	16,375.6	14,505.9	1,869.6	15,988.8	14,061.0	1,927.8	1.5
JAPAN	39,620.9	24,612.3	15,008.7	34,120.7	21,279.7	12,841.0	27,551.6	17,236.3	10,315.3	6.2
U.S.A.	159,760.0	124,336.0	35,424.0	149,068.0	117,147.0	31,921.0	132,949.6	106,712.6	26,237.0	3.1
REFERENCE GROUP V										
INDIA	1,713.2	888.9	824.3	1,565.4	710.9	854.5	1,420.6	812.3	608.3	3.2
OTHER COUNTRIES (EUROPE, LATIN AMERICA, ETC)	176,231.5	141,260.3	34,973.9	150,696.3	121,869.7	28,816.7	122,082.0	99,518.4	22,563.6	6.3
WORLD TOTAL	432,078.7	335,101.7	96,976.9	385,167.3	301,315.4	83,841.9	327,780.8	260,055.2	67,725.6	4.7

SOURCE : WORLD AUTOMOTIVE MARKET, 1982, 1979 AND 1976

TABLE 3.2.21

MALAYSIA : ANNUAL NEW REGISTRATIONS OF AUTOMOBILES, 1973 TO 1983

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
PASSENGER CARS											
- Peninsular Malaysia	39.2	44.7	41.1	41.9	59.4	63.6	48.5	85.6	88.4	88.3	90.0
- Sabah & Sarawak	6.0	7.6	6.4	7.5	8.8	10.7	12.6	12.8	13.0	13.3	14.6 *
SUB-TOTAL	45.2	52.3	47.5	49.4	68.2	74.3	61.1	98.4	101.4	101.6	104.6
COMMERCIAL VEHICLES											
- Peninsular Malaysia	7.5	10.4	10.6	10.8	12.8	12.4	9.9	20.3	18.0	17.7	18.1
- Sabah & Sarawak	1.9	2.9	2.5	2.6	3.1	4.7	6.7	8.3	6.7	5.8	6.5
SUB-TOTAL	9.4	13.3	13.1	13.4	15.9	17.1	16.6	28.6	24.7	23.5	24.6
TOTAL ANNUAL NEW AUTOMOBILE REGISTRATION	54.6	65.6	60.6	62.8	84.1	91.4	77.7	127.0	126.1	125.1	129.2

* - Estimated

Sources: Malaysian Motor Vehicles Assemblers Association
Malaysian Motor Traders Association
Annual Statistics Bulletin : Department of Statistics

In terms of passenger car ownership, Malaysia's ratio of 20.8 persons per passenger car is considerably larger than those of countries in Reference Groups III and IV which have ratios of less than 5.0. As indicated in Table 3.2.22, the highest incidences of car ownership are found in the U.S., Canada and Australia with ratios of 1.8, 2.2 and 2.4 persons per passenger car respectively. However, amongst ASEAN and other Asian countries within Reference Groups I and II (with the exception of Singapore), Malaysia's incidence of car ownership is still higher.

2.1.10 Motor Vehicle Imports

Table 3.2.23 presents the total imports of new motor vehicles for the various Reference Group countries over the period 1977 to 1981. With the exception of ASEAN countries of Malaysia, Indonesia and Singapore as well as South Korea and Australia, total imports of new motor vehicles for other countries registered a decline, ranging from 4.3% per annum for Japan to 38.8% per annum for Brazil. The United States had a marginal increase of 0.7% over the period.

In the case of Malaysia, it can be seen that the importation of CBU and CKD motor vehicle units grew at an average rate of 5.5% per annum between 1977 and 1982. However, in actual fact, motor vehicle imports declined from 100,200 units in 1977 to 76,000 units in 1979, but increasing to 130,800 units by 1982. Running contrary to the import trend over the same period, local production (i.e. assembly) of motor vehicles registered a steady

TABLE 3.2.22

WORLD : PERSONS PER PASSENGER CAR, 1978 TO 1982

	1978	1979	1980	1981	1982
MALAYSIA	25.7	23.5	22.5	21.2	20.8
Reference Group I					
Indonesia	317.5	274.9	263.2	240.1	205.0
Philippines	105.6	102.8	103.2	101.0	100.0
Thailand	131.1	124.7	121.9	118.8	114.9
Reference Group II					
Korea, South	293.8	203.2	158.5	153.4	146.0
Singapore	17.1	16.2	16.7	14.5	13.7
Taiwan	58.1	55.7	55.4	52.1	50.3
Reference Group III					
Australia	2.5	2.6	2.5	2.5	2.4
Canada	2.4	2.3	2.3	2.3	2.2
Reference Group IV					
Japan	5.8	5.5	5.2	4.9	4.8
United Kingdom	3.9	3.9	3.7	3.6	3.6
U.S.A.	1.9	1.9	1.9	1.8	1.8

Source : Sinclair, Staurt, The World Car : The Future of The Automobile Industry, Euromonitor Publications Ltd, 1983

TABLE 3.2.23

WORLD : IMPORTS OF NEW AUTOMOBILES BY COUNTRIES, 1982, 1979 AND 1977 ('000 UNITS)

	1982			1979			1977			AV. TOTAL GROWTH RATES
	TOTAL	P.C.	C.V.	TOTAL	P.C.	C.V.	TOTAL	P.C.	C.V.	(%) 1976 - 1982
MALAYSIA	130.8	116.8	14.0	76.1	64.3	11.8	100.2	88.1	12.1	5.5
REFERENCE GROUP I										
INDONESIA	163.4	30.4	133.1	81.5	13.7	67.8	107.7	13.4	94.3	8.7
PHILIPPINES	42.8	25.5	17.3	50.6	28.8	21.8	57.2	28.2	29.0	-5.6
THAILAND	83.6	25.2	58.4	85.3	23.9	61.4	105.4	26.7	78.7	-4.5
REFERENCE GROUP II										
BRAZIL	0.6	0.6	0.0	0.8	0.5	0.3	7.0	0.3	6.7	-38.8
SOUTH KOREA	10.3	7.1	3.2	8.9	3.9	5.0	0.6	0.3	0.3	76.6
SINGAPORE	47.7	34.7	12.9	39.1	26.3	12.8	25.0	18.0	7.0	13.8
TAIWAN	27.3	21.2	6.1	46.3	29.7	16.6	60.4	32.7	27.7	-14.7
REFERENCE GROUP III										
AUSTRALIA	301.3	160.3	140.9	217.1	145.0	72.1	286.3	212.8	73.4	1.0
CANADA	643.9	536.7	107.4	879.1	722.0	157.1	908.5	780.5	120.0	-6.6
REFERENCE GROUP IV										
UNITED KINGDOM	947.4	880.0	67.3	1,086.9	1,007.8	79.1	770.4	718.4	52.0	4.2
JAPAN	30.8	30.6	0.2	56.2	56.0	0.2	38.3	38.2	0.1	-4.3
U.S.A.	3,668.9	2,859.5	809.4	3,587.5	2,686.6	900.9	3,546.2	2,818.2	728.0	0.7

SOURCE : WORLD AUTOMOTIVE MARKET, 1977, 1980 AND 1982

increase of 15.9% per annum from 61,900 units in 1977 to 100,900 units by 1982. This reflects the coming onstream of 4 additional assembly plants within the period as well as the Government's efforts at restricting imports (especially CBU units) into the country by way of import quotas and steeper tariff rates for CBUs.

Table 3.2.24 shows the total supply (both CBU imports and local production) of motor vehicles in Malaysia between 1967 and 1983. The import of CBU motor vehicles (passenger and commercial vehicles) shows a decline since the establishment of the motor vehicle assembly industry in 1967. Although there has been a slight increase since 1972, neither the volume nor value of import has reached the 1968 level. In 1969, a total of approximately 1,500 units of four-wheelers were imported, 80% of which were passenger cars. In 1983, the import of CBU four wheelers totalled approximately 13,800 units, passenger cars comprising 72%. The value of CBU four-wheeler import came to more than $154 million in 1983, almost 60% of which were passenger cars. A detailed breakdown of motor vehicle imports by CBU and CKD units and value between 1967 and 1983 are shown in Table 3.2.25.

2.1.11 Motor Vehicle Output

World production of motor vehicles (four wheelers) stood at 37.1 million units in 1982, representing a slight decline of 1% per annum from the figure of 39.1 million units in 1976. Passenger cars accounted for 27.7 million units (or almost three-quarters) of total 1982 production. Table

TABLE 3.2.24

PENINSULAR MALAYSIA : TOTAL SUPPLY OF MOTOR VEHICL--, 1970 TO 1983 ('000 UNITS)

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	Average Growth Rate %
IMPORTS (CBUS)																		
FOUR WHEELERS	[illegible]	26.1	1.5	2.3	1.5	1.6	1.6	3.9	5.4	7.1	[illegible]	17.9	12.4	23.6	20.9	17.5	13.8	-1.5
- PASSENGER CARS	14.?	21.9	1.2	2.1	1.1	1.4	1.3	2.1	3.2	3.8	10.2	14.4	9.0	16.5	14.4	12.5	9.9	-2.4
- COMMERCIAL VEHICLES	[illegible]	4.2	0.3	0.2	0.4	0.2	0.3	1.8	2.2	3.3	[illegible]	3.5	3.4	7.1	6.5	5.0	3.9	1.4
TWO WHEELERS	n.a	n.a	14.6	6.9	7.3	7.9	9.7	17.5	14.1	6.8	6.7	8.1	11.5	13.2	8.1	1.8	1.3	-15.9
TOTAL IMPORTS (C BUS)	n.a	n.a	16.1	9.2	8.8	9.5	11.3	21.4	19.5	13.9	21.4	19.5	23.9	36.8	29.0	19.3	15.1	-0.01
LOCAL PRODUCTION																		
FOUR WHEELERS	[illegible]	11.2	25.0	28.0	30.5	30.9	48.8	64.2	47.3	51.6	61.1	77.9	76.2	99.5	106.2	98.9	115.6	32.6
PASSENGER CARS	3.3	9.6	20.5	21.0	23.6	24.8	40.8	52.5	37.5	43.2	51.7	64.1	61.0	80.3	87.5	84.9	99.5	43.8
COMMERCIAL VEHICLES	0.9	2.6	4.5	7.0	6.9	6.1	8.0	11.7	9.8	8.4	9.4	13.8	15.2	19.2	18.7	14.0	16.1	20.7
TWO WHEELER	n.a	n.a	n.a	n.a	n.a	n.a	n.a	108.5	96.7	99.1	122.3	127.1	116.5	174.6	179.3	209.1	242.9*	9.4
TOTAL LOCAL PRODUCTION	n.a	n.a	n.a	n.a	n.a	n.a	n.a	172.7	144.0	150.7	183.4	205.0	192.7	274.1	285.5	308.0	358.5	8.5
SUPPLY																		
FOUR WHEELER	19.0	17.3	26.4	30.3	32.0	32.5	50.4	68.1	52.7	58.7	75.8	95.8	88.6	123.1	127.1	116.4	129.4	12.9
PASSENGER CARS	15.0	10.5	21.7	23.0	24.7	26.2	42.4	54.6	40.7	47.0	61.9	78.5	70.0	96.8	101.9	97.4	109.4	13.3
- COMMERCIAL VEHICLES	4.0	6.8	4.8	7.2	7.3	6.3	8.3	13.5	12.0	11.7	13.9	17.3	18.6	26.3	25.2	19.0	20.0	11.3
TWO WHEELER	n.a	n.a	n.a	n.a	n.a	n.a	n.a	126.0	110.8	105.9	129.0	135.2	128.0	187.8	187.4	210.9	244.2	7.6
TOTAL SUPPLY	n.a	n.a	n.a	n.a	n.a	n.a	n.a	194.1	163.5	164.6	204.8	231.0	216.6	310.9	314.5	327.3	373.6	7.6

Source: Malaysian Motor Vehicles Assemblers Association
Annual Statistics of External Trade, Malaysian - Volume II, Dept. of Statistics

TABLE 3.2.25

PENINSULAR MALAYSIA: VOLUME AND VALUE OF MOTOR VEHICLE IMPORTS, 1967 - 1983

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
PASSENGER CARS										
CBU UNITS	14,634		1,165	2,068	1,111	1,400	1,284	2,083	3,234	3,818
VALUE C.IF ($'000)	72,877		5,819	5,765	6,942	10,360	9,309	18,852	25,312	23,469
CKD UNITS			22,373	23,454	29,267	32,078	52,080	71,955	44,857	56,664
VALUE C.I.F ($'000)			105,290	112,219	148,120	173,886	271,615	399,064	250,910	340,024
CBU + CKD ($'000)	14,634	0	23,538	25,522	30,378	33,478	53,364	74,038	48,091	60,482
VALUE C.I.F ($'000)	72,877	0	111,109	117,984	155,062	184,246	280,924	417,916	276,222	363,493
% CBU (UNITS)	100.0%	NA	4.9%	8.1%	3.7%	4.2%	2.4%	2.8%	6.7%	6.3%
COMMERCIAL VEHICLES										
CBU UNITS	3,051		276	179	408	180	328	1,822	2,243	3,316
VALUE C.I.F ($'000)	24,741		1,531	1,292	3,388	3,038	3,079	15,302	23,264	24,277
CKD UNITS			4,321	8,317	6,101	5,476	8,260	12,093	9,938	8,613
VALUE C.I.F ($'000)			165,464	72,308	66,102	44,978	70,334	124,970	103,507	93,274
CBU + CKD UNITS	3,051	0	4,597	8,496	6,509	5,656	8,588	13,915	12,181	11,929
VALUE C.I.F ($'000)	24,741	0	166,995	73,600	69,490	48,016	73,413	140,272	126,771	117,551
% CBU UNITS	100.0%	NA	6.0%	2.1%	6.3%	3.2%	3.8%	13.1%	18.4%	27.8%
MOTOR CYCLES										
CBU UNITS			14,589	6,873	7,260	7,872	9,730	17,514	14,127	6,806
VALUE C.I.F ($'000)			9,022	4,638	5,230	6,847	10,156	18,933	15,112	6,869
CKD UNITS			17,797	32,966	28,758	38,090	70,022	119,743	90,805	86,552
VALUE C.I.F ($'000)			11,190	20,506	17,932	24,111	44,322	87,070	66,346	56,978
CBU + CKD ($'000)	0	0	32,386	39,839	36,018	45,962	79,752	137,257	104,932	93,358
VALUE C.I.F ($'000)	0	0	20,212	25,144	23,162	30,958	54,478	106,003	81,458	63,84[illegible]
% CBU (UNITS)	NA	NA	45.0%	17.3%	20.2%	17.1%	12.2%	12.8%	13.5%	7.3%
ALL VEHICLES										
TOTAL CBU UNITS	17,685	0	16,030	9,120	8,779	9,452	11,342	21,419	19,604	13,940
VALUE C.I.F ($'000)	97,618	0	16,372	11,695	15,560	20,245	22,544	53,087	63,688	54,615
TOTAL CKD UNITS	0	0	44,491	64,737	64,126	75,644	130,362	203,791	145,600	151,829
VALUE C.I.F ($'000)	0	0	481,944	205,033	232,154	242,975	386,271	611,104	420,763	490,276
TOTAL CBU + CKD UNITS	17,685	0	60,521	73,857	72,905	85,096	141,704	225,210	165,204	165,769
TOTAL VALUE C.I.F ($'000)	97,618	0	498,316	216,728	247,714	263,220	408,815	664,191	484,451	544,891
% CBU (UNITS)	100.0%	NA	26.5%	12.3%	12.0%	11.1%	8.0%	9.5%	11.9%	8.4%

SOURCE : DEPARTMENT OF STATISTICS.

TABLE 3.2.25 (CONT.)

PENINSULAR MALAYSIA: VOLUME AND VALUE OF MOTOR VEHICLE IMPORTS, 1967 - 1983

	1977	1978	1979	1980	1981	1982	1983
PASSENGER CARS							
CBU UNITS	10,218	14,391	8,963	16,545	14,364	36,514	9,932
VALUE C.IF ($'000)	50,250	82,214	80,461	103,547	116,861	134,396	91,044
CKD UNITS	77,859	66,721	55,330	80,983	86,303	80,269	101,532
VALUE C.I.F ($'000)	480,100	507,023	423,595	612,464	683,966	582,313	760,163
CBU + CKD ($'000)	88,077	81,112	64,293	97,528	100,667	116,783	111,464
VALUE C.I.F ($'000)	530,350	589,237	504,056	716,011	800,827	716,709	851,207
% CBU (UNITS)	11.6%	17.7%	13.9%	17.0%	14.3%	31.3%	8.9%
COMMERCIAL VEHICLES							
CBU UNITS	4,458	3,453	3,421	7,119	6,503	4,950	3,914
VALUE C.I.F ($'000	18,106	10,767	19,770	112,513	99,112	90,284	63,342
CKD UNITS	7,613	6,610	8,423	15,843	11,279	9,038	11,275
VALUE C.I.F ($'000)	90,898	113,242	108,434	224,878	163,606	102,916	128,838
CBU + CKD UNITS	12,071	10,063	11,846	22,962	17,782	13,988	15,189
VALUE C.I.F ($'000)	129,004	144,009	148,204	137,391	262,718	193,200	192,180
% CBU (UNITS)	36.9%	34.3%	28.9%	31.0%	36.6%	35.4%	25.8%
MOTOR CYCLES							
CBU UNITS	6,680	8,116	11,529	13,245	8,147	1,820	1,259
VALUE C.I.F ($'000	6,286	7,973	12,614	17,018	13,704	3,383	3,401
CKD UNITS	24,527	122,089	118,674	182,482	187,287	199,718	275,138
VALUE C.I.F ($'000)	81,548	86,089	100,369	140,536	160,412	153,559	194,885
CBU + CKD ($'000)	31,207	130,205	130,203	195,727	195,430	201,538	276,397
VALUE C.I.F ($'000	87,834	94,062	112,983	157,554	174,116	156,942	198,286
% CBU (UNITS)	5.1%	6.2%	8.9%	6.8%	4.2%	0.9%	0.5%
ALL VEHICLES							
TOTAL CBU UNITS	[illegible]	25,960	23,915	36,909	[illegible]	43,284	15,105
VALUE C.I.F ($'000)	94,642	120,954	132,845	233,078	229,677	228,063	157,787
TOTAL CKD UNITS	209,999	195,420	182,427	279,308	284,869	289,025	387,945
VALUE C.I.F ($'000)	652,546	706,354	632,398	977,878	1,008,004	838,788	1,083,886
TOTAL CBU + CKD UNITS	231,355	221,380	206,342	316,217	313,879	332,309	403,050
TOTAL VALUE C.I.F ($'000)	747,188	827,308	765,243	1,210,956	1,237,683	1,066,851	1,241,673
% CBU (UNITS)	9.2%	11.7%	11.6%	11.7%	9.2%	13.0%	3.7%

SOURCE : DEPARTMENT OF STATISTICS.

3.2.26 presents a breakdown of World motor vehicle production by the various Reference Group Countries.

It is evident from Table 3.2.26 that slightly over half (or 51%) of world production was accounted for by countries in Reference Group IV, namely United Kingdom, Japan and the U.S.A. Amongst these 3 countries, Japan was the only one registering a positive growth rate averaging 5.4% per annum within the period 1976 to 1982, as against a similar but declining rate of production (averaging 7.0% per annum) for both United Kingdom and the U.S. This reflects the shift occuring throughout the seventies in world demand and purchasing patterns away from British, American and other Continental made motor vehicles to Japanese-made motor vehicles, making Japan the major source of motor vehicle exports to the world market today. Next in terms of contribution to world automobile production was Europe (excluding the United Kingdom) accounting for 38% of total production in 1982, followed by the Asia and Pacific region (excluding Japan but including Australia, India, South Korea, New Zealand, Philippines and Malaysia) with 32%.

In relation to other countries in the various Reference Groups, Malaysia's growth in motor vehicle production (i.e. assembly) over the 1976 to 1982 period was rather impressive. Apart from South Korea (the production growth of which registered 22.5% per annum), Malaysia's average growth of 11.8% per annum surpassed that of the

TABLE 3.2.26

WORLD AUTOMOBILE PRODUCTION/ASSEMBLY BY COUNTRIES, 1982, 1979 AND 1976 ('000 UNITS)

	1982 TOTAL	1982 P.C.	1982 C.V.	1979 TOTAL	1979 P.C.	1979 C.V.	1976 TOTAL	1976 P.C.	1976 C.V.	AV. TOTAL GROWTH RATES (%) 1976-1982
MALAYSIA	[illegible]	85.3	15.6	[illegible]	[illegible]	[illegible]	51.6	43.2	8.4	11.8
REFERENCE GROUP I										
INDONESIA	N.A	N.A	N.A	N.A	N.A	N.A	75.6	24.3	51.3	
PHILIPPINES	54.0	29.4	24.6	[illegible]	34.8	[illegible]	53.3	31.2	22.1	0.2
THAILAND	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	
REFERENCE GROUP II										
BRAZIL	859.3	718.8	140.5	1,128.0	967.1	[illegible]	985.5	822.5	163.0	-2.2
SOUTH KOREA	163.5	94.5	69.0	204.5	113.6	90.9	48.3	25.6	22.7	22.5
SINGAPORE	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	
TAIWAN	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	N.A	
REFERENCE GROUP III										
AUSTRALIA	616.4	454.2	162.2	543.6	440.4	[illegible]	362.2	291.8	70.4	9.3
CANADA	1,273.3	806.8	466.5	1,602.3	944.9	657.4	1,644.6	1,143.5	501.1	-4.2
REFERENCE GROUP IV										
UNITED KINGDOM	1,156.5	887.7	268.8	1,478.5	1,070.4	408.1	1,705.5	1,333.4	372.1	-6.1
JAPAN	10,737.1	6,886.9	3,850.2	9,635.4	6,175.7	3,459.7	7,841.4	5,027.8	2,813.6	5.4
U.S.A	6,981.9	5,073.2	1,908.7	11,391.9	8,418.4	2,973.5	11,484.2	8,537.8	2,946.4	-8.0
REFERENCE GROUP V										
INDIA	152.3	42.7	109.6	101.2	29.2	72.0	85.1	31.6	53.5	10.2
OTHER COUNTRIES (EUROPE, LATIN AMERICA)	15,045.3	12,628.2	2,417.2	15,937.1	13,568.2	2,368.9	14,749.3	12,430.6	2,318.7	0.3
WORLD TOTAL	37,140.6	27,707.7	9,432.9	42,166.2	31,823.9	10,342.3	39,088.3	29,743.5	9,344.8	-0.8

SOURCE : WORLD AUTOMOTIVE MARKET, 1982, 1980 AND 1978

other countries mentioned, due mainly to the coming onstream of four additional assembly plants within the period.

Malaysia's four wheeler Motor Vehicle output in 1976 was comparable to the other ASEAN countries, in particular Thailand and the Philippines. However, the bulk (84%) of Malaysia's output has been in passenger cars as against only 14% for Indonesia.

2.2 The Motor Vehicle Parts and Accessories

2.2.1 Industrial Structure

The motor vehicle component parts manufacturing industry was established with the main objective of supplying components to the large replacement equipment market (REM). The products manufactured initially comprised mainly of tyres, batteries and filters. With the setting up of the first local motor vehicle assembly plants in 1967, the government extended the scope of its incentive programme to cover component parts manufacturing companies catering to both the replacement equipment market (REM) and the original equipment market (OEM). By 1983, there were about 100 types of component parts approved by MIDA of which about half were already manufactured locally.

The number of motor vehicle component manufacturing companies approved by MIDA to date is about 200, of which slightly more than half have commenced production. The majority of these companies were established after 1970. With the introduction of the mandatory deletion programme in July 1979, the number of manufacturing companies approved by MIDA has further increased.

Although more than 200 motor vehicle ancillary companies have been approved by MIDA, only 137 companies falling into the statistical classifications under study in 1983 will be covered in this paper. The companies are those manufacturing the six main categories of motor vehicle components, namely, engine parts, electrical parts, drive, transmission and steering parts, suspension and brake parts, body parts and accessories.

Within the framework established above, it can be seen from Table 3.2.27 that 77 of the 137 approved companies are in operation, of which only 2 are located in East Malaysia. Most of the companies in production are concentrated in the more developed states of Selangor (38%), Federal Territory (25%) and Johore (9%). In contrast, there is not a single approved motor vehicle component parts manufacturer located in the less developed states of Pahang, Perlis and Trengganu.

The 1981 Census of Manufacturing Industries revealed that the 4 states of Selangor, Penang, Negri Sembilan and the Federal Territory together accounted for 85% and 75% of total revenue and employment generated respectively by the industry. Of the 80 establishments covered in the Census, 61% were located in these 4 states (Appendix 5). Component parts manufacturers are not organised into any one particular form of legal entity as there exists both individual proprietorships and public limited companies (Table 3.2.28). The larger companies are usually licencee of foreign companies which have experience in supplying original equipment in their home countries. In 1981, private limited and public limited companies accounted for about two-thirds of the total establishments. Of these, 16% were individual proprietorships and 18% partnerships.

TABLE 3.2.27

APPROVED MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURERS BY LOCATION, 1983

	In Operation		Not in Operation		Total	
	No.	%	No.	%	No.	%
Johore	7	9.1	4	6.7	11	8.0
Kedah	3	3.9	3	5.0	6	4.4
Kelantan	1	1.3	1	1.7	2	1.4
Malacca	2	2.6	1	1.7	3	2.2
Negri Sembilan	6	7.8	2	3.3	8	5.8
Pahang	-	-	-	-	-	-
Penang	5	6.5	4	6.7	9	6.6
Perak	3	3.9	3	5.0	6	4.4
Perlis	-	-	-	-	-	-
Selangor	29	37.7	10	16.7	39	28.5
Terengganu	-	-	-	-	-	-
Federal Territory	19	24.7	31	51.7	50	36.5
Total Peninsular Malaysia	75	97.4	59	98.3	134	97.8
Sabah	-	-	1	1.7	1	0.7
Sarawak	2	2.6	-	-	2	1.5
Total Malaysia	77	100.0	60	100.0	137	100.0

Source: Compiled from MIDA, Directory of Malaysian Automotive Component Manufacturers 1984.

TABLE 3.2.28

PENINSULAR MALAYSIA : PRINCIPAL STATISTICS OF MOTOR VEHICLES PARTS AND ACCESSORIES (MIC 38439) BY LEGAL STATUS, 1981

LEGAL STATUS	NO. OF ESTB.		OUTPUT		VALUE ADDED		TOTAL EMPLOYMENT		SALARIES & WAGES	
		(%)	($'000)	%	($'000)	(%)		(%)	($'000)	(%)
INDIVIDUAL PROPRIETORSHIP	13	16.25%	1,348,206	1.36%	455,989	1.16%	81	2.43%	269,716	1.76%
PARTNERSHIP	14	17.50%	2,325,915	2.35%	908,778	2.31%	92	2.75%	231,157	1.51%
PRIVATE LTD. & PUBLIC LTD.	53	66.25%	95,273,594	96.29%	38,051,695	96.54%	3,167	94.82%	14,835,997	96.73%
OTHERS	-	-	-	-	-	-	-	-	-	-
TOTAL	80	100.00%	98,947,715	100.00%	39,416,462	100.00%	3,340	100.00%	15,336,870	100.00%

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, PEN. MALAYSIA, 1981

The total value of fixed assets of the component parts manufacturing industry amounted to about $84.8 million in 1981. The value of fixed assets per establishment tend to differ in accordance with employment size, ranging from $65,357 to $7.5 million per establishment. On the whole, the average fixed assets size per establishment of the motor vehicle parts manufacturing industry is about twice as large as the total manufacturing sector (Table 3.2.29). This implies that motor vehicle parts manufacturing is capital intensive and requires large investment layout.

2.2.2 Factor Intensity and Productivity

As can be seen in Table 3.2.29, the motor vehicle parts manufacturing industry is more capital intensive than the overall TEI and the manufacturing sector. The capital-labour ratio in 1981 was $25,400 per worker as compared to $15,770 for TEI and $18,220 for the manufacturing sector. In terms of wages, the industry pays the lowest rates, viz $4,590 per worker per annum as compared to $6,260 and $4,890 respectively for TEI and the manufacturing sector. This indicates indirectly that the industry utilizes less skill and labour.

Although the industry is more capital intensive than both TEI and the manufacturing sector, the utilization of semi-skilled labour has somewhat affected productivity. In dollar terms, the labour productivity is about $11,800 per worker as compared to $16,[illegible]10 for [illegible] and $16,650 for the manufacturing sector. [illegible] degree of [illegible]

TABLE . 29

PENINSULAR MALAYSIA : PRODUCTION CHARACTERISTICS OF MOTOR VEHICLE PARTS MANUFACTURING INDUSTRY (MIC 38439), 1981

EMPLOYMENT SIZE	% ESTABLISHMENT	% OUTPUT	% EMPLOYMENT	AVG. FIRM SIZE L/ESTB.	AVG. FIRM SIZE K/ESTB. ($'000)	K/L ($'000)	V.A./L ($'000)	WAGES/L ($'000)	V.A./OUTPUT
< 5	17.5	0.8	1.2	2.79	65.33	23.45	6.01	2.15	0.32
5 - 49	57.5	24.9	26.9	19.54	319.17	16.33	10.21	3.80	0.37
50 - 199	21.2	52.1	50.7	99.59	2,751.04	27.62	11.23	4.18	0.37
200 - 499	3.8	22.2	21.2	236.33	7,493.66	31.71	15.49	6.71	0.50
> 500									
SUB-GROUP	100.0	100.0	100.0	41.75	1,060.57	25.40	11.80	4.59	0.40
TOTAL SUBGROUP (abs.)	80	$98.95	3,340						
DIVISION TOTAL	266	$777.75 mil.	14,528	54.62	861.36	15.77	16.21	6.26	0.30
TOTAL MANUF.	17,780	$34,486.5 mil.	534,145	30.04	547.26	18.22	16.65	4.89	0.26
SUB-GROUP/ MANUF.	0.05	0.29	0.63	139.0	193.8	139.4	70.9	93.9	153.8
DIV. / MANUF.	1.5	2.26	2.72	181.8	157.4	86.6	97.4	128.0	115.4

SOURCE : COMPILED FROM CENSU[illegible] NUFACTURING INDUSTRIES, PENINSULAR MALAYSIA, [illegible] BLISHED DATA, 1981 in the industry in terms of value added output ratio is higher than the TEI and manufacturing sector (0.40 vs 0.30 and 0.26 respectively).

Using the criteria of capital intensity, labour productivity and average wage paid, there is a major difference between small-size and large establishments.

In 1981, the average capital-labour ratio (.27) of small-size establishments was less than large establishments ($28,830). In the case of both wage and labour productivity, the larger establishments paid higher wage rates and in return, benefitted from higher labour productivity.

2.2.3 Product Mix

Table 3.2.30 shows a comparison of the ex-factory values of the different types of motor vehicle parts manufactured locally in 1978 and 1981.

The principal components of the industry include oil filter, exhaust pipe and silencer system, piston, air filter, brake lining and clutch facing, clutch, brake and radiator. Many parts and accessories were unclassified and they constituted about 40.1% of the total output in 1978 and 31.1% in 1981.

The ex-factory value of production of motor vehicle parts and accessories increased from $33.85 million in 1978 to $86.2 million in 1981 or an average annual growth rate of 36.6%. Brake lining and clutch facing experienced the highest growth

TABLE 3.2.30

PENINSULAR MALAYSIA : PRINCIPAL PRODUCT MIX OF MOTOR VEHICLE PARTS AND ACCESSORIES (MIC 38439), 1978 AND 1981

PRODUCTS	MIC CODE	1978 EX-FACTORY VALUE OF PRODUCTION	1978 %	1981 EX-FACTORY VALUE OF PRODUCTION	1981 %	AVERAGE ANNUAL GROWTH RATE (%)
MOTOR VEHICLE OIL FILTER	38439-10	7,387,115	21.82%	9,795,292	10.98%	9.9
EXHAUST PIPE AND SILENCER SYSTEM MOTOR VEHICLE	38439-07	3,748,157	11.07%	6,997,424	7.85%	23.1
PISTON (CAR AUTO)	38439-27	2,144,620	6.34%	3,985,240	4.47%	22.9
AIR FILTERS	38439-30	1,322,635	3.91%	363,307	0.41%	-35.0
BRAKE LINING AND CLUTCH FACING	38439-23	1,316,877	3.89%	10,194,130	11.43%	97.8
MOTOR VEHICLE CLUTCH	38439-04	1,141,597	3.37%	854,013	0.96%	-9.2
MOTOR VEHICLE BRAKE	38439-01	947,002	2.80%	N.A.	0.00%	
RADIATOR & PARTS, MOTOR VEHICLE	38439-11	678,968	2.01%	1,824,779	2.05%	39.0
OTHERS & PARTS AND ACCESSORIES n.e.c.	38439-20	15,165,201	44.80%	55,161,896	61.86%	24.7
TOTAL		33,852,172	100.00%	89,176,081	100.00%	36.6

SOURCE : DEPARTMENT OF STATISTICS, SURVEY OF MANUFACTURING INDUSTRIES, PENINSULAR MALAYSIA 1978 rate (98%) during the period 1978 to 1981, followed by radiator and parts (39%), exhaust pipe and silencer system (23%) and piston (22.9%). In contrast, air filters and clutch had a drop in production.

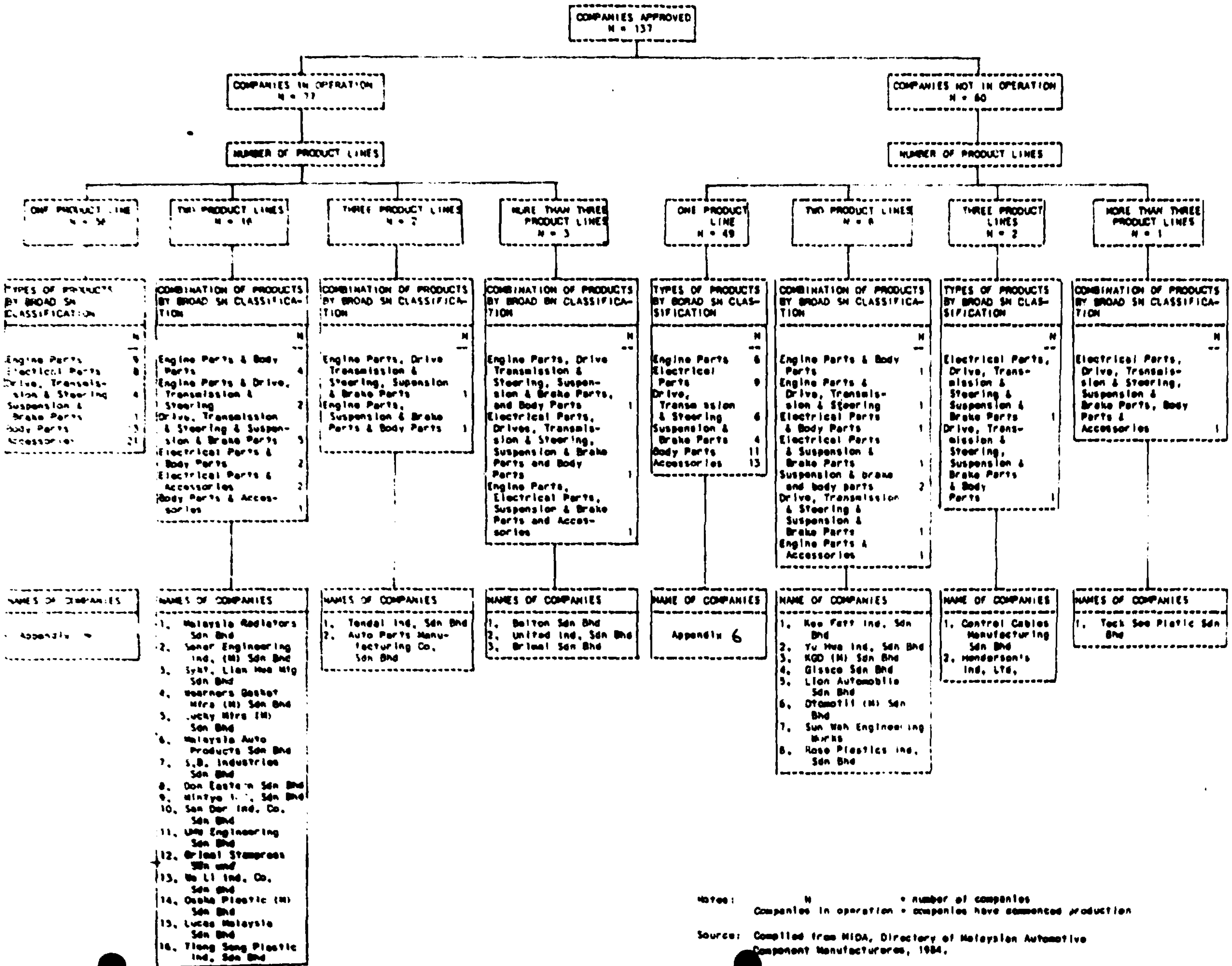
Brake lining and clutch facing represented the largest component (11.8%) manufactured locally in 1981, followed by oil filter (11.4%), exhaust pipe and silencer system (8.1%), piston (4.6%), and radiator and parts (2.1%). These top 5 components accounted for about 40% of the total ex-factory value. Air filters and clutch together comprised less than 1.5% of the output values. The other parts and accessories not classified accounted for another 60%.

Chart 3.2.2 shows the breakdown of approved companies by product lines or broad categories of component parts. A total of 105 companies has been granted approval by MIDA to manufacture one product line of which 56 (or slightly more than 50 %) are in operation. The majority of companies in operation are concentrated on manufacturing either motor vehicle accessories or body parts. The chart also shows that 32 companies have been given approval by MIDA to manufacture more than 1 product line, 21 of which are already in operation. The majority of these operating companies are manufacturing a combination of drive, transmission and steering parts as well as suspension and brake parts.

Appendices 7 to 12 provide a further breakdown of approved companies by specified types of component parts manufactured. It can be seen that further classification of companies by specific parts

CHART 3.2.2

MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURING INDUSTRY



Notes: N = number of companies
Companies in operation = companies have commenced production

Source: Compiled from MIDA, Directory of Malaysian Automotive Component Manufacturers, 1984.

results in the number of companies involved in components manufacturing being larger than the actual number. The Appendices also show the various product mix within each brand component parts category, for instance, a company can be producing fuel filters, air filters and oil filters within the broad category of engine parts. Highlights of the Appendices are summarised below.

(i) Engine Parts

Appendix 7 shows that of the 27 companies approved to manufacture motor vehicle engine parts, 19 have started operation, the majority producing more than 1 type of engine part. A total of 10 types of engine parts are being manufactured locally, the most common ones being air, oil and fuel filters. 70% of the companies are concentrated in this. Although approvals for the manufacture of piston pins, piston rings, valve springs and bearings have been granted to 7 companies, none has, to date commenced production of these items.

(ii) Electrical Parts

Appendix 8 shows that half the 28 companies approved to manufacture electrical parts have already commenced production, the majority producing 1 type of electrical part, ranging from spark plugs, starting motors, and voltage regulators to wiring harnesses, flashers and signal indicator lamps. Only about one-third of the 33 electrical parts approved is actually produced locally.

(iii) Drive, Transmission and Steering Parts

Appendix 9 shows that 14 of the 26 approved companies have commenced production of drives, transmission and steering parts in particular clutch facings and discs, light alloy wheels and king/shackle pins. Component parts which are not yet produced although approvals have been granted, include clutch cover, clutch tubings, steering wheels, propeller shafts, steel wheels, oil seals and control cables.

(iv) Suspension and Brake Parts

The number of companies producing suspension and brake parts is shown in Appendix 10. Less than half of the total approved companies are in operation. Four companies are already producing disc pads and brake linings. Other items such as coil springs, torsion bars and stabilizers, brake hoses, brake pipes, brake drums and discs are still not being manufactured locally. Most of these items are for the Replacement Equipment Market.

(v) Body Parts

Appendix 11 shows that about 60% of the companies approved to manufacture motor vehicle body parts are in operation. The deleted component parts are safety belts, carpets, and safety glasses. There are also four companies manufacturing exhaust system.

(vi) Accessories

The majority of motor vehicle accessories companies are granted approval to manufacture one product only (Appendix 12). These companies mainly produce car coolers and batteries and are located in the Federal Territory and Selangor. All companies which have been granted approval to produce baby car seats and helmets are already in operation. On the other hand, approved companies for car clocks and service tools are still not in production.

2.2.4 Plant Utilization

The average plant utilization level of about 40 motor vehicle ancillary firms in Malaysia is less than a third of the maximum production capacity. Most of the plants work only one shift. (Odaka 1983).

Plants that have two or three shifts are those producing filters, tyre tube valves, brake linings, windscreens, tyres and electrical parts which cater more for the Replacement Equipment market than the Original Equipment Market.

The under-utilization of production capacity reflects the excess supply situation in the motor vehicle component parts' manufacturing industry. The main demand problems that are currently faced by manufacturers are:

i) The recent global recession has affected the motor vehicle industry badly as can be seen in Chart 3.2.1. The demand for motor vehicle component parts is a derived demand which depends on the demand for motor vehicles. Since the demand for motor vehicle has slowed down, the demand for components follows a similar path.

ii) Stiff competition amongst importers of motor vehicle components and local suppliers. This is due largely to the preference of consumers for imported items.

iii) Lack of government protection. With low and under-declared price of imported components from Taiwan, Hong Kong, Thailand and Japan, the demand for locally manufactured components is greatly affected.

iv) Limited market. The components manufacturers cater mainly for the domestic market, which is small and limited in nature. Moreover, only those companies falling under the mandatory deletion programme are able to penetrate the original equipment market. The present market is therefore too small for local manufacturers to realize economies of scale in production.

The problem is further compounded by the several makes and models in the motor vehicle industry (each model requiring components of different specifications) which has further fragmented the market. This has made it difficult for component manufacturers to realize fully the benefits of both large-scale production and specialization. The implications are as follows:

i) less efficient production methods due to the production of small lots. The outcome is lower yield ratio and productivity;

ii) more frequent idle or down time in the manufacturing process due to the necessity to adjust plant and machinery and sometimes labour to meet the particular needs of each model;

iii) higher tooling costs in terms of moulds and jigs, and testing gauges. All these tools are specially developed and made for a particular model;

iv) higher inventory costs due to higher level of raw material and finished goods required to cater fc a wider variety of models.

On the other hand, supply-related problems faced by manufacturers are:

i) Production costs, namely material and labour cost which are relaively high. This is contrary to the common belief that factor inputs from developing countries, including Malaysia, are much lower than developed countries. Owing to the infancy of the industry, there is generally lack of expertise and technical know-how and these together with problems arising from the high labour turnover, worker inefficiency and low capacity utilization levels have caused production costs to increase tremendously.

ii) Shortage of working capital faced by the smaller companies due to the difficulty in securing financial assistance from financial institutions. These problems hinder any further expansion of existing plants.

iii) The increase in the number of companies under the deletion programme has further reduced the market share of existing manufacturers.

2.2.5 Input Materials Usage

The cost of raw materials amounted to $52.1 million in 1981 representing 88% of the total input cost. Table 3.2.31 shows the breakdown of the cost structure of motor vehicle parts and accessories.

Since the product mix of the industry is very broad, the usage of raw material differs greatly from one components to another. As can be seen in the Table 3.2.31, the types of raw materials used range from wire mesh to filter papers. In 1978, (latest available statistics) wire mesh accounted for 15.4% of the total input material consumed by the industry. Other materials included electrodes/welding rods (7.6%), cast iron (7.4%), iron and steel plates (5.6%), and iron and steel rods/bars/ strips. The top 5 material inputs of mainly metallic mineral account for 41% of the total cost of raw material input. These materials are mainly used for making exhaust pipe and silencer systems, pistons, and radiators and parts.

TABLE 3.2.31

PENINSULAR MALAYSIA : INPUT MATERIAL USED IN MOTOR VEHICLE PARTS MANUFACTURING INDUSTRY (MIC 38439), 1978

TOP 10 MATERIALS USED	COST ($)	%
WIRE MESH	2,580,128	15.4%
ELECTRODES/WELDING RODS	1,283,531	7.6%
CAST IRON PROUCTS	1,240,432	7.4%
IRON & STEEL PLATES	938,513	5.6%
IRON & STEEL RODS, BARS, STRIPS	802,108	4.8%
THINNERS	711,796	4.2%
PART FOR FILTER OIL MOTOR VEHICLES	685,132	4.1%
BRAKE LINING	647,049	3.9%
SPARE PART	548,411	3.3%
FILTER PAPER	516,930	3.1%
OTHERS	6,831,832	40.7%
TOTAL	16,785 862	100.0%

SOURCE : DEPARTMENT OF STATISTICS, SURVEY OF MANUFACTURING INDUSTRIES, PENINSULAR MALAYSIA, 1978

Other raw materials, namely brake lining, filter paper and part for filter oil, are used for the final product of brake lining, clutch facing and filter.

2.2.6 External Trade

Table 3.2.32 shows the imports and exports of motor vehicle parts and accessories. Total imports of the industry increased from $59.8 million in 1968 to $131.4 million in 1983 registering an average annual growth rate of 5.4%.

However, only five components are significant enough to be classified as separate items in the External Trade Annual Report. These five components are exhaust pipes and silencer systems, radiators and parts, safety belts, spokes and nipples, and disc pads and bonded brake shoes which together amounted to approximately $7 million(or slightly more than 5% of total imports) in 1983. Other miscellaneous parts for motor vehicles which are unclassified form the major portion of the total imports (91%).

Total expott values of the industry increased from $2.9 million in 1968 to $10.6 million in 1983 having an annual growth rate of 9%. The growth of exports was slightly higher than the growth of imports (at 5.4%) during the period from 1968 to 1983.

Exports of selected parts and accessories of motor vehicle by country of destination are shown in Table 3.2.33.

TABLE 3.2.37

MALAYSIA : EXPORTS AND IMPORTS OF MOTOR VEHICLE PARTS AND ACCESSORIES, 1968 - 1983

DESCRIPTION	SITC CODE	1968		1973		1978		1981		1983	
		EXPORT ($ f.o.b)	IMPORT ($ c.i.f)	EXPORT ($ f.o.b)	IMPORT ($ c.i.f)	EXPORT ($ f.o.b)	IMPORT ($ c.i.f)	EXPORT ($ f.o.b)	IMPORT ($ c.i.f)	EXPORT ($ f.o.b)	IMPORT ($ c.i.f)
EXHAUST PIPES & SILENCER SYSTEMS	78499300	N.A.	N.A.	84,326	580,539	138,064	1,023,724	90,372	3,466,531	50,426	3,350,623
RADIATORS AND PARTS	78499100	N.A	N.A.	2,311	428,646	4,049	1,237,442	30,859	1,538,610	85,667	1,568,612
- - - - - - - - - -	78499200	N.A.	N.A.	29,534	224,442	31,366	765,159	3,511	795,306	3,722	836,842
SAFETY BELTS	78499600	N.A.	N.A.	N.A.	N.A.	5,655	602,386	609	339,203	4,030	332,298
SPOKES AND NIPPLES	78499400	N.A.	N.A.	N.A.	N.A.	N.A.	21,247	N.A.	17,066	50	9,316
	78689100	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	3,200	-	-	-
	78689200	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	-	-	-
DISC PADS & BONDED BRAKE SHOES	78499600	N.A.	N.A.	N.A.	N.A.	82,458	1,949,839	207,209	1,837,915	169,839	906,116
OTHER PARTS & ACCESSORIES											
- MOTOR VEHICLES	78499900	2,480,936	59,240,363	2,669,837	41,044,321	1,992,182	81,529,434	5,967,272	122,256,079	9,675,668	119,249,409
- TRAILERS	78689900	-	-	-	-	-	-	244,411	-	-	-
- TRUCKS	74413100	391,275	613,243	35,946	1,299,505	163,690	2,131,486	79,574	5,236,260	186,045	3,497,503
-	74419900	-	-	22,323	538,730	541,220	1,143,762	-	1,431,207	424,660	1,635,858
TOTAL		2,872,211	59,853,606	2,844,277	44,116,183	2,958,684	90,404,479	6,627,017	136,918,177	10,600,107	131,386,577

* PARTS AND ACCESSORIES INCLUDING TRACTORS (SITC 732890)

SOURCE : DEPARTMEN OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, MALAYSIA, VARIOUS YEARS

TABLE 3.2.33

MALAYSIA : EXPORTS OF SELECTED MOTOR VEHICLE PARTS AND ACCESSORIES BY COUNTRY OF DESTINATION, 1983 (VALUE : $ f.o.b)

COUNTRY/SITC	RADIATORS AND PARTS 784-991-00 & 784-992-00	EXHAUST PIPES AND SILENCER SYSTEM 784-993-00	SPOKES AND NIPPLES 784-994-00	DISC PADS & BONDED BRAKE SHOES 784-995-00	AUTOMOBILE SAFETY SEAT BELT 784-996-00
AUSTRALIA	30,108 (33.7)	-	-	48,148 (28.3)	-
BRUNEI	896 (1.0)	8,147 (16.2)	-	-	-
JAPAN	3,578 (4.0)	-	-	-	-
SINGAPORE	49,483 (55.4)	15,893 (31.5)	50 (100.0)	-	270 (6.7)
U.K.	1,738 (1.9)	-	-	-	-
INDIA	207 (0.2)	-	-	-	-
SWEDEN	3,379 (3.8)	-	-	-	-
U.S.A.	-	24,809 (49.2)	-	-	-
HONG KONG	-	-	-	26,801 (15.8)	-
TAIWAN	-	-	-	87,930 (51.8)	-
CANADA	-	-	-	-	3,760 (93.3)
OTHERS	-	1,577 (3.1)	-	6,960 (4.1)	-
TOTAL	89,389 (100.0)	50,426 (100.0)	50 (100.0)	169,839 (100.0)	4,030 (100.0)

NOTE : FIGURES IN BRACKET ARE IN PERCENTAGE

SOURCE : DEPARTMENT OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, MALAYSIA, 1983

Of the five major components exported in 1983, disc pads and bonded brake shoes comprised more than 50% or $169,839 of component export values. The export markets were mainly Taiwan (52%), Australia (28%), and Hong Kong (16%).

Export values of radiators and parts, and exhaust pipes and silencer system amounted to $89,389 and $50,426 respectively. Radiators and parts were mainly exported to Singapore (55%) and Australia (34%) while exhaust pipes and silencer systems were exported to the U.S. (49%), Singapore (31%) and Brunei (16%).

Exports of safety belts and spokes and nipples were still insignificant, and only amounted to less than $5,000 in 1983.

2.3. The Motor Vehicle Body Building Industry

The motor vehicle body building industry represents part of the ancillary industry and is based mainly on raw materials of metal, timber and glass. The principal products of the industry comprise mainly bodies for commercial vehicles, passenger cars, trailers, refuse collectors and agricultural tractors.

In 1981, this industry subgroup generated $74.9 million of output, employed 1,742 workers and had $9 million fixed assets. The contribution to the TEI under study, was 9.6%, 12% and 4% respectively.

2.3.1 Industrial Structure

In 1981, there were 111 establishments in the motor vehicle body building industry. The establishments are geographically concentrated in Johore (18%), Perak (17%), the Federal Territory (16%) and Selangor (15%). These four states alone account for 81% and 73% of output value and employment (Table 3.2.34).

The distribution of establishments by employment size in Table 3.2.35 shows that about 92% of the establishments employ less than 50 workers each. Although only 9 establishments or 8% of the total number of establishments have employment between 50 and 200 workers, these few establishments effectively account for 32% of total output and 41% of total employment in the industry.

TABLE 3.2.34

PENINSULAR MALAYSIA :REGIONAL DISTRIBUTION OF MOTOR VEHICLE BODY BUILDING INDUSTRY
(MIC 38439) 1981

STATES	NO. OF ESTABLISHMENT		TOTAL REVENUE		TOTAL EMPLOYMENT		SALARIES & WAGES	
	NO.	%	NO.	%	NO.	%	NO.	%
JOHORE	20	18.18%	5,493,567	7.12%	92	5.28%	695,995	3.94%
KEDAH	4	3.64%	1,295,964	1.68%	35	2.01%	153,809	0.87%
MELAKA	9	8.18%	1,721,234	2.23%	57	3.27%	204,937	1.16%
NEGRI SEMBILAN	11	10.00%	3,481,645	4.51%	132	7.58%	456,712	2.59%
PAHANG/TRENGGANU	8	7.27%	4,544,194	5.89%	128	7.35%	745,927	4.22%
PENANG	4	3.64%	3,494,161	4.53%	126	7.23%	690,244	3.91%
PERAK	19	17.27%	13,413,826	17.39%	253	14.52%	1,368,904	7.75%
SELANGOR	17	15.45%	19,786,949	25.65%	491	28.19%	3,443,380	19.50%
FEDERAL TERRITORY	18	16.36%	23,899,534	30.99%	428	24.57%	9,896,457	56.05%
TOTAL FOR DIVISION	111	100.00%	77,131,074	100.00%	1,742	100.00%	17,656,365	100.00%

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, PEN. MALAYSIA, 1981

TABLE 3.2.35

PENINSULAR MALAYSIA: PRODUCTION CHARACTERISTICS OF
MOTOR VEHICLE BODY BUILDING INDUSTRY (MIC 38431), 1981

EMPLOYMENT SIZE	% ESTB.	% OUTPUT	% EMPLOYMENT	AVG. FIRM SIZE L/ESTB.	AVG. FIRM SIZE K/ESTB. ($'000)	K/L ($'000)	V.A./L ($'000)	WAGES/WORKER ($'000)	V.A./OUTPUT
< 5	30.6	5.5	5.6	2.88	12.71	4.41	10.05	2.70	0.24
5 - 49	61.3	62.0	53.6	13.72	84.54	6.16	17.24	5.99	0.35
50 - 199	8.1	32.5	40.8	79.00	253.23	3.21	12.05	6.61	0.35
200 - 499									
> 500									
SUBGROUP	100.0	100.0	100.0	15.69	76.22	4.86	14.72	6.05	0.34
SUBGROUP TOTAL (ABS)	111	74.9 MIL.	1,742.0						
DIV. TOTAL	266.0	777.75 MIL.	14,258.0	54.6	861.36	15.7	16.21	6.26	0.3
TOTAL MANUFACTURING	17,780	34,486.5 MIL.	534,145	30.04	547.26	18.22	16.65	4.89	0.26
SUBGROUP/ MANUF. (%)	0.62	0.22	0.33	52.2	13.9	26.7	88.4	123.7	130.8
DIV./MANUF. (%)	1.5	2.26	2.72	181.8	157.4	86.6	97.4	128.0	115.4

SOURCE : COMPILED FROM CENSUS OF MANUFACTURING INDUSTRIES, PENINSULAR MALAYSIA, 1981

Unlike the motor vehicle parts manufacturing and motor vehicle assembly industries where most of the establishments are owned by private limited and public limited companies, the motor vehicle building industry mainly involves individual proprietorships (50%) and partnerships (25%) (Table 3.2.36). This indicates that the industry does not involve large capital requirement.

2.3.2 Production Characteristics

The production characteristics of the motor vehicle body building industry shown in Table 3.2.35 are as follows:

i) Very low capital intensity

In 1981 the capital establishment ratio was only $76,220 as compared to $861,360 for TEI and $547,260 for the overall manufacturing sector. This accounted for 14 percent of the total capital investment for the manufacturing sector. As seen in Table 3.2.35, the smaller the size of the establishment, the lower is the capital investment. The average capital investment for establishment with less than 5 workers is $12,710 as compared to $253,230 for establishment with 50 to 200 workers.

The capital intensity of the industry is about 3 to 4 times lower than that of TEI and the manufacturing sector.

TABLE 3.2.36

PENINSULAR MALAYSIA : PRINCIPAL STATISTICS (INCL. VALUE ADDED) OF MOTOR VEHICLES BODY BUILDING INDUSTRY (MIC 38431) BY LEGAL STATUS, 1981

LEGAL STATUS	NO. OF ESTB.		OUTPUT		VALUE ADDED		TOTAL EMPLOYMENT		SALARIES & WAGES	
		(%)	($'000)	%	($'000)	(%)		(%)	($'000)	(%)
INDIVIDUAL PROPRIETORSHIP	56	50.45%	11,126,172	14.85%	3,854,635	15.04%	410	23.54%	1,620,047	15.36%
PARTNERSHIP	28	25.23%	15,864,298	21.18%	4,151,199	16.19%	364	20.90%	1,444,848	13.70%
PRIVATE LTD.	27	24.32%	47,908,423	63.96%	17,627,881	68.77%	968	55.57%	7,482,493	70.94%
PUBLIC LTD.	-	-	-	-	-	-	-	-	-	-
OTHERS	-	-	-	-	-	-	-	-	-	-
TOTAL	111	100.00%	74,898,893	100.00%	25,633,715	100.00%	1,742	100.00%	10,547,388	100.00%

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, PEN. MALAYSIA, 1981

ii) Small employment size

The average employment per establishment in the motor vehicle body building industry is about 16 (55 workers per establishment for TEI and 30 for the overall manufacturing sector).

iii) High average wage rate

Although the capital investment of the industry is low, the average wage rate paid is about 24 percent higher than that of the manufacturing sector. In 1981, the average wage per labour of the motor vehicle body building industry was about $6,050 per annum as compared to $4,890 for the manufacturing sector. Larger firms in the industry paid higher average wages than the smaller ones ($2,700 for establishments with less than 5 workers and $6,610 for establishments with employment of 50-200 workers).

iv) Average labour productivity

The labour productivity of the industry is about $14,720 as compared to $16,210 for TEI and $16,650 for the manufacturing sector as a whole. The value added per labour is highest in establishments with 5-50 workers ($17,240) which works out to be even higher than the TEI and manufacturing sector.

The above analysis shows that the motor vehicle body building industry contributes very little to capital formation as the main input is skilled labour. The industry comprises mainly small-scale establishments with average employment of 16 workers.

2.3.3 Production Trend

The production trend of motor vehicle bodies is shown in Table 3.2.37. As evident, production increased quite steadily from 941 units in 1972 to 2,317 units in 1981, representing an average increase of 10.5% per annum.

The highest growth rate is encountered in the production of bodies and frames for lorries (13.4%). Production of bodies for motor coaches, buses and vans was quite constant during the 10 year period. In contrast, production of bodies and frames for trailers increased from 34 units in 1972 to 530 units in 1980 and dropping to 95 units in 1981. Production of bodies for the various types of vehicles is close to the actual sales.

Table 3.2.38 shows the product mix of the motor vehicle body building industry. In 1981, the ex-factory value of motor vehicle bodies amounted to $48 million. Bodies for motor coaches and buses represented the largest group of products in terms of output value (48.7%), followed by bodies and frames for lorries (12.7%), bodies and frames for trailers (9.4%) and bodies was agricultural tractors (8.3%). The production of car bodies is only 0.1% of the total ex-factory value.

TABLE 3.2.37

PENINSULAR MALAYSIA : PRODUCTION OF MOTOR VEHICLE BODIES, 1972 - 1983

YEAR	PRODUCTION (NUMBER)			
	BODIES FOR MOTOR COACHES, BUSES & VANS	BODIES & FRAMES FOR LORRIES	BODIES & FRAMES FOR TRAILERS	TOTAL
1972	410	497	34	941
1973	391	615	215	1,221
1974	424	762	185	1,371
1975	570	1,144	88	1,802
1976	416	1,239	28	1,683
1977	579	470	80	1,129
1978	816	1,075	231	2,122
1979	638	946	422	2,006
1980	855	1,491	530	2,876
1981	680	1,542	95	2,317
1982	1,014	2,955	N.A.	3,969

SOURCE : DEPARTMENT OF STATISTICS, MONTHLY STATISTICAL BULLETIN, PENINSULAR MALAYSIA, VARIOUS YEARS

TABLE 3.2.38

PENINSULAR MALYSIA : PRODUCT MIX OF MOTOR VEHICLES BODY BUILDING INDUSTRY, (MIC 38431), 1978 AND 1981

DESCRIPTION	MIC CODE	1978 EX-FACTORY VALUE OF QTY. PRODUCED	1978 (%)	1981 EX-FACTORY VALUE OF QTY. PRODUCED	1981 (%)
Bodies for motor coaches & buses	38431-01	12,994,014	48.88%	23,368,694	48.71%
Bodies & frames for lorries	38431-02	4,355,567	16.38%	6,085,872	12.69%
Bodies & frames for trailers	38431-03	-	-	4,495,490	9.37%
Bodies for broiler/tankers	38431-04	1,307,272	4.92%	2,318,337	4.83%
Trailer body parts	38431-05	920,000	3.46%	-	-
Bodies for vans	38431-06	625,591	2.35%	2,672,164	5.57%
Bodies for cars	38431-07	615,160	2.31%	69,470	0.14%
Vehicle, commercial purposes	38431-08	429,360	1.62%	3,710,908	7.73%
Body for refuse collector	38431-09	196,345	0.74%	1,274,045	2.66%
Body for agricultural tractor	38431-13	135,000	0.51%	3,980,924	8.30%
Others	38431-99	5,006,500	18.83%	6	.000
TOTAL		26,584,809	100.00%	47,975,910	100.00%

SOURCE : Department of Statistics, Census of Manufacturing Industries, 1981
And Survey of Manufacturing Industries, 1978

During the period 1978 to 1981, the growth of the industry in terms of ex-factory value was about two-fold. The highest increase was seen in the production of bodies for motor coaches and buses. In 1981, the ex-factory value of this product was $23.4 million as compared to $13 million in 1978 giving an average annual growth rate of 21.6% in current prices. On the other hand, bodies for other types of motor vehicle showed a decline during the same period.

2.3.4 Input Material Usage

Raw materials comprised 95% of the total input cost in 1981. In contrast, consumption of energy (water, lubricated fuel and electricity) was negligible and lower than other TEI sub-groups (1.7% vs 3.6%).

The basic raw materials used are iron and steel, aluminium, sawn timber, nails and glass. (Table 3.2.39) In 1978 (the latest statistics available), iron and steel (in the form of angles, sheets, bars, plates and frames) constituted 31% of the total raw material cost. Aluminium accounted for 11%, followed by sawn timber (8%), nails (7%) and glass (5.5%). Other miscellaneous raw materials including bus accessories and spare parts unspecified constituted another 38%.

Metallic raw materials are usually used to build bodies for buses and coaches, refuse collectors, vans, cars and agri-tractors. On the other hand, sawn timber is mainly used for lorries and trailers.

TABLE 3.2.39

PENINSULAR MALAYSIA : INPUT MATERIAL USED IN MOTOR VEHICLE BODY BUILDING INDUSTRY (MIC 38431)

TOP 10 MATERIAL CONSUMED	COST ($)	%
ALUMINIUM SHEETS	2,220,672	10.65%
IRON & STEEL ANGLES, SHEETS & BARS	2,072,630	9.94%
IRON & STEEL SHEETS	1,878,226	9.01%
IRON & STEEL PLATES	1,824,742	8.75%
SPARE PARTS (UNSPECIFIED)	1,683,599	8.08%
SAWN TIMBER	1,624,039	7.79%
HARDWARE (NAILS)	1,530,056	7.34%
GLASS	1,146,886	5.50%
STEEL FRAMES	666,649	3.20%
BUS ACCESSORIES	628,952	3.02%
OTHERS	5,570,391	26.72%
TOTAL	20,846,842	100.00%

SOURCE : Department of Statistics, Survey of Manufacturing Industries, Peninsular Malaysia, 1978

3.0 The Motorcycle Assembly and Parts Manufacturing Industry

The motorcycles and parts industry produces motorcycles, motor scooters, exhaust pipes and system, bumpers, carriers, baskets, handle bars and other miscellaneous motorcycle accessories. In 1981, motor scooters and motorcycles constituted slightly more than 94% of the ex-factory value of production. The rest comprised motorcycle parts and accessories, of which exhaust pipes and system accounted for about 4.6% (Table 3.3.1).

The share of motorcycle and parts in the overall product mix of the industry has not changed significantly over the past few years despite having increased from $2.3 million in 1978 to $4.2 million in 1981. The high annual growth rate of 22% could be attributed to the mandatory deletion programme and the local content targets that assemblers have to comply with.

3.1 Industrial Structure

In 1981, there were only 16 establishments in the motorcycles and parts industry. These establishments were mainly located in the West Coast of Peninsular Malaysia, particularly, in the states of Perak (31%), Selangor (19%), Federal Territory (19%), Penang (19%) and Johore/Pahang (12%). Penang and Selangor together contributed 98% and 92% of the total revenue and employment generated respectively in 1981 although these two

TABLE 3.3.1

PRINCIPAL PRODUCT MIX OF MOTORCYCLE AND PARTS ASSEMBLY AND MANUFACTURING INDUSTRY (MIC 38441) FOR 1978 AND 1981

PRODUCTS	MIC CODE	1978 EX-FACTORY VALUE OF PRODUCTION	1978 %	1981 EX-FACTORY VALUE OF PRODUCTION	1981 %
MOTOR CYCLES	38441-02	25,146,524	73.47%	35,284	0.05%
MOTOR SCOOTERS	38441-01	6,779,065	19.81%	69,312,109	94.28%
MOTOR CYCLES ACCESSORIES	38441-08	1,744,945	5.10%	246,764	0.34%
EXHAUST PIPES & SYSTEM	38441-07	171,789	0.50%	3,364,871	4.58%
BUMPERS	38441-03	163,123	0.48%	197,393	0.27%
CARRIERS	38441-04	77,696	0.23%	185,772	0.25%
BASKETS	38441-05	58,342	0.17%	80,660	0.11%
HANDLE BARS	38441-06	50,399	0.15%	94,116	0.13%
OTHERS	38441-99	33,436	0.10%	-	0.00%
TOTAL		34,225,319	100.00%	73,516,969	100.00%

SOURCE : DEPARTMENT OF STATISTICS, SURVEY OF MANUFACTURING INDUSTRIES, 1978 AND CENSUS OF MANUFACTURING INDUSTRIES, 1981.

establishments. As can be seen in Table 3.3.2, the average number of employees per establishment in Penang and Selangor was 222 and 134 respectively. A large proportion of these employees were employed at the assembly plants of (Vespa, Yamaha, Honda and Suzuki) which are located in these two states. The other establishments are small-scale motorcycle ancillary industries.

The motorcycles and parts manufacturing industry comprises mainly medium and large scale establishments with average employment of 72 workers. More than one-third of the establishments had employment size of more than 50 workers and they controlled 98% and 92% of total output and employment respectively.

About two-thirds of the establishments are owned by private limited and public limited companies. Individual proprietorships and partnerships account for another 25% and 12% respectively. As can be observed from Table 3.3.3, private limited and public limited companies take up the largest share of output, value added and employment.

Total investment in the form of fixed assets for 1981 was $25.7 million, the bulk of fixed assets being owned by large establishments of more than 50 workers.

3.1.1 Factor Intensity and Productivity

The motorcycles and parts industry is characterised by the following features:

TABLE 3.3.2

PENINSULAR MALAYSIA : REGIONAL DISTRIBUTION OF MOTORCYCLE AND PARTS ASSEMBLY AND MANUFACTURING INDUSTRY (MIC 38441), 1981

STATES	NO. OF ESTABLISHMENT		TOTAL REVENUE ($'000)		TOTAL EMPLOYMENT		SALARIES & WAGES ($'000)		TOTAL REVENUE/ ESTABLISHMENT ($'000)	L/ESTB.
		(%)		(%)		(%)		(%)		
JOHOR/PAHANG	2	12.50%	325,868	0.32%	30	2.59%	42,290	0.57%	162,934	15.0
PENANG	3	18.75%	25,803,329	25.13%	667	57.55%	4,695,173	63.[illegible]0%	8,601,110	222.3
PERAK	5	31.25%	283,968	0.28%	27	2.33%	51,760	0.70%	56,794	5.4
SELANGOR	3	18.75%	74,833,269	72.88%	401	34.60%	2,417,143	32.54%	24,944,423	133.7
WILAYAH PERSEKUTUAN	3	18.75%	1,435,088	1.40%	34	2.93%	222,739	3.00%	478,363	11.3
TOTAL FOR DIVISION	16	100.00%	102,681,522	100.00%	1,159	100.00%	7,429,105	100.00%	6,417,6[illegible]	72.4

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, PENINSULAR MALAYSIA, 1981

TABLE 3.3.3

PENINSULAR MALAYSIA · PRINCIPAL STATISTICS (INCL. VALUE ADDED) OF MOTORCYCLES AND PARTS ASSEMBLY AND MANUFACTURING INDUSTRY (MIC 38441) BY LEGAL STATUS, 1981

LEGAL STATUS	NO. OF ESTABLISHMENT	(%)	OUTPUT	(%)	VALUE ADDED	(%)	TOTAL EMPLOYMENT	(%)	SALARIES & WAGES	(%)
INDIVIDUAL PROPRIETORSHIP	4	25.00%	733,055	0.73%	278,303	0.74%	22	1.90%	45,635	0.61%
PARTNERSHIP	2	12.50%	127,028	0.13%	65,054	0.17%	9	0.78%	17,839	0.24%
PRIVATE AND PUBLIC LTD.	10	62.50%	99,291,936	99.1[illegible]%	37,365,445	99.09%	1,128	97.33%	7,365,631	99.15%
TOTAL	16	100.00%	100,152,019	100.00%	37,708,802	100.00%	1,159	100.00%	7,429,105	100.00%

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES, PENINSULAR MALAYSIA, 1981.

i) Relatively high capital intensity

The investment per establishment employed in the motorcycles and parts industry is about double that of the TEI and thrice that of the manufacturing sector. In 1981, the investment per establishment ratio for the industry was $1.6 million as compared to $0.86 million for TEI and $0.55 million for the manufacturing sector (Table 3.3.4). The table also shows that the larger establishments (in terms of employment size) also invest more on fixed assets. In the same year the average investment per capital ratio for establishment with less than 5 workers was $2,900 as compared to $7.15 million for establishments with employment size of between 200 to 499.

ii) Relatively large employment size

In 1981, the average employment per establishment for the industry was about 72 workers. This amounted to one and a third times higher than TEI and more than double that of the manufacturing sector. This indicates that the industry is labour intensive.

TABLE 3.3.4

PENINSULAR MALAYSIA : PRODUCTION CHARACTERISTICS OF MOTOR CYCLES & PARTS MANUFACTURING INDUSTRY (MIC 38441), 1981

EMPLOYMENT SIZE	% ESTB.	% OUTPUT	% EMPLOYMENT	% FIXED ASSET	AVG. FIRM SIZE L/ESTB.	AVG. FIRM SIZE K/ESTB. ($'000)	K/L ($'000)	V.A./L ($'000)	WAGES/WORKER ($'000)	WAGES/V.A. ($'000)	V.A./OUTPUT
< 5	6.2	0.04	0.4	0.01	4.00	2.93	0.73	7.00	1.01	0.14	0.75
5 - 49	56.2	1.9	7.5	2.05	9.67	58.62	6.06	9.26	3.59	0.39	0.42
50 - 199	18.8	6.3	23.2	14.5	89.67	1,239.27	13.82	5.17	6.06	1.17	0.22
200 - 499	18.8	91.8	68.9	83.5	266.33	7,151.32	26.85	44.41	6.86	0.15	0.39
> 500	-	-	-	-	-	-	-	-	-	-	-
SUB-GROUP TOTAL	100	100.04	100	100	72.44	1,606.39	22.18	32.54	6.41	0.20	0.38
SUB-GROUP TOTAL (ABS)	16	$100.15 mil.	1,159	$25.70 mil.	-	-	-	-	-	-	-
DIVISION TOTAL	266	$777.75 mil.	14,528	$108.00 mil.	54.6	861.36	15.7	16.21	6.26	0.39	0.30
TOTAL MANUF.	17,780	$34,486.50 mil.	534,145	$9,730.30 mil.	30.04	547.26	18.22	16.65	4.89	0.29	0.26
SUB-GROUP/ MANUF. (%)	0.09	0.29	0.22		241.1	293.5	121.73	195.4	131.08	69.00	146.20
DIV./MANUF. (%)	1.50	2.26	2.72		181.1	157.4	86.2	97.4	128.00	134.50	115.40

SOURCE : COMPILED FROM CENSUS OF MANUFACTURING INDUSTRIES, PENINSULAR MALAYSIA, 1981

iii) Average wage rate

The average wage rate for the industry does not differ very much from the TEI although it is slightly higher than the manufacturing sector. In 1981, the average wage rate for the industry was $6,860 as compared to $6,260 for the TEI and $4,890 for the manufacturing sector.

However, there is a wide variation between the average wage rates paid by firms of different sizes. The larger firms with employment between 200 to 500 workers paid an average wage of $6,860 per year as compared to $1,010 for firms with 5 workers.

iv) Relatively Higher Labour Productivity

The high capital intensity coupled with the slightly higher wage rate have resulted in the relatively higher labour productivity. In 1981, the value added per worker was about twice as high as the TEI as well as the manufacturing sector ($32,540 vs $16,210 and $16,650 respectively). Labour productivity was highest in firms with employment size between 200 to 500 workers. In contrast, firms with employment size between 50 and 200 workers experienced labour productivity which was even lower than the smallest firm. In monetary terms, the wages paid to workers were even higher than the value added obtained. This could be attributed to the inefficiency or under-utilization of either labour or capital.

3.1.2 Production

Table 3.3.5 illustrates the production of locally assembled motorcycles by makes and engine size. As can be observed, production of motorcycles had increased about three folds from 95,711 units in 1975 to 242,711 units in 1983, registering an average annual growth rate of 12.3%. The highest growth came from motor cycles of above 110 c.c range, in particular those of, Honda, Yamaha and Suzuki makes.

In the case of the smaller engine size, viz. below 90 c.c., the Yamaha and Suzuki makes have the highest growth rate of 32.5% and 22.5% respectively. On the other hand, the Honda model below the 90 c.c. range regarded as the most popular, only shows an average annual growth rate of 1.8%. The market share for Honda has also declined. In 1975, Honda make motorcycles of below 90 c.c. captured 82% of the total production within that c.c range. However, in 1983, the share dropped to about 40% due to the increasing demand for Yamaha and Suzuki motorcycles and the shift in production to higher c.c. ranges by the Honda assembler.

The breakdown of motorcycles by make and variant is presented in Table 3.3.6. The most popular makes and variants in the early 1980s are Honda

TABLE 3.3.5

MALAYSIA : PRODUCTION OR LOCALLY ASSEMBLED TWO-WHEELERS BY MAKE AND ENGINE SIZE, 1975 - 1983

		1975	1976	1977	1978	1979	1980	1981	1982	1983	AVERAGE ANNUAL GROWTH RATE (%)
BELOW 90 C.C.	HONDA	54,251	62,765	67,747	71,301	57,304	80,494	72,236	54,369	62,439	1.8
	YAMAHA	7,301	9,104	10,451	6,600	-	15,983	49,549	63,930	69,288	32.5
	SUZUKI	4,398	8,053	11,316	14,659	19,259	42,026	26,570	16,421	22,272	22.5
	KAWASAKI	-	-	-	-	-	-	-	4,337	2,146	-
	VESPA	395	-	-	-	-	-	-	-	-	-
	TOTAL	66,345	79,922	89,514	92,560	76,563	138,503	148,355	139,057	156,145	11.3
90 - 110 C.C.	HONDA	986	183	2,037	2,427	1,478	-	604	25,355	40,145	58.9
	YAMAHA	12,000	8,733	13,501	7,527	-	13,817	2,047	1,265	-	-
	SUZUKI	4,558	4,744	7,521	15,718	22,063	11,791	8,025	614	361	-27.2
	KAWASAKI	-	-	-	-	-	-	-	-	-	-
	VESPA	-	-	-	-	-	-	-	-	-	-
	TOTAL	17,544	13,660	23,059	25,672	23,541	25,605	10,676	27,234	40,506	11.0
ABOVE 110 C.C.	HONDA	-	-	-	200	5,451	4,900	5,425	4,150	4,525	86.6
	YAMAHA	2,148	1,183	600	300	-	1,646	15,151	18,990	28,381	38.1
	SUZUKI	1,690	750	600	2,510	4,456	3,123	3,600	14,027	12,105	27.9
	KAWASAKI	-	-	-	-	-	-	641	588	106	-
	VESPA	7,984	5,131	6,899	6,134	3,528	2,963	2,105	1,455	943	-23.4
	TOTAL	11,822	7,064	8,099	9,144	13,435	12,637	26,922	39,210	46,060	18.5
TOTAL	HONDA	55,237	62,948	69,784	73,928	64,233	85,394	78,265	83,874	107,109	8.6
	YAMAHA	21,449	19,020	24,552	14,427	-	31,443	66,747	84,185	97,669	20.9
	SUZUKI	10,646	13,547	19,437	32,887	45,778	56,940	38,195	31,062	34,738	15.9
	KAWASAKI	-	-	-	-	-	-	641	4,925	2,252	-
	VESPA	6,379	5,131	6,899	6,134	3,528	2,968	2,105	1,455	943	23.9
	GRAND TOTAL	95,711	100,646	120,672	127,376	113,539	176,745	185,953	205,501	242,711	12.3

SOURCE : MASAAN

TABLE 3.3.6

MALAYSIA : ASSEMBLY PLANTS BY NUMBER OF MAKE, MODEL AND VARIANT OF TWO WHEELERS, 1980 - 1983

MAKE/MODEL/VARIANT	1980	1981	1982	1983
HONDA - C70	72,998	52,336	-	62,439
- CG125	4,900	5,425	3,150	1,625
- C86	6,500	3,200	-	-
- GL100	996	604	-	-
- C70K	-	16,700	54,369	-
- C90	-	-	25,355	40,145
- GL125	-	-	1,000	-
- GL145	-	-	-	2,900
SUB TOTAL	85,394	78,265	83,874	107,109
YAMAHA - RX100	11,714	906	-	-
- Y80	15,983	49,549	63,930	65,976
- DX100	2,100	1,141	1,265	-
- DT125	1,646	2,754	2,183	1,900
- RXS	-	12,397	16,807	26,481
- SA50	-	-	-	3,312
SUB TOTAL	31,443	66,747	84,185	97,669
SUZUKI - GP100	6,692	5,757	599	361
- FR80	42,026	26,570	16,421	15,978
- TS100	5,099	2,268	15	-
- TS125	3,123	3,600	478	242
- TRS	-	-	13,549	11,863
- RC80	-	-	-	6,294
SUB TOTAL	56,940	38,195	31,062	34,738
KAWASAKI - GTO	-	641	588	106
- JOY	-	-	4,337	2,146
SUB TOTAL	-	641	4,925	2,252
VESPA - P150X	1,292	1,356	-	-
- P150S	1,675	749	5	92
- P200E	1	-	-	-
- PX150E	-	-	1,450	851
SUB TOTAL	2,968	2,105	1,455	943
GRAND TOTAL	176,745	185,953	205,501	242,711

SOURCE : MASAAM

C70 and C90, Yamaha Y80 and RXS, and Suzuki FR80 and TR-S. Vespa is not popular while Kawasaki is gaining popularity.

The production capacity and level of utilization of the four motorcycle assembly plants in Table 3.3.7 shows that the average level of utilization is about twice that of the approved capacity of a single shift. Most of the assembly plants, with the exception of East Asiatic Company (M) Bhd., have exceeded their respective approved capacities. The East Asiatic Co., which assembles Vespa, only managed to achieve 10.4% of its approved capacity of 30,000 units in 1983. Thus, the slack in demand for Vespa has prompted a decrease in the production of that make.

3.1.3 Input Material Usage

As with the motor vehicle assembly industry, the activities of of the motorcycle and parts industry are mainly concentrated on assembling services. The CKD packs are mainly imported from Japan although some components are manufactured locally.

As can be seen in Table 3.3.8, CKD motor cycles and scooters accounted for about 79% of the total cost of raw material inputs in 1978. Although the data are somewhat outdated, the cost structure does provide a useful illustration of the structure of input material usage. Besides CKD packs, other raw materials used were tyres (9.2%), paints (2.4%), batteries (2.3%), iron & steel

TABLE 3.3.7

MALAYSIA : LIST OF EXISTING MOTORCYCLE ASSEMBLY PLANTS

NO.	NAME, LOCATION OF ASSEMBLY PLANTS AND DATE OF APPROVAL	APPROVED CAPACITY PAYABLE 'SINGLE SHIFT'	1 9 8 1		1 9 8 2		1 9 8 3	
			QTY. (UNITS)	% UTILISATION	QTY. (UNITS)	% UTILISATION	QTY. (UNITS)	% UTILISATION
1.	THE EAST ASIATIC COMPANY (M) BHD., JALAN TANDANG, PETALING JAYA. 10.12.70	30,000 UNITS	2,743	9.1	6,392	21.3	3,144	10.4
2.	HONG LEONG YAMAHA MOTOR SDN. BHD., JALAN UTAS, SHAH ALAM. 1.1.80	48,000 UNITS	66,747	139.0	84,034	175.0	95,372	198.6
3.	KAH MOTOR CO. SDN. BHD., PERMATANG PAUH ROAD, BUTTERWORTH. APRIL, 1969.	30,000 UNITS	77,765	259.2	83,874	279.5	107,109	357.0
4.	SUZUKI ASSEMBLERS (M) SDN. BHD., PRAI INDUSTRIAL ESTATE, PRAI. 19.11.73	20,000 UNITS	38,195	190.9	31,062	155.3	34,738	173.6
	TOTAL	128,000 UNITS	185,450	144.8	205,362	160.4	240,363	187.7

SOURCE : MIDA

TABLE 3.3.8

PENINSULAR MALAYSIA : INPUT MATERIALS USED IN THE MOTORCYCLE AND PARTS ASSEMBLY AND MANUFACTURING INDUSTRY (MIC 38441), 1978

TOP 10 MATERIAL CONSUMED	COST ($)	(%)
MOTOR CYCLES & SCOOTERS	18,474,093	78.64%
TYRES	2,147,744	9.14%
OTHER ACCESSORIES FOR M.V.	664,417	2.83%
PAINT	554,564	2.36%
BATTERIES	550,389	2.34%
IRON & STEEL RODS STRIPS & ANGLES	432,474	1.84%
STEEL PLATE & SHEETS	243,411	1.04%
IRON SHEETS	87,742	0.37%
HARDWARE	79,241	0.34%
SOLVENT	75,357	0.32%
OTHERS	181,585	0.77%
TOTAL	23,491,007	100.00%

SOURCE : DEPARTMENT OF STATISTICS, SURVEY OF MANUFACTURING INDUSTRIES, 1978 miscellaneous accessories (3.6%). This indicates that the motorcycle component industry is relatively underdeveloped. However, with the target phases being introduced lately, it will further promote backward linkages.

3.1.4 Sales

Sales are closely related to the production of motorcycles. It merely means that the supply is met by demand or production is made to order. The difference between supply and demand is the stock for the year (Table 3.3.9). Sales were quite constant during the late 1970s but in the early 1980s there was a steep increase.

3.1.5 External Trade

Import values increased sharply from $5.04 million in 1968 to $212.98 million in 1983 representing an average annual growth rate of 28%. The imports in 1968 comprised mainly CBU motorcycles. However, since the establishment of the assembly plants, the bulk of the imports have been in the form of CKD packs. In 1973, CKD packs accounted for about 80% of total imports, increasing to 92% by 1983. (Table 3.3.10). This indicates the important role played by the four assemblers in promoting import substitution, basically from the viewpoint of increasing local content of CKD packs.

TABLE 3.3.9

MALAYSIA : ANNUAL SALES OF MOTORCYCLES AND SCOOTERS BY MAKE, 1973 - 1982

MAKE	1974	1975	1976	1977	1978	1979	1980	1981	1982
HONDA	57,860	63,805	65,979	74,219	68,885	63,868	80,965	76,526	87,534
YAMAHA	27,366	17,969	22,039	23,447	16,167	-	35,515	65,991	88,074
SUZUKI	12,229	13,614	15,584	23,276	35,518	45,057	57,717	38,309	39,406
VESPA	10,445	6,170	5,837	6,740	5,291	3,566	2,732	874	316
KAWASAKI	-	-	-	-	-	-	1,423	2,226	5,202
TOTAL	107,900	101,558	109,439	127,682	125,861	112,491	178,352	183,926	220,532

SOURCE : MASAAM

TABLE 3.3.10

MALAYSIA : EXPORTS AND IMPORTS OF MOTOR CYCLE AND PARTS, 1968 - 1983

DESCRIPTION	SITC CODE	1968 EXPORT $ f.o.b	1968 IMPORT $ c.i.f	1973 EXPORT $ f.o.b	1973 IMPORT $ c.i.f	1978 EXPORT $ f.o.b	1978 IMPORT $ c.i.f	1981 EXPORT $ f.o.b	1981 IMPORT $ c.i.f	1983 EXPORT $ f.o.b	1983 IMPORT $ c.i.f
MOTOR CYCLES - CKD	78519100	-	-	3,400	44,321,724	1,000	86,089,982	16,930	160,431,620	16,600	194,896,919
MOTOR CYCLES - CBU NEW	78519210	-	-	8,259	10,999,498	42,676	8,967,086	6,448,309	14,987,377	1,817,619	3,100,211
MOTOR CYCLES - CBU OLD	78519290	127,781	5,038,608	84,180	258,982	24,838	1,316,494	282,948	659,180	150,784	464,145
SPOKES	78539111	-	-	-	-	7,951	142,178	-	-	-	-
NIPPLES	78539112	-	-	-	-	-	3,988	22,437	55,506	22,280	133,253
OTHER PARTS & ACCESSORIES	78539119	-	-	-	-	171,913	8,187,181	218,217	14,097,694	188,252	14,381,375
TOTAL		127,781	5,038,608	95,839	55,580,204	248,378	104,706,909	6,988,841	190,231,377	2,195,535	212,975,903

SOURCE : DEPARTMENT OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, MALAYSIA, VARIOUS YEARS

Table 3.3.11 shows the imports of motorcycles and parts by country of origin. As can be seen, the bulk of imports is from Japan. Imports of CKD packs from Japan comprised 99% of the total imports in 1983 while new and old CBUs made up 97% and 96% respectively. Other sources of inputs include Italy, Singapore (mainly re-exports), Taiwan, the U.K., Germany F.R. and the U.S. For parts and accessories, the imports are mainly from Japan (61%), Taiwan (31%), Thailand (6%), Italy (0.7%) and China (0.7%). Spokes of motorcycles are imported mainly from Japan (94%), Taiwan (6.4%) and Thailand (0.08%).

The industry exported an amount of $2.2 million in 1983, a substantial increase when compared to the figure of $0.13 million in 1968. (Refer to Table 3.3.12) However, most of the exports of CKD and CBU motorcycles represented the re-exports. The major export markets are Australia, Singapore, Burma, India, Philippines and Indonesia. Exports to India, Philippines and Indonesia comprise mainly old CBU motorcycles. For motorcycle parts and accessories, exports increased from nil in 1968 to $14.5 million in 1983. Spokes are exported mainly to Singapore while other parts and accessories go to Singapore (76%), Japan (14%) and the U.K. (5%). The ASEAN market does not feature prominently in the exports of parts and accessories.

TABLE 3.3.11

MALAYSIA : IMPORTS OF MOTORCYCLES AND PARTS BY COUNTRY OF ORIGIN, 1983 (VALUE $c.i.f)

COUNTRY OF ORIGIN	MOTORCYCLES CKD SITC 78519100	MOTORCYCLES CBU NEW SITC 785191210	MOTORCYCLES CBU OLD SITC 78519290	SPOKES SITC 78539112	OTHER PARTS & ACCESSORIES SITC 78539119
ITALY	1,411,486	-	-	-	-
JAPAN	193,229,048	3,013,457	444,590	124,678	103,830
SINGAPORE	242,000	-	-	-	8,744,056
TAIWAN	12,500	2,279	-	8,475	-
UNITED KINGDOM	1,881	3,721	-	-	4,528,294
WEST GERMANY	-	21,889	6,908	-	-
UNITED STATES	-	58,865	7,615	-	-
THAILAND	-	-	-	100	833,734
CHINA	-	-	-	-	97,771
TOTAL	194,896,915	3,100,211	464,145	133,253	14,381,375

SOURCE : DEPARTMENT OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, MALAYSIA, 1983

TABLE 3.3.12

MALAYSIA : EXPORTS OF MOTORCYCLES AND PARTS BY COUNTRY OF DESTINATION, 1983 (VALUE $f.o.b)

COUNTRY OF DESTINATION	MOTORCYCLES CKD SITC 78519100	MOTORCYCLES CBU NEW SITC 785191210	MOTORCYCLES CBU OLD SITC 78519290	SPOKES SITC 78539112	OTHER PARTS & ACCESSORIES SITC 78839119
AUSTRALIA	7,650	-	12,424	-	-
SINGAPORE	8,950	1,710,406	43,079	22,280	142,343
BURMA	-	29,100	-	-	-
INDIA	-	-	30,272	-	-
PHILIPPINES	-	-	8,870	-	-
INDONESIA	-	-	8,002	-	-
JAPAN	-	-	-	-	25,532
UNITED KINGDOM	-	-	-	-	9,175
TOTAL	16,600	1,757,165	113,798	22,280	188,252

SOURCE : DEPARTMENT OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, MALAYSIA, 1983

3.2 **Comparison with Selected Reference Countries**

3.2.1 **Production**

The Japanese manufacturers, viz, Honda, Yamaha, Suzuki and Kawasaki, dominate the world market. In 1980, the four manufacturers produced a total of 6.4 million units of motorcycles constituting about half the world output. The dominance of Japanese manufacturers is due largely to the many joint-venture projects established with local counterparts of various newly industrialised or developing countries.

As can be seen in Table 3.3.13, world production of motorcycles increased from 8.5 million units in 1971 to 13.2 million in 1980, registering an average annual growth rate of 5.1%. The highest growth rate is observed in the developing countries of ASEAN and the newly industrialized countries. In 1980, the six countries, viz, Malaysia, Indonesia, Philippines, Thailand, R.O.Korea and Taiwan, accounted for 13% of total production.

Amongst the ASEAN countries, Indonesia seems to have the highest increase in output (33%), followed by Thailand (30.4%), Malaysia (21.4%) and Philippines (12.4%). As for Indonesia, the most popular mode of transport especially, in the remote part of the country is the motorcycle.

Other producers of motorcycle, apart from Japan, include Taiwan which captured slightly more than 5% of the world market in 1980. The average annual production growth rate of motorcycles in

TABLE 3.3.13

OUTPUT OF MOTORCYCLES AND SCOOTERS BY REFERENCE COUNTRIES, 1971 - 1980 ('000 UNITS)

COUNTRY	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	AVERAGE ANNUAL GROWTH RATE (%)
MALAYSIA	31	36	63	109	96	100	122	127	115	177	21.4
REFERENCE GROUP 1											
INDONESIA	-	42	102	165	204	261	305	223	239	410	33.0
PHILIPPINES	16	-	19	28	-	-	-	40	40	46	12.4
THAILAND	-	34	57	67	84	102	149	244	244	284	30.4
REFERENCE GROUP 2											
BRAZIL	-	-	-	5	-	-	-	-	-	-	-
KOREA REPUBLIC	12	9	13	11	12	17	35	77	101	112	28.2
SINGAPORE	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
TAIWAN	166	175	248	309	319	337	414	639	746	724	17.8
INDIA	107	136	162	182	205	263	266	298	306	310	12.5
REFERENCE GROUP 3											
AUSTRALIA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
CANADA	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
REFERENCE GROUP 4											
UNITED KINGDOM	83	44	-	-	-	-	-	-	-	-	-
JAPAN	3,401	3,565	3,763	4,510	3,803	4,235	5,577	6,000	4,470	6,435	7.3
UNITED STATES	-	183	-	-	-	-	-	-	-	-	-
WORLD TOTAL	8,463	8,807	9,495	10,768	9,622	10,316	12,014	12,402	10,661	13,191	5.1

NOTE : * N.A. = NOT AVAILABLE
SOURCE : (1) INDUSTRY OF FREE CHINA, JULY 1982
(2) UNITED NATIONS, YEARBOOK OF INTERNATIONAL PRODUCTION STATISTICS, VARIOUS YEARS

Taiwan over the ten year period from 1971 to 1980 was about 18% while R.O.Korea experienced a growth rate of 28%.

Most of the motorcycle producing countries rely greatly on their principals in Japan for technology and components. However, with the greater emphasis on technology transfer and the promotion of local content policies, the dependency of local manufacturers on their principals is slowly diminishing. Many components which do not require high technical know-how are manufactured locally. There is potential for the newly industrialized and the developing countries, for instance, Taiwan, Korea and the ASEAN countries (except Singapore) to manufacture motorcycles domestically.

3.2.2 Imports

The total imports of motorcycles for the selected reference countries is presented in Table 3.3.14. As can be seen, world imports increased fromUS$1.6 billion in 1976 to US$3.4 billion in 1980 representing an average annual growth rate of 21%. Most of the selected reference countries except ASEAN registered a positive growth in imports, ranging from 1% for Brazil to 22% for Japan.

The developing countries of ASEAN (except Malaysia and Singapore) had a negative growth rate during the period 1975 to 1980. Thailand registered the highest decline in imports (61%), followed by Indonesia (38%). Philippines, on the other hand,

TABLE 3.3.14

IMPORTS OF MOTORCYCLES AND PARTS BY REFERENCE COUNTRIES, 1975 - 1981 (US $'000)

COUNTRY	1975	1976	1977	1978	1979	1980	1981	AVG. ANNUAL GROWTH RATE (%)
MALAYSIA	37,043	28,566	39,508	41,661	52,548	N.A.	N.A.	9.10
REFERENCE GROUP 1								
INDONESIA	79,515	80,318	76,494	84,169	17,142	7,398	N.A.	-37.80
PHILIPPINES	6235	4,781	4271	6625	5,247	6,085	N.A.	-0.48
THAILAND	30,048	22,879	34,117	10,479	N.A.	279	N.A.	-60.80
REFERENCE GROUP 2								
BRAZIL	8,913	7,793	8,407	7,118	6,052	9,434	N.A.	1.14
KOREA REPUBLIC	387	199	1,021	2,669	634	624	N.A.	10.00
SINGAPORE	-	-	-	-	-	-	-	-
TAIWAN	N.A.	16,023	14,735	21,134	15,965	16,272	27,310	11.20
INDIA	826	628	N.A.	N.A.	N.A.	N.A.	N.A.	-
REFERENCE GROUP 3								
AUSTRALIA	48,470	62,102	44,358	53,916	54,452	97,197	N.A.	14.90
CANADA	N.A.	65,234	82,903	88,789	90,675	10,887	N.A.	13.70
REFERENCE GROUP 4								
UNITED KINGDOM	124,725	146,120	148,915	217,055	212,055	295,994	N.A.	18.90
JAPAN	5,634	1,574	3,474	8,352	21,673	30,284	18,512	21.90
UNITED STATES	-	-	-	-	-	-	-	-
WORLD TOTAL	N.A.	1,596,941	1,945,978	2,514,910	2,561,121	3,396,424	N.A.	20.80

SOURCE : UN, YEARBOOK OF INTERNATIONAL TRADE STATISTICS, VARIOUS YEARS period. The decline in imports in these countries has been in response to government policies instituted by the respective countries to promote import substitution and local production of motorcycles and parts.

On the other hand, the developed and the industrialised countries, of Australia, Canada, United Kingdom and Japan recorded the highest increases in imports as compared to other selected countries.

As illustrated in Table 3.3.15, Japan imported a total of US$15.2 million from the rest of the world in 1982, of which 96% came from the developed market economies and the rest from the developing market economies. North America (the U.S.) and Europe (EEC) accounted for more than 94% of Japanese imports.

For the U.S., imports of motorcycles was US$1,069 million, of which 99.7% came from the developed market economies, namely Japan. Imports from the developing countries amounted to $2.4 million while the Republic of Korea and India constituted 50% and 15% respectively.

U.K also imported a substantial amount of $152.4 million in 1982, of which only $118,000 and $933,000 came from the developing economies and the Centrally Planned Economies respectively.

Similarly, the bulk of imports of Canada and Singapore came from the developed market economies,

TABLE 3.3.15

IMPORTS OF MOTORCYCLES (SITC 785.1) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE
WORLD	15,218	1,069,894	152,384	190,330	16,025
DEVELOPED EC	14,588	1,066,960	151,334	189,093	14,569
DEVELOPING EC	607	2,394	118	1,149	1,453
CENTRALLY PLANNED EC	-	540	933	-	-
NORTH AMERICA	5,586	2,460	2,628	36,211	-

DEVELOPED EC	5,586	2,460	2,628	36,211	-
U.S.A. PUERTO RICO	5,584	-	2,618	36,211	-
CANADA	-	2,460	-	-	-
OTHER AMERICA	207	-	-	-	-
DEVELOPING EC	207	-	-	-	-
LAFTA	207	-	-	-	-
BRAZIL	205	-	-	-	-
ASIA	352	1,036,459	130,799	150,451	15,949

DEVELOPED EC	-	1,034,084	130,768	149,304	14,496
JAPAN	-	1,034,084	130,764	149,304	14,496
DEVELOPING EC	348	2,375	-	1,147	1,453
OTHER ASIA	348	2,375	-	1,147	1,453
INDIA	-	351	-	-	137
MALAYSIA	-	-	-	-	1,286
INDONESIA	-	-	-	178	-
KOREA REPUBLIC	-	1,169	-	277	-
SINGAPORE	187	-	-	-	-
OTHER ASIA NES	-	855	-	693	-
EUROPE	8,930	30,949	18,748	3,666	-

DEVELOPED EC	8,922	30,413	17,864	3,579	-
EEC	8,802	20,914	15,241	3,507	-
GERMANY REPUBLIC	3,439	15,500	7,958	813	-
ITALY	4,670	1,815	4,889	854	-
UNITED KINGDOM	589	1,590	-	192	-
BELGIUM-LUX	-	1,673	836	1,573	-
NETHERLANDS	-	280	1,048	-	-
FRANCE	-	-	330	-	-
IRELAND	-	-	101	-	-
EFTA	-	8,901	1,661	-	-
AUSTRIA	-	1,993	1,342	-	-
SWEDEN	-	6,909	311	-	-
OTHER EUROPE	-	598	962	-	-

SPAIN	-	500	877	-	-
CENTRALLY PLANNED EC	-	536	884	-	-

CZECHOSLOVAKIA	-	536	367	-	-
GERMANY REPUBLIC	-	-	516	-	-
OCEANIA	125	-	-	-	-

SOURCE : UN, YEARBOOK OF INTERNATIONAL TRADE STATISTICS, 1982

imported about $1.45 million from the developing countries of Asia, of which slightly more than 88% were from Malaysia and India.

3.2.3 Export

World exports of motorcycles and parts increased from US$1,565.1 million in 1976 to US$3,572.4 million in 1980 giving an average annual increase of about 23%. The main exporters are Japan (78% of world exports), followed by Germany F.R. (3.3%), Taiwan (2.4%) and the U.S. (2%).

It is obvious from Table 3.3.16 that the NICs of Brazil, Taiwan and Republic of Korea had embarked on an aggressive overseas marketing campaign of that motorcycles and parts. Brazil showed an average growth rate of 49% while Taiwan and R.O.Korea had an increase of 45% and 22% respectively. In contrast, exports from the ASEAN countries were still insignificant.

The detailed breakdown of motorcycle and parts exports from the three developed countries, viz, Japan, the U.S. and the U.K. is presented in Appendix 20. In 1982, Japan exported a total amount of $2,588.2 million. About 82% of its exports went to the developed market economies (mainly to the U.S., Canada and EEC countries) and the rest to the developing market economies and the Centrally Planned Economies. The main importers from the developing market economies were Asia (Indonesia [41%], Malaysia [21%], Middle East [10%] and Pakistan [9%]) and Africa (Nigeria [70%]).

TABLE 3.3.16

EXPORTS OF MOTORCYCLES AND PARTS BY SELECTED REFERENCE COUNTRIES, 1975 - 1980 (US $'000)

	1975	1976	1977	1978	1979	1980	% GROWTH
MALAYSIA	665	258	312	-	-	-	-31.50
INDONESIA	-	-	-	-	-	-	-
PHILIPPINES	-	255	-	-	-	-	-
THAILAND	205	-	-	-	123	432	16.10
BRAZIL	-	-	286	203	142	950	49.20
KOREA REPUBLIC	330	-	823	2,838	585	879	21.60
TAIWAN	-	19,149	30,595	47,411	45,835	85,642	45.40
AUSTRALIA	406	702	385	294	386	335	-3.80
SWEDEN	12,682	-	9,089	9,317	12,244	9,798	-5.00
UNITED KINGDOM	44,699	25,098	25,075	32,325	32,293	20,340	-14.60
JAPAN	1,275,512	1,161,949	1,622,028	1,886,536	1,925,231	2,802,307	17.00
UNITED STATES	18,690	22,412	29,385	23,016	35,536	65,957	28.70
GERMANY REPUBLIC	79,923	94,624	121,577	101,369	101,476	117,475	8.00
INDIA	2,922	4,756	3,911	6,666	5,118	-	15.00
WORLD MARKET	-	1,565,091	2,124,254	2,446,481	2,513,162	3,572,373	22.90

SOURCE : UN, YEARBOOK OF INTERNATIONAL TRADE STATISTICS, VARIOUS YEARS

Motorcycles from the U.S were mainly exported to North America (mainly to Canada) and Europe (EEC countries). The United Kingdom, on the other hand, mainly exported to Europe. Motorcycles from these two countries are not very popular in the Asia region. In 1982, the exports to Asia were less than 10% of U.S. exports and 7% of U.K. exports.

4.0 Status of Motor Vehicle Industry In Asia

4.1 Overall Structure and Organization

Despite the domestic content programs pursued by Asian countries such as Thailand, Indonesia, Malaysia, Philippines and Korea (and including Japan in the pre-war decades), the number of primary firms or motor vehicle manufacturers found in most Asian countries is rather large. There are about 22 foreign automotive manufacturers (including motorcycles) in the South-East Asian region alone i.e. 11 western automotive manufacturers including GM, Ford, VW, Benz etc. and 11 Japanese automotive manufacturers including Toyota, Nissan and Mitsubishi. Thailand for instance, has 13 automotive primary firms. This reflects the importance of this region as a collective market of worldwide significance. On the average, there are at least 15 models existing in each country.

In contrast to South-East Asian countries, the industry in Japan and Korea is relatively oligopolistic in nature despite the comparatively small domestic markets for motor vehicles.

The characteristics of the motor vehicle industry in Asia (specifically covering Japan, Korea, Thailand, Indonesia, Malaysia and the Philippines) have been extensively covered by Konosuka Odaka in a study on the motor vehicle industry in Asia, parts of which are condensed below :

4.1.1 Industrial Structure

i) The effective market of each South-East Asian country is so small yet each has numerous car manufacturers or assemblers.

ii) Models for each assembler/manufacturer are too numerous. For instance, Taiwan's Yue Loong has 11 models including Sunny, New Sunny, Violet, Cedric, Blue Bird, Datsun Truck, Asia Car, Homer, Stanza and Sunny Truck.

iii) Annual production of each South-East Asian country is too small to achieve economies of scale.

iv) Among the car manufacturers, more than 50% are Japanese's for instance, there are 7 Japanese and 6 Western primary firms in Thailand.

4.1.2 Ancillary Firm Development

On the whole, the promotion of domestic content program has encouraged the growth of ancillary firms. This is especially significant in Korea and the Philippines where the program is relatively advanced. In Korea, the number of automotive parts manufacturers doubled from 101 in 1963 to 234 in 1976, with medium-sized firms (with 50 to 199 employees) recording the highest growth rate and therefore, accounting for slightly over a quarter of the total number of ancillary firms in the country until 1980. Similarly in the Philippines, the number of automotive ancillary firms grew from about 50 (before the introduction of "PCMP" in

1973) to 280 in 1975. The high growth was generally accompanied by improvements in the technological and managerial capabilities of the respective firms.

The impact of ancillary firm development on technology transfer in the various countries is discussed in the subsequent sub-section while that of Malaysia is in section 4 covering Technology Trends.

4.1.3 Relations Between Primary and Ancillary Firms

Three type of models with regard to primary-ancillary firm relations are discernible:

i) The Japanese Model

At the top of the Japanese system is a primary firm, which is supported by a a large number of ancillary firms. The latter have have close relationship vertically with the primary firm and horizontally (through trade associations) with other ancillary firms. In certain cases, an ancillary firm holds an exclusive relation with one primary firm which in turn, places indefinite standby procurement orders and extends various forms of assistance to the ancillary firm. The vertical relationship can be very tight, so much so that sub-contracting to the ancillary firm isalmost like in-house production by the primary firm itself.

ii) The Korean Model

The ancillary firms are highly independent of the primary units. This has been due to the Korean government's policy to promote the competitive position of the automotive parts industry through the encouragement of horizontal integration of ancillary firms. This policy was originally considered necessary in order to improve the export capability of the motor vehicle industry. In South Korea, the proportion of in-house manufacturing of Original Equipment by the primary firms is definitely higher (70%) than in other countries because of the Government's insistence on the local production of the more sophisticated functional components such as engine and transmission.

iii) The South-East Asian Model

In this model, the primary firms are in the process of either developing or strengthening their ties with ancillary firms mainly because of governmental pressure to promote the use of locally produced parts and components. There are 3 variations to this model:

- The Philippine Type

In this case, the export promotion drive of the government has prompted primary firms to engage themselves in the in-house production of certain functional components, portions of which are exported. Other less sophisticated parts and components are procured from the indigenous ancillary firms. Multiple sourcing by primary firms is common.

- The Indonesian/Malaysian Type

Because of the underdeveloped transport industry, the primary firms would tend to associate only with those ancillary firms which are either joint-ventures or under technological licensing agreements with foreign firms. Hence, indigenous firms do not benefit much from the diffusion of new technology or new technological information. In Indonesia, however, the mandatory deletion schedule and other tax privileges have worked in favour of ancillary firms as they have designated for the local ancillary firms the entire domestic market of the specified components. In Malaysia, on the other hand, the lack of production expertise of primary firms has deprived the majority of the opportunity to engage in the in-house production of their parts and components. There are, therefore, little backward linkage effects.

- The Thai Type

The Thai case is a mixture of the Philippine and Indonesia/Malaysian types. Automotive parts are supplied either by in-house production of primary firms or by foreign-related manufacturers. Production of purely indigenous original equipment is practised only to a limited extent.

On the whole, the relationship between primary and ancillary firms, with the exception of Japan, is characterized by a trading rather than a sub-contracting relationship. Interaction between the primary and ancillary firms is limited to the purchase and sales of components between the two parties. There is no close relationship between primary and ancillary firms.

4.1.4 Production Technology and Localization

For most South-East Asian countries, as a whole, the manufacturing of body parts presents the largest obstacles for localization, as not only is sizeable demand required but it entails highly capital-intensive technology which allows little opportunity for factor substitution. The second most difficult component is the production of power train (transmission) components.

There is a certain flexibility in the choice of techniques in automotive component production. Ancillary firms in most countries do not specialize in the production of a particular component. Instead, multi-purpose machines and labour-intensive techniques are being used to compensate for the low volume of the domestic market. Hence, ancillary firms in most countries can be considered to be rather responsive to local factor endowments.

4.1.5 Problems of Local Content Programmes

The major difficulties facing the primary firms in the Asian countries (excluding Japan) are the deterioration in the quality of the completed vehicles and the significant increase in the price of the final product (motor vehicle).

i) Low Product Quality

On the whole, the domestic content program has led to the decline in output quality for reasons connected to both the low technological and managerial capabilities of the local assembly operations as well as the low quality of domestically supplied parts and components.

On the assembly side, poor product quality has been attributed to the poor quality of production facilities of labour skill and of production control. Painting and welding activities are still utilizing obsolete methods and equipment.

In the case of production management, the most obvious problems are encountered in the improper storage of parts and components imported as part of the CKD packs, and deficiency in material handling of the body parts. In addition, the quality of the domestically purchased components is inferior to the imported versions in most cases. This has often given rise to strong preference by the final users for imported components which are usually sold with high premiums.

ii) High Product Cost

The high unit cost of vehicles in most cases is attributable to the high cost of parts and components as well as the relative inefficiency of final assembly operations. This problem is compounded further by the various government's imposition of high motor vehicle taxes.

The relative inefficiency in the assembly operation of the respective countries is due in part to the low level of technology and also other factors relating to the very nature of the assembly operation such as the late delivery of locally purchased parts and components, the smallness of assembly line and production by small lots in response to relatively unstable, limited demand. The small assembly line and small-lot operation is essentially due to the limited market for motor vehicles aggravated further by the existence of too many makes and models which tend to segment further the already small market.

4.1.6 Problems Facing the Ancillary Firms

The 3 major problems facing the motor vehicle ancillary firms in most South-East Asian countries are the problem of industrial organization i.e. differentials of various kinds existing between between foreign-related and purely local firms.

i) Poor Production Control

In most cases, the problem of low product quality and of high rejection rates are the result of the shortage of skilled labour, the poor quality of the production equipment and the non-uniformity in the quality of raw materials.

ii) High Production Cost

Inefficiency in production, high raw material costs and high interest charges are factors leading to the high cost of production of the ancillary firms. This is made more critical because of the model-specificity of many OEs, the practice of multi-sourcing by the primary firms, and the absence of a strong primary-ancillary relationship.

Certain country-specific factors have also contributed to higher production costs, for instance, the payment of royalties in Korea and multiple taxation at different stages of component production in Indonesia.

iii) Unequal Development among Ancillary Firms

In 3 Southeast Asian countries, there is a gap between the firms with close links with foreign corporations (both primary and ancillary firms) and the purely indigenous firms (mostly ancillary firms).

In Indonesia, all the OE suppliers are relatively large in size, associated with GIAM (Automobile Components Industrial Association) and closely tied to foreign counterparts i.e., either 100% subsidiaries or joint ventures.

In Malaysia, foreign-controlled corporations are not only large in production scale but also hold a prominent position in the production and export of selected localized automotive components (for example, tyres and batteries).

In the Philippines, the production of major functional components (engine, transmission and body stamping) is undertaken by the primary firms themselves.

4.2 The Motor Vehicle Industry in Taiwan

4.2.1 Production and Sales of Mot Vehicles

In Taiwan, motor vehicles are usually of 2 categories : small models (passenger vehicles with 9 or less seats and trucks of 3.5 tons or less) and large models (passenger vehicles with 10 or more seats and trucks of over 3.5 tons).

There has been a significant increase in the demand for small motor vehicles in recent years, increasing at 15.5% per annum from 76,682 units (US$422.7 million) in 1978 to 134,729 units (US$922.6 million) in 1982 (See Table 3.4.1). The 1200 cc class dominated sales between 1980 and 1982 despite its overall market share falling from 30.0%

TABLE 3.4.1

PRODUCTION AND SALES OF AUTOMOBILES IN TAIWAN, 1978 TO 1982

Year	1982	1981	1980	1979	1978
Small automobile production (units)	133,654	137,598	132,116	115,462	76,634
Small automobile sales (units)	134,729	136,901	130,263	114,648	76,682
Small automobile sales value	922.6	941.2	818.2	694.7	422.7
Sales growth rates (%)	−1.6	5.1	13.6	49.5	-
Large automobile production (units)	538	303	464	641	543
Large automobile sales (units)	376	275	503	688	546
Large automobile sales value (US$1,000,000)	15.4	10.1	16.3	22.6	15.2
Sales growth rates (%)	36.7	−45.3	−26.9	26.0	

Source: Bureau of Statistics, Ministry of Economic Affairs, "Taiwan Industrial Production Statistical Monthly."

(38,458 units) in 1980 to 22.0% (27,904 units) in 1982. This was partly because many private owners moved up from the 1200 cc class to the 1400 cc and 1800 cc classes and partly because the market for taxis has become fairly saturated. The second most popular class was 600 cc vehicles accounting for 17.2% (21,670) units in 1982. Many of the vehicles in this class are pick-ups and vans. The third largest class was 1400 cc vehicles with market share of 14.5% (18,436 units) in 1982 (Table 3.4.2).

There are 6 motor vehicle manufacturers in Taiwan, namely, Yue Loong Motor Co., Ford-Lio Ho Motor Co., China Motor Industrial Co., San Fu Motor Industrial Co., San Yang Motor Industrial Co. and Yeu Tyan Machinery Manufacturing Co. Yue Loong is Taiwan's largest motor vehicle manufacturer with market share of 44.7% in 1982 (56,516 units) followed by Ford Lio Ho with 22.8% (28,892 units).

4.2.2 Number and Ownership of Motor Vehicles

As shown in Table 3.4.3, the number of small motor vehicles in Taiwan increased from 136,294 in 1973 (including 95,113 passenger vehicles and 41,181 light trucks) to 837,727 in 1982 (comprising 592,554 passenger vehicles and 245,173 light trucks). This represented an increase of 6.1 times in 10 years. Annual growth rates have ranged from 16.7% to 30.9% while per capita ownership has risen from one vehicle per 114.2 persons in 1973 to one vehicle per 22 persons in 1982.

The number of large vehicles in Taiwan increased to 37,337 in 1973 (including 10,165 buses and 27,172 heavy trucks). This represented an increase in

TABLE 3.4.2

STATISTICS OF AUTOMOBILE SALE-VOLUME IN 1982
(UNIT SET)

DISPLACEMENT / MANUFACTURER	TYPE	600 c.c	1,200 c.c	1,300 c.c	1,400 c.c	1,500 c.c	1,600 c.c	2,000 c.c	2,200 c.c.	2,400 c.c.	2,800 c.c	6,980 c.c	8,208 c.c	9,507 c.c	10,308 c.c	SUM	%
	Sedan		26,019		6,713		1,275	3,783	2,387	1,853							
YEE LOONG	Truck		32													56,515	44,7
	Chassis		1,853				5,255	4,592	2,779								
	Sedan			6,230		9,496	9,618	897			1,295					28,892	22,8
FORD LIO HO	Truck					1,060											
	Chassis					296											
	Sedan	2,117															
SAN-FU	Truck	3,036														5,203	4,1
	Chassis	50															
	Sedan	6,963				2,637											
CHINA-MOTOR	Truck	9,504				1,919									98	21,362	16,8
	Chassis					241											
SAN YANG	Sedan				11,723											11,723	9,2
YEU TYAN	Sedan					1,667		1,236								2,903	2,3
HWA TUNG	Chasis											75	79	1		155	0,1
TOTAL	-	21,670	27,904	6,230	18,436	17,316	16,118	10,512	5,166	1,853	1,295	75	79	1	98	126,755	100,0
%	-	17,2	22,0	4,9	14,5	13,7	12,7	8,3	4,1	14	10	0,0	0,0	0,0	0,1	100	

Source: Taiwan Transportation Vehicle Manufacturers' Association.

TABLE 3.4.3

OWNERSHIP OF AUTOMOBILES IN TAIWAN, 1973 TO 1982

Year	Passenger vehicles (units)	Light trucks (units)	Small automobile (units)	Rate of growth (%)	Population (10,000)	Rate of ownership	Bus (units)	Heavy trucks (units)	Large automobiles (units)	Rate of growth (%)	Rate of ownership
1973	95,113	41,181	136,294	-	1,556	114.2	10,165	27,172	37,337	-	416.7
1974	122,517	55,715	178,232	30.8	1,585	88.9	11,191	33,841	45,032	20.6	352.0
1975	144,860	71,300	216,160	21.3	1,615	74.7	12,443	35,699	48,142	6.9	335.5
1976	170,984	88,089	259,073	19.9	1,651	63.7	13,724	41,764	55,488	15.3	297.5
1077	209,921	103,824	313,745	21.1	1,681	53.6	14,904	45,698	60,602	9.2	277.4
1978	255,667	112,309	367,976	17.3	1,714	46.6	14,959	49,000	63,959	5.5	268.0
1979	340,663	141,196	481,859	30.9	1,748	36.3	16,265	60,106	76,371	19.4	228.9
1980	425,443	175,268	600,711	24.7	1,781	29.6	18,004	62,253	80,257	5.1	221.9
1981	506,291	211,304	717,595	19.5	1,814	25.3	18,790	66,562	85,352	6.3	[illegible]
1982	592,554	245,173	837,727	16.7	1,845	22.0	19,181	69,38[illegible]	88,566	3.8	[illegible]

Source: Ministry of Communications, Bureau of Statistics, TAIWAN large motor vehicles of 2.4 times in 10 years. Per capita ownership has risen from one vehicle per 416.7 persons in 1973 to one vehicle per 208.3 persons in 1982.

4.2.3 Exports and Imports of Motor Vehicles

As evident from Table 3.4.4, there is a very great discrepancy between imports and exports of motor vehicles. In 1978, US$64.9 million worth of motor vehicles were imported. This doubled to US$132.1 million in 1982. Most of these imports were either sedans or heavy trucks. Following the banning of imports of sedans from Japan, the imports of European and American sedans rose sharply. Most heavy trucks, however, continue to come from Japan.

Exports of motor vehicles have been relatively insignificant rising from US$1,900 in 1978 to US$1.3 million in 1982, accounting for less than 1% of the value of imports in 1982.

4.2.4 Imports and Exports of Automotive Parts and Components

The imports of automotive parts are still far greater than exports, increasing from US$135 million in 1978 to US$197.4 million in 1982. Most of the imports are miscellaneous parts and accessories, body parts, steering system parts and speed change gears and system. Miscellaneous parts accounted for the bulk of imports. Japan and England are the primary sources of miscellaneous parts mainly because Yue Loong, China Motors, San

TABLE 3.4.4

EXPORTS AND IMPORTS OF AUTOMOBILES IN TAIWAN, 1978-1982

(Value : US$'000)

YEAR	1982		1981		1980		1979		1978	
CATEGORY	EXPORT	IMPORT	EXPORT	IMPORT	EXPORT	IMPORT	EXPORT	IMPORT	EXPORT	IMPORT
Passenger Vehicle and Chassis	177	77,784	24	61,965	49	34,294	11	57,436	19	30,458
Bus and Chassis	160	11,471	221	12,476	582	27,898	-	38,356	-	8,681
Light Truck and Chassis	970	436	1,165	5,726	137	66,684	2	88,576	-	25,771
Heavy truck and Chassis	-	42,404	-	52,173					-	
TOTAL	1,307	132,095	1,410	133,340	768	129,056	13	194,368	19	64,910

Source : Bureau of Customs, "Export-Import Statistics Monthly Report", TAIWAN

Yang and San Fu maintain technical co-operation agreements with Japanese manufacturers while Ford-Lio Ho's shareholder is Ford England. (Table 3.4.5)

Imports of engine parts mainly from Japan have also increased in recent years peaking in 1980 at US$23.1 million. In fact, Japan is the largest source of imports of accessories, body parts and other types of automotive components.

Exports of automotive parts from Taiwan, on the other hand, included wire harnesses and electric horns as well as braking system parts. Of these, wire harnesses and electric horns are the most important reaching an export level of US$8.2 million in 1982 (6 months) or more than 50 times the figure for 1981. Over 95% of the market is centred in North America. Electric car horns are second in importance at export level of US$2.9 million in 1981 followed by braking system parts with US$12.3 million in the same year.

4.2.5 Government Assistance

Apart from technical co-operation between Taiwan and Japan, the Taiwanese government previously has had no comprehensive plan for the development of the motor vehicle industry in Taiwan. Policies have at times been loose and limited to restricted imports of motor vehicles. To protect the infant automotive parts manufacturing industry, the Taiwanese government has introduced various incentive measures including the following :

TABLE 3.4.5

IMPORTED PARTS FOR MOTOR VEHICLES

Currency: CIF US$1000

Country \ Year	1982*		1981		1980		1979		1978	
	Value	Ratio	Value	Ratio	Value	Ratio	Value	Ratio	Value	Ratio
Japan	56,298	60.81	174,833	78.21	87,314	47.17	95,413	51.30	74,325	58.21
U. K.	11,357	12.27	29,304	13.11	60,429	32.64	45,697	24.57	27,909	21.86
France	4,032	4.36	4,477	2.00	3,596	1.94	324	0.17	293	0.23
West Germany	6,612	7.14	4,327	1.94	11,246	6.08	23,023	12.38	11,729	9.19
Philippines	1,811	1.96	2,979	1.33	6,968	3.76	4,883	2.63	3,142	2.46
U.S.A.	1,245	1.34	2,633	1.18	10,760	5.81	12,191	6.56	7,857	6.15
Brazil	7	0.01	476	0.21	3,196	1.73	2,931	1.58	827	0.65
Sweden	173	0.19	368	0.16	116	0.06	167	0.09	56	0.04
Italy	85	0.09	126	0.06	105	0.06	162	0.09	159	0.12
Other	10,957	11.83	4,021	1.80	1,380	0.75	1,187	0.63	1,397	1.09
Total	92,577	100.00	223,544	100.00	185,110	100.00	185,978	100.00	127,694	100.00

* Note: Statistics for 1982 Contain Only 6-Month (1-6) Data.

Source: Annual Statistics of Trade of the Republic of China (Taiwan District Only)

i) exemption from income tax for 5 consecutive years for eligible enterprises.

ii) exemption from income tax for 5 consecutive years for subscriber of registered share bonds of 15%

iii) exemption from income tax for undistributed earnings for expansion

iv) service life of renovated machinery or equipment may be accelerated 1 $^{1}/_{2}$ times

v) imports of machinery or equipment are tax exempted

vi) expenses on researches and experiments are tax exempted

Presently, production in Taiwan is still being done on a small scale with motor vehicles being fairly high-priced. To cut into international markets and promote the growth of the whole industry, the Taiwanese government has initiated its own national car project through a joint-venture between government-owned China Steel Corporation and a foreign motor vehicle manufacturer. At one time in mid 1984, it was announced that the new joint-venture partner would be Toyota Motor Corporation of Japan with full protection of 300,000 units expected in mid 1990, of which 50% will be exported. Toyota was expected to have 45% share in the joint-venture company with the remaining 55% to be shared between China Steel Corporation (25%) and other local producers. The deal, however, did not matrerialise.

Although the project is expected to provide a boost to various sectors like steel, durable plastics and electronics manufacturing, some problems may be encountered in the availability of export markets as most countries in South-East Asia (with the exception of Hong Kong and Singapore with small markets), Europe and America have policies to protect their own car industry. The other export option is Japan but unless local production in Japan is reduced, the Taiwanese models may not be attractive as prices will definitely be higher.

4.3 The Motor Vehicle Industry In Korea

Despite a relatively short history, the growth of the motor vehicle industry of Korea has been remarkable. Since 1962 when the first assembly plant was established, domestic production of motor vehicles has increased from 3,000 units to over 163,500 units in 1982. The number of registered vehicles totalled about 562,000 units (excluding motorcycles) at the end of 1982, with passenger cars comprising 48% of the total.

The rapid growth of the Korean automobile industry was accompanied by a high level of domestic production of parts and components. The domestic content ratio averaged over 90% in small passenger cars, 87% in buses, and 66%-80% in trucks at the end of 1979.

The remarkable progress in the localization of parts and components production is largely due to the Korean government's adherence to the automobile manufacturing policy patterned after the Japanese model. The respects from the strategies of most of the developing countries where completed cars are assembled by subsidiaries of foreign companies (usually multinationals) or by joint ventures with foreign firms, and the development of ancillary firms is closely linked to multinational corporations which control the supply of major parts and components. In contrast, most ancillary firms in Korea developed prior to or independent of primary firms, and this has greatly facilitated the rapid localization of parts and components within a relatively short period of time.

4.3.1 The Primary Firms

There are 6 manufacturers dominated by Hyundai Motor and Daewoo Motors. The leading Korean car manufacturer is Hyundai Motor which produces Pony cars with technological help from Mitsubishi Motors. Pony cars have local content of 90% and is sold mainly in 50 developing countries. This makes Korea the only developing country to have a national car industry with minimal direct involvement and investment of the TNCs.

Measures are now being undertaken to achieve a 100% local content which means a totally independent industry.

Plans are also underway to increase the production of Pony cars. A new Hyundai factory designed to make 300,000 cars a year will quadruple the Korean car maker's capacity in a few years. The company wants to reduce unit costs, improve quality and export to the U.S. In order to do this, Korea's car manufacturers are teaming up with their U.S. counterparts. For example, in July 1984, Daewoo signed an agreement with General Motors to take equal shares in a $427.8 million joint venture to build front-wheel-drive cars in the U.S. Similarly, Hyundai and Samsung also had joint venture plans with Ford Motor Company and Chrysler respectively. The Koreans hope that partnerships with American companies will help them in their automobile export drive.

4.3.2 The Ancillary Firms

The development pattern of Korean ancillary firms differs in many respects from those of most other developing countries in Asia. They grew more or less prior to, or independent of, modern assembly production for a considerable period of time in which repair and replacement demand, particularly for the military, played a crucial role in fostering ancillary firm development. It was also in this period when there was an accumulation of technology and skills in automobile manufacture. On the basis of this historical background, the Korean government attempted to foster the domestic manufacture of motor vehicles from the relatively early period of modern assembly production. In order to carry out the domestic manufacture of automobiles as rapidly as possible, the government began to accelerate the localization of parts and components production. The government set up an annual target for domestic content ratio and enforced it through various preferential support and higher protective measures taken against the import of parts and components.

As a result, the production of parts and components increased very rapidly with the proliferation of small ancillary firms which created greater employment opportunities. In 1977, for example, the total number of employees working in the parts and components industry constituted 1.4 percent of the total employment in the manufacturing sector, while complete car producers accounted for only 0.6 percent.

4.3.3 Problems Facing the Korean Motor Vehicle Industry

Korea's automobile industry has registered a remarkable performance within a relatively short time. It has overcome, to a large extent, difficulties arising in the transition from the assembly of imported CKD to the domestic manufacture of automobiles in terms of localization of parts and components production.

However, this strategy has been accompanied, by components production. This strategy has been accompanied, by rising costs of manufacture and higher prices of final products. The supplier industries can now produce almost all the necessary parts and components, but the cost and quality of most of them are not yet internationally competitive.

There are also technology problems. Since most of the assemblers have no ties with multinationals, critical know-how is not readily accessible. Current domestic and international economic conditions are not favorable for the automobile industry because of continuing oil price increases. As a result, the automobile industry, including the parts and components industry, is expected to undergo a period of substantially lower growth rate.

The higher input costs and higher prices of final products, to a large extent, can be attributed to the rapid implementation of the domestic content programme associated with high protectionistic measures. It would have been less costly if it had been carried out more selectively so that the promotion of the parts and components industry could be more linked to export growth. Since products are highly protected, the industry has in general fallen short of efficiency and productivity growth. Even in the ancillary firms, total productivity growth has not been very significant since it has accounted for only 12 percent of their output growth, which seems low in international comparison.

Technology import in the parts and components industry had been very limited until recently. This limited import of foreign technology seems to have resulted in the low quality of products impeding international competitiveness of the ancillary as well as primary firms. This is also one of the reasons why the parts and components industry has not developed as an export industry. which seems inevitable. In the future, the import of foreign technology either in licensing form or joint ventures should be actively promoted for ancillary firms.

In view of these difficulties and other future problems to be encountered by Korea's motor vehicle industry, it may be too early to derive any conclusive policy implications from the country's short experience.

4.4 The Motor Vehicle Industry in the Philippines

After Korea, the Philippines is probably the most advanced in the motor vehicle industry in South-East/East Asia although it is still at the assembly stage. The Philippines automotive industry began with the establishment of the Progressive Car Manufacturing Programme (PCMP) and the Progressive Car and Truck Manufacturing Programme (PTMP).

4.4.1 Progressive Car Manufacturing Programme

The Progressive Car Manufacturing Programme was implemented in 1973 with the following objectives:

- to realize a measure of foreign exchange savings for the country through domestic manufacture of automobile components;
- to create increased manufacturing activities in the various small- and medium-scale enterprises for the domestic manufacture of

automobile components, and in the process upgrade engineering and production skills and provide new technological know-how to the domestic manufacturing industry; and

- to generate new exports of manufactured products as automobile components in a regional automobile complementation programme.

The PCMP covers the manufacturing of cars and light vehicles with engines of four cylinders or less and with piston displacement not exceeding 2,000 c.c.

Specific major guidelines for the Progressive Car Manufacturing Programme were thus formulated which included among others, specific target minimum levels of local contents for local production of cars. These guidelines were prepared in consultation with representative from the motor vehicle industry sector.

Of particular interest to the area of ancillary firm development is the programme's objectives of creating new manufacturing activities in related small- and medium-scale industry and the dispersal of technological know-how to this sector. In relation to this objective the programme guidelines specifically state the preference for the sourcing of original components through domestic sub-contracting in related manufacturing enterprises rather than through the in-house production by the primary firms themselves. To assure the promotion of such sourcing arrangements, mechanisms were adopted which require the applicant for accreditation/registration with the PCMP programme indicating local sourcing as well as supplier development. The examination of these plans form one of the components in the evaluation of the application for registration in the programme.

It is to be recognized, however, that there may be individual instances where vertical integration i.e., in-house production by assembler, provides the opportunity for greater economies of scale. There are a number of automobile components which by the technical nature of the manufacturing process require substantial volume of production to be competitive with imports. The extended market provided by the international affiliates of the manufacturers participating in the programme may be allowed to manufacture selected components.

4.4.2 The Progressive Truck Manufacturing Programme

The Progressive Truck Manufacturing Programme (PTMP) adopted in 1977 is very similar to the PCMP. It has basically the same objectives as those of the PCMP and uses a similar formula to determine local content ratios for trucks classified according to gross vehicle weights (GVW). The target local content ratios for the first 3 years of the programme were as follows:

Vehicle Type	Local Content Ratio (%) 1977	1978	1979
Light Commercial Vehicle GVW < 4,500 lbs.	60	65	70
Trucks with 4,500 < GVW < 10,000 lbs.	30	35	40
Trucks with 10,000 < GVW < 30,000 lbs.	25	30	35
Trucks with 30,000 < GVW < 40,000 lbs.	20	25	30

4.4.3 The Effectiveness of the Progressive Manufacturing Programme

Under the PCMP and PTMP, the Philippine motor vehicle industry achieved nearly 70% local content in 1979. The utilisation of domestically produced parts encouraged the establishment of more than 250 component manufacturers producing mainly metal parts and fabrications, rubber products and car accessories.

The PCMP has also helped to achieve closer ancillary relationships. At the onset of the PCMP, the accredited assemblers undertook active identification with, and cultivation of, ancillary firms. They conducted extensive survey of potential ancillary firms which were later on screened through the fielding of test orders. In order to minimize the problem of low quality and delivery delay, the assemblers undertook training seminars on quality control and production planning control for the key personnel of the domestic automobile part manufacturers.

However, despite the achievements, the PCMP and PTMP have their share of criticism. The main criticism relates to the benefits of the PCMP and PTMP relative to their costs. Critics charge that the Philippines market is not large enough to support the PCMP and PTMP. Consequently, they point out that the prices of locally assembled automobiles have risen by 100 per cent or more between 1973 and 1978 (ESCAP 1979).

5.0 The Technology Trend of the Industry

5.1 Introduction

The world automotive industry is presently in the midst of a technological upheaval resulting in major changes to the composition of the motor vehicle, the various manufacturing processes as well as the inter-industry linkages of the sector. These technological changes (along with organizational changes) are setting new standards throughout the industry. Since large-scale production in developing countries is undertaken by affiliates of the major transnational corporations, it seems unlikely that these countries including Malaysia, can avoid at least part of the organizational, technological and production changes. In fact, assemblers/producers in developing countries will have to conform to any norms set by the core producers.

However, it is also widely recognised that not all modern technologies transferred from the industrialized countries may be suitable to the receiving developing countries due to their tendencies towards inadequate employment generation and misallocation of resources. In addition, the absorptive capacity or level of technological capability of the recipient country is also cricital. There is therefore, the question of appropriate technology and what constitutes appropriate technology is still subject to considerable debate.

For Malaysia, the appropriate technology issue is of particular significance in view of its embarkation on the national car project. In this case, appropriate technology need not necessarily mean the most technically efficient or advanced technology. It will be more relevant to relate the most appropriate set of technologies for the automotive industry to various factors such as the cost, availability of relevant limited resources, the social welfare function and the long term development goals of the industry and the country as a whole.

In order to arrive at the levels of appropriate technology for the automotive industry over the next few years, it will be necessary for this section to examine the current technology level of the world industry (including the set of currently available techniques and processes), the track record of technology choice made by Malaysia and the inherent limitations and problems facing the industry.

5.2 The Current Technology Level in the World

The motor vehicle is a complex product consisting of 3,000 to 4,000 different types of components many of which involve different production processes. The diversity and complexity of these components provide tremendous scope for manufacturing either by the motor vehicle manufacturers themselves or by ancillary firms. Despite a higher level of integration in production, motor vehicle manufacturers in such countries as the United States, Japan and United

MOTOR VEHICLE PRODUCT AND COMPONENT TREE

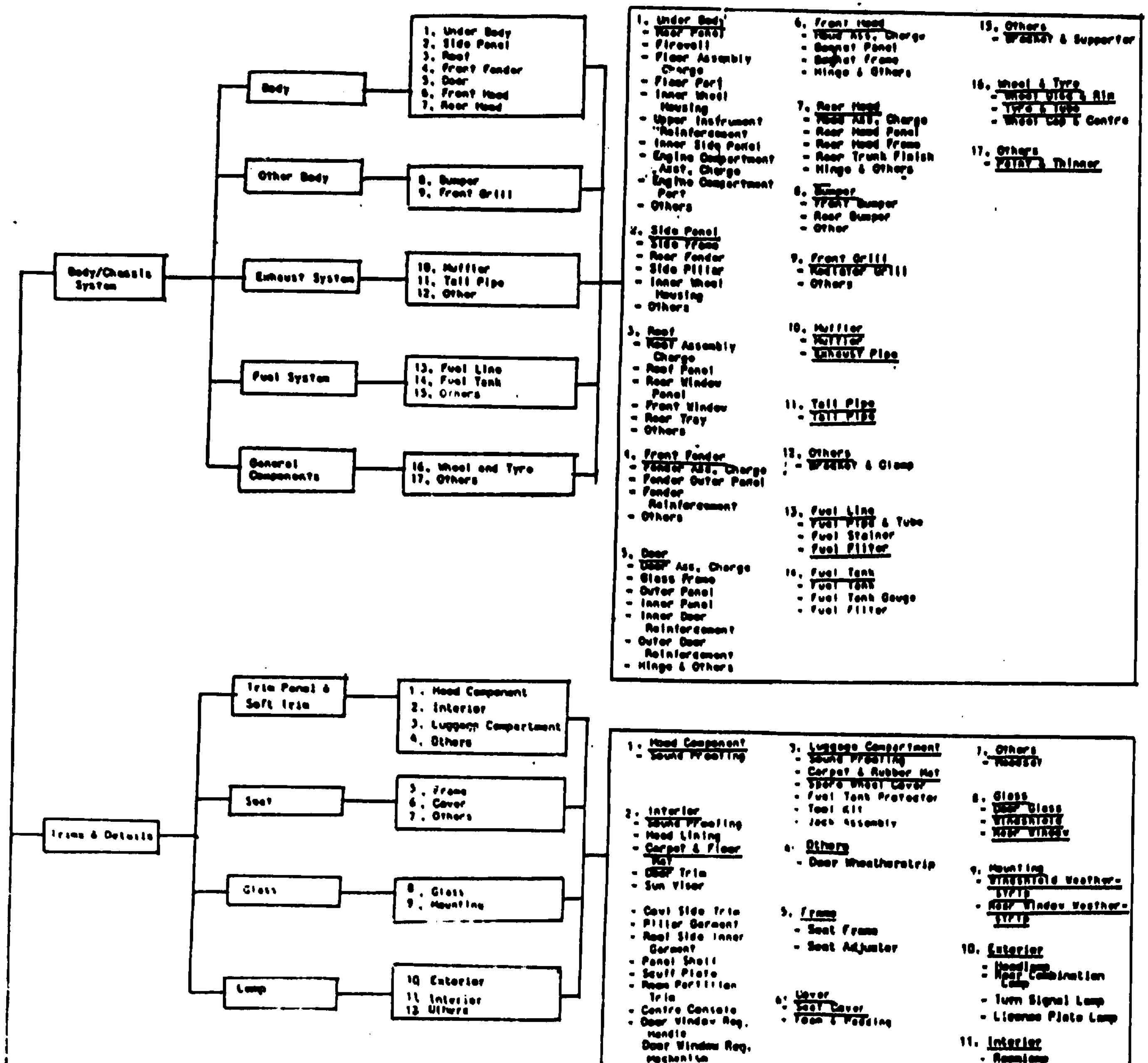


Chart 3.5.1 (Cont.)

MOTOR VEHICLE PRODUCT AND COMPONENT TREE

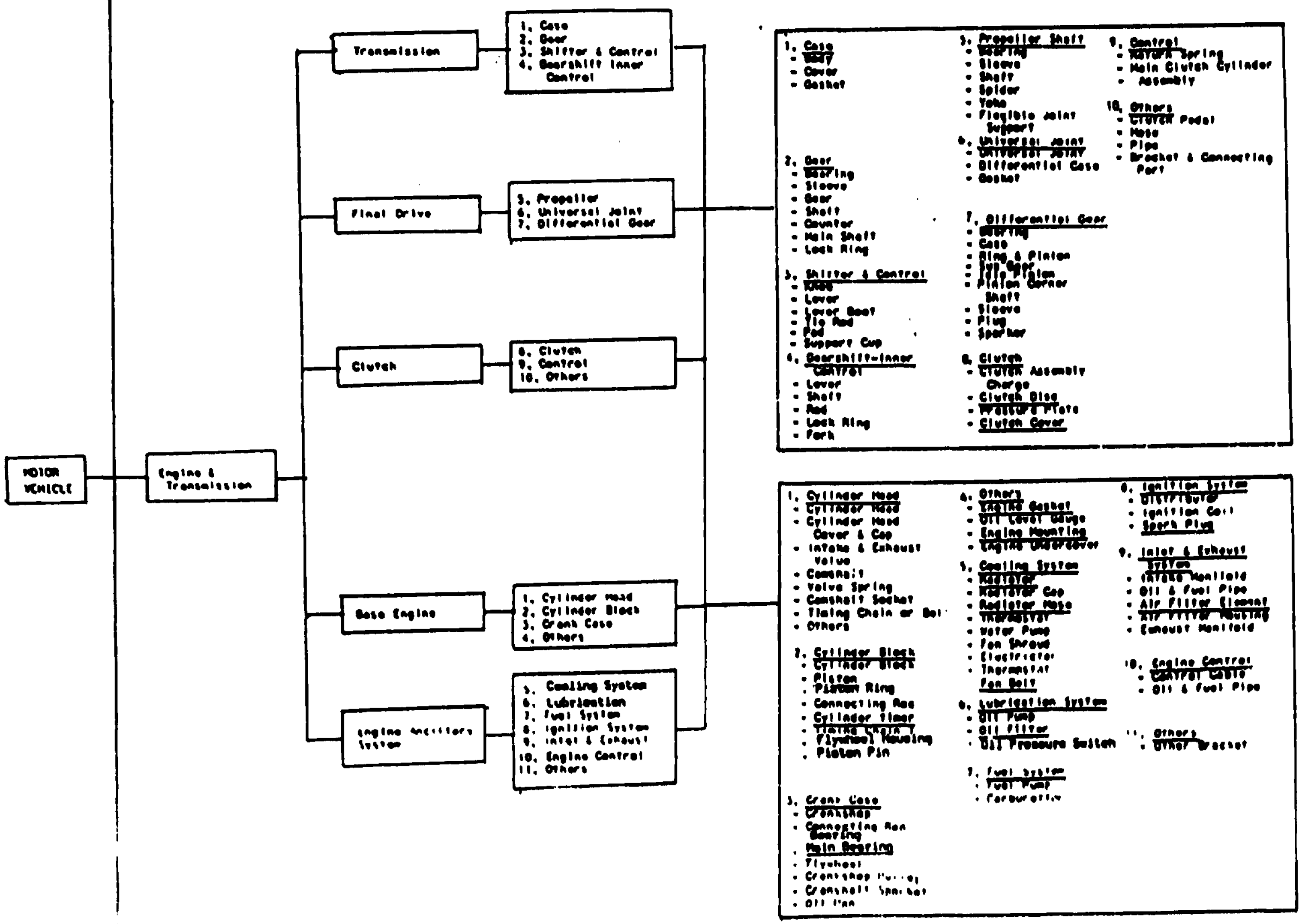


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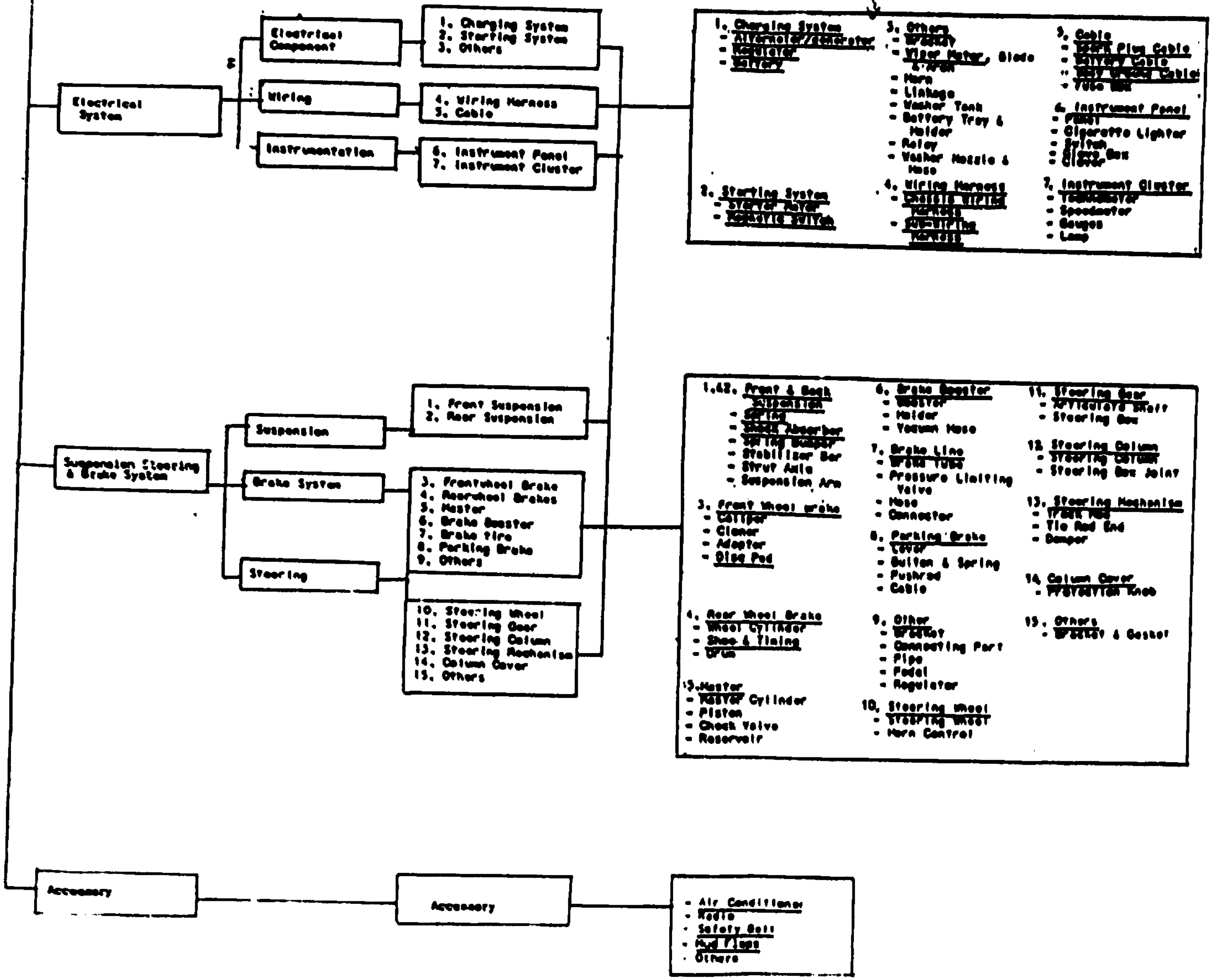
Chart 3.5.1 (Cont.)

MOTOR VEHICLE PRODUCT AND COMPONENT TREE



* COMPONENTS/PARTS IN BOLD AND UNDERSCORE LETTERS HAVE EXISTING LOCAL MANUFACTURER(S)

Kingdom generally find it more economical to sub-contract or purchase from ancillary firms a large portion of the components and accessories incorporated in a modern motor vehicle.

Chart 3.5.1 illustrates the basic product structure and component tree of the typical motor vehicle. Of a total of 280 odd major components falling into 73 sub-groups included in the chart, only about 40 from 25 sub-groups are being manufactured locally in Malaysia.

The manufacture of any type of motor vehicle involves 3 basic stages: design, manufacture of parts and sub-assemblies and assembly into the complete vehicle.

i) Design

Design work involves meticulous planning, research and substantial investment. The design time for a new car model may take about 2 to 4 years involving various phases beginning with general product concepts, production cost targets and sketches of ideas to drawing up of specifications, construction of tools and dies, sourcing of parts suppliers, plant conversion and making of prototypes.

ii) Manufacture of Parts and Sub-Assemblies

Basic raw materials used in this second stage of the production process include steel, iron, plastics, glass, rubber, and fabric. Since backward integration into basic raw materials is rather rare, vehicles and component manufactures, usually purchase the basic raw materials from the original producers for fashioning into the various components.

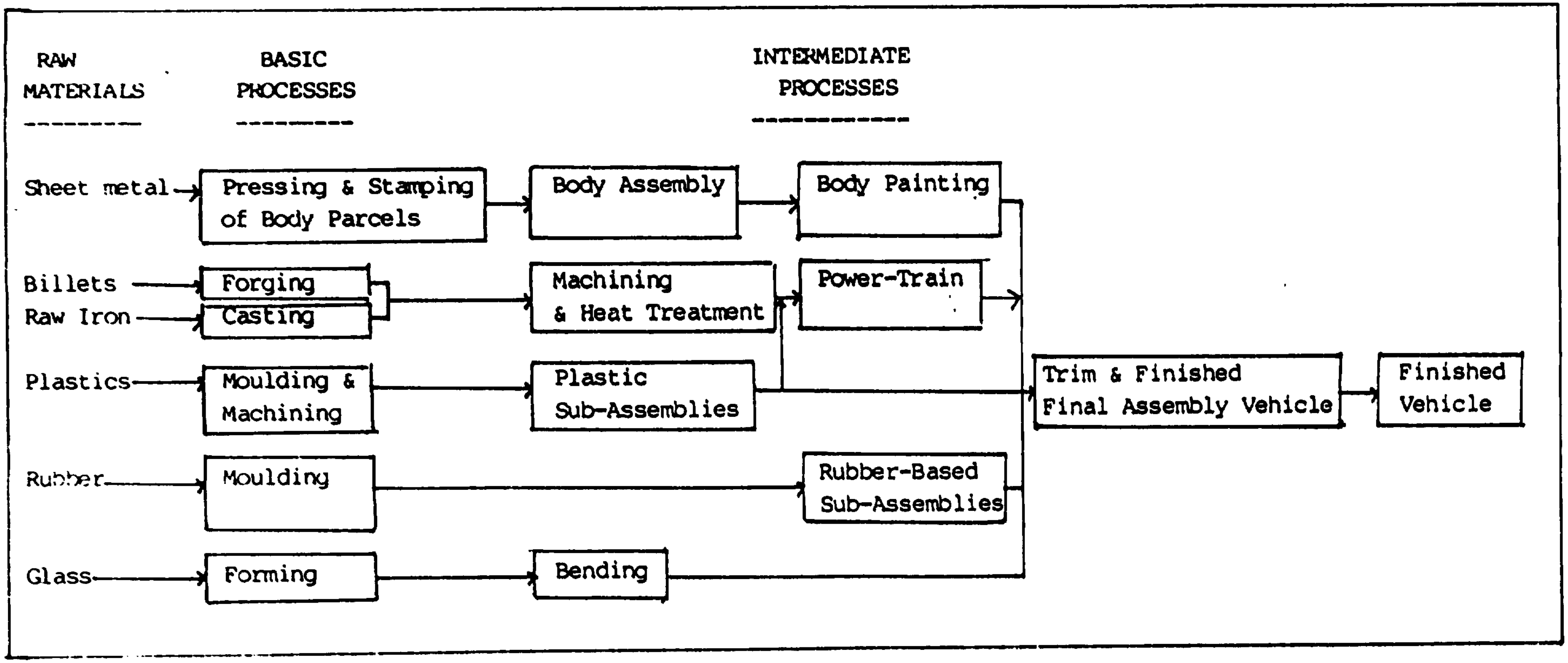
Generally, the involvement of motor vehicle manufacturers is confined to the fashioning of iron and steel into components of the body and power train (engines and transmission units). Other specialized components including plastic and fabric based components are usually purchased from outside suppliers. The various basic and intermediate processes involved in the manufacture of parts and sub-assemblies are presented in Chart 3.5.2.

iii) Final Assembly

Assembly is the last stage of the production process, bringing together all the parts and sub-assemblies into the finished vehicle. The basic assembly process is almost the same in all plants, except for variations in scale of output, plant layout and types of mechanical handling equipment. All the sub-assemblies are brought together in a carefully planned and controlled sequence. This is the stage of production the assembly plants in Malaysia are involved in, using imported CKD packs and locally manufactured parts and components in place of the deleted items.

CHART 3.5.2

BASIC CAR MANUFACTURING PROCESSES



The above 3 basic stages of production involve different levels and types of technology which are changing all the time. The technologies of specific relevance to the automotive industry can be classified as shown in Table 3.5.1. These new technologies are adopted by most major manufacturers to achieve various targets and objectives, as follows:

- better fuel economy by reducing the fuel consumption of the vehicle

- increased safety to the driver and occupants of the vehicle

- reduction in the total number of parts and increase in their overall durability

- reduction in production time and costs through increases in productivity and efficiency

The key technological innovations having major implications on the automotive industry are:

- CAD/CAM System
- Robotization
- New Materials
- Electronics

TABLE 3.5.1

TECHNOLOGY CLASSIFICATIONS IN THE AUTOMOTIVE INDUSTRY

Level	Technology Class	Examples
Design	Design Technology	CAD/CAM
	(including prototyping)	CAE
		Value Engineering
	Materials Technology	New materials - plastics
		- ceramics
		- aluminium
	Electronics Technology	Motor vehicle electronics
		- e.g. engine mounting
		- e.g. electronic ignition
		- e.g. electronic instrument
Production Processes	Process Technology	New joining processes
		- hybrid joining methods
		- adhesive bonding
		New cutting tools
		- ceramics
		- diamond cutters
		New finishing methods
		- paint finishing
		- sealants
Testing	Inspection & Testing Tech.	NDT (Non destructive testing techniques)
		Automated testing methods
		New measurement and inspecting methods
		Statistical Quality Control
Production	Materials Handling & Plant Layout Technology	Automated conveyors
		Pick & place units
		Auto warehouses
		(random access storage and retrieval systems)
Maintenance	Maintenance Technology	Advanced maintenance methods
		- condition monitoring of machinery
		- computer applications
Automation at various levels	Automation Technology	Robotics
		Computer monitoring and control systems
		Flexible Manufacturing
		(Programmable [illegible]

5.2.1 CAD/CAM System

A recent technological innovation of significant importance in the promotion of a total integrated design and manufacturing system is computer-aided design and manufacturing system (CAD/CAM). CAD essentially provides a more precise system for communicating engineering details to manufacturing and quality functions. It allows the following:

- The mathematical representation of a complete vehicle surface shape thus guaranteeing consistency throughout the design, manufacture and inspection procedures.

- The weight and structural stiffness to be assessed before prototypes are made.

- Crash worthiness to be assessed with destructive testing.

The adoption of the CAD system by most manufacturers has helped to reduce the design time for a new car model to 14 months and for single components from 6 months down to 1 month.

Overall, the CAD/CAM systems are important in the logistics of control of groups of machine in automotive inspection and in systems for partly unmanned production. In addition, the CAM system offer the opportunity to combine large scale production methods with the manufacture of vehicles with custom-made characteristics (flexible manufacturing system).

5.2.2 Robotization

In line with efforts to increase productivity, production quality and reduce labour costs, motor vehicle manufacturers in Japan, USA and Western Europe have succeeded in robotizing fully or partially certain production processes such as the assembling of engines and bodies, spot-welding, spray painting and other mechanical processes. In fact, more than 60% of the robots in the world are installed in the automotive ind' -y. Computerized robotic equipment appear to ha he following advantages:

- They are ideal for repetitive tasks

- They do not require as "clean" environmental conditions as humans

- They are easy to re-programme to cope for model changes or a changing mix of models

- They do not require breaks

- They can achieve better consistency of work

- In most applications requiring fine tolerances, robots can achieve higher standards of quality than humans

Table 3.5.2 shows some estimates of the expected rate of introduction of robots into different parts of the automotive production process in Japan. It should be noted that the Japanese definition of industrial robots includes manual manipulations and fixed sequence robots which are usually excluded under U.S. and British definitions. Since they are re-programmable nevertheless, Japan still leads in the field of robotics.

TABLE 3.5.2

TECHNOLOGICAL DIFFUSION : EXPECTED RATE OF INTRODUCTION OF ROBOTS INTO VARIOUS PRODUCTION ACTIVITIES IN JAPAN, 1980 -2000

Activity	1980	1990	2000
Spot welding	44.9	77.5	89.7
Arc welding	15.7	55.9	73.7
Coating and sealing	11.1	51.9	70.2
Material handling	17.9	48.1	60.5
Engine production	12.8	42.5	60.5
Measurement inspections	8.0	39.2	56.5
Assembly operations	4.7	29.4	47.5

Source: Iguchi (1983)

As is evident from Table 3.5.2, although robots tend to be concentrated initially on welding operations, they are also gradually being used in a wide range of other activities. It is envisaged that by 1990, approximately 50% or more of activities in Japan such as material handling , engine production, measurement inspections and assembly operations would have been robotized.

The American Society of Manufacturing Engineers forecasts the following possibi:ities:

- "By 1985, 20% of labour in final automobile assembly will be replaced by robots and automated systems.

- By 1987, 15% of all assembly systems will be using robot technology.

- By 1988, 50% of labour in assembly of small components will be replaced by automation.

- By 1990, development of sensory techniques will enable robots to approximate human capability in assembly operation. "

5.2.3 New Materials

There are 4 main areas of development concerning the introduction and use of new materials in motor vehicle manufacturing:

- The introduction of lighter and better quality steel

- The use of aluminium as a steel substitute

- Early experiments with ceramics

- The use of plastics (particularly structural plastics)

Of greatest significance to the industry is the development in plastics. This is because not only does the use of plastics permit reductions in vehicle weight but its different types of manufacturing technology also make it possible to replace sheet metal parts (fabricated from several stampings) by one integral component. Hence, although at present plastics make up 5% - 6% of car body weight (and is confined to fairly secondary and unimportant areas such as instrument panels, bumpers, panel trims, mud flaps and fenders), forecasts have suggested that the proportion of plastics may double by 1990. By then, the scope of application of plastics parts would have enlarged to cover those under the bonnet (subject to high temperature), fuel tank (impact resistance) and housings for many peripheral equipment, driving and braking units.

The second Delphi forecast on the U.S. Automotive Industry in 1980's (conducted by the Michigan Manufacturers Association in July 1981) predicted the following material composition of U.S. produced passenger cars:

Table 3.5.3

U.S. PRODUCED PASSENGER CARS
- PROJECTED USE OF MATERIALS
(Based on material weight)

	1980	1990
Average Weight of car	1,497 kg	1,020 kg
Material Weight (%)		
- Steel	58 %	58 %
- Iron	15 %	11 %
- Plastics	6 %	13 %
- Aluminium	4 %	9 %
- Glass	3 %	2 %
- Others	14 %	7 %

Also evident from the above is the increasing usage of aluminium, particularly tc replace certain casted components (such as cylinder blocks), pressed parts (e.g. copper tubing for radiators) and steel parts (e.g. motorcycle frame and swing arm). Material panelists of the 1981 Delphi Forecast expect that in 1990 one-third of all sheet material used in U.S. produced components will be plastic and one-sixth of all structural support and wheels will be aluminium as shown in Table 3.5.4.

It is also predicted that the applications of ceramics has tremendous potential. Apart from fuel savings derived from ceramic engines, the ability of ceramics to withstand high temperature, thermal shock and its high durability indicate possible major uses in machine tool cutting.

5.2.4 Electronics

Electronics is not only used increasingly in computer systems (in particular, robotics and CAD/CAM systems) but are also being introduced into the motor vehicle itself with the aim of improving its performance, fuel efficiency and safety aspects. Apart from the traditional usage in car accessories (e.g. casette/radio systems), electronics are being applied in instrumentation and fuel/oil consumption of the vehicle. It is expected that overall by 1990, approximately 20% of car value will comprise electronic items.

In the United States, technology panelists of the 1981 Delphi Forecast mentioned previously have projected that by 1985, 80% of all light-duty vehicles produced in the U.S. will employ a microprocessor, increasing to 95% by 1990. Engine, driveline and entertainment applications will count for 65% of advanced electronic component costs as shown below.

TABLE 3.5.4

U.S. PRODUCED VEHICLES - COMPONENT MATERIALS, 1985 & 1990

% Share of U.S. - Produced Components

Material	Inner and Outer Sheet Material[3]		Support and Wheels[4]		Gas Tank and Floor Pan		Suspension Components[5]	
	1985	1990	1985	1990	1985	1990	1985	1990
Steel	71%	53%	75%	58%	81%	66%	92%	76%
Aluminium	10	14	14	17	3	4	1	2
Plastics and Miscellaneous	19	33	11	25	16	30	7	22

1 includes mild steel and HSLA steel.

2 includes fiber-reinforced plastics or composites, nonreinforced plastics, metal-plastic, metal-plastic laminates or composites, other.

3 includes inner and outer hood, roof, doors, bumper-fascia, fenders, cyclinder head covers.

4 includes bumper and radiator supports, seat frames, wheels.

5 includes suspension springs and control arms.

TABLE 3.5.5

AUTOMATIVE ELECTRONIC COMPONENTS IN
THE U.S. - DISTRIBUTION OF PROJECTED
COSTS IN THE 1980'S

Component	%
Engine and driveline controls	40%
Comfort (heating and air conditioning)	10
Safety	5
Diagnostics	5
Convenience and power assist features	5
Instrumentation and displays	10
Entertainment	25

	100%

In terms of electronic component costs for engine and driveline controls (the largest cost item), it has been estimated that microprocessors, activators and transducers will account for 30%, 25% and 20% of its total respectively. Future electronic advances in the United States are expected in the following areas :-

- Engine and drive-train controls
- Less costly, simpler, smaller, more reliable components

- Diagnostics
- Driver assistance
- Braking controls
- Instrumentation
- Centralized, programmable microprocessor

5.2.5 Other Innovations

Apart from the 4 key technological innovations outlined above, there have been other innovations aimed at improving several established production techniques. These include increased usage of springs to replace conventional fasteners for general applications (e.g. bolts and nuts), modular or integral design of many components and sub-assembly to reduce the number of sub-components for faster and easier assembly or further processing, weight reduction and improvement in functional plating.

A summary of new inventions and innovations in the motor vehicle industry is presented in Table 3.5.6.

5.2.6 Technological Trend

In the United States, the following technological trends have been predicted in the 1981 Delphi Forecast:

- Downsizing, use of light materials and improved engine efficiency together will account for 65% of total fuel economy improvement through 1990.

TABLE 3.5.6

SOME NEW INVENTIONS AND INNOVATIONS IN THE MOTOR VEHICLE INDUSTRY

	Item	Purpose
a.	Air bag	safety
b.	Electronic injection pump systems	reduction of fuel consumption
c.	Anti skidding brake system	safety
d.	Alcohol fuel	substitution
e.	Exhaust systems with catalyst	environment pollution
f.	Capsuling of engines	environment, noise
g.	Electronic information systems for the driver (travel routes navigation aids ECO meter for optimal use of the engines transmissions)	safety, fuel reduction
h.	Electrical engines (electricity batteries) savings in connection with energy saving diesel engines	fuel reduction energy cost environment, pollution
i.	Digital instruments, electronic supervision	safety
j.	Trend from forged to casted engine parts, e.g. crank shafts, connecting rods, aluminium steering, brake and engine parts, aluminium cylinder blocks and heads aluminium radiators	reduction of weight for fewer fuel consumption production cost reduction cost reduction
k.	Plastics instead of steel corrosion	reducing problems weight reduction (fuel savings)
l.	Exhaust systems of stainless steel	durability
m.	Electro galvanised steel on both sides	resistance to corrosion, higher and stronger steel can be used

- Four and six-cylinder engines will account for 80% of U.S. production in 1985 and 1990.

- 65% of the spark-ignited engines in U.S. made cars will have 1.5 to 3-liter displacements during the 1980s.

- Fuel efficiency of the spark-ignition is expected to increase 10% by 1985 and 15% by 1990. By 1995, 25% of all U.S. produced autos will have diesel engines, and another 5% will have electric power plants.

- Front-wheel drive will appear in 85% of all U.S. produced passenger cars in 1990.

- Automatic transmission passenger cars will decrease from 90% of U.S. production in 1979 to 70% in 1985 and 1990.

- By 1990, 95% of all U.S. produced light-du vehicles will employ microprocessors.

- 95% of all U.S. produced passenger cars in 1990 will use integral body frame construction.

- While 26% of the 1990 cars will have no spare tyres, mini-spares will be on board 63% of U.S. produced car in 1990

5.2.7 Commercial Vehicles

Although the key technological innovations affecting motor vehicles as a whole are also expected to have a significant impact on commercial vehicles, the performance standards and requirements of large, heavy-duty diesel-driven commercial vehicles are very different from ordinary, petrol-driven passenger vehicles.

In the first place, the commercial vehicle, whether a light van, a dropside truck or a tipper, is expected to have a long life, and be reliable and economical to run. Recent improvements that have been made in the manufacturing of commercial vehicles (mainly in the usage of new materials) include those listed below:

- Diesel engines are now more economical as a result of raised combustion efficiency brought about through the use of higher grade steel alloys for critical components like valves, piston crowns and rings. Higher operating temperatures are allowed so that heat rejection is reduced.

- Improved seating with new synthetic seal materials has also enabled fuel system pressures to be increased so that injection (and hence, combustion) is accelerated. More complete combustion means less fuel passing out of the exhaust system as smoke and therefore, as wasted energy. Apart from fuel economy and performance improvements, another benefit of this development is the automatically reduced emissions of noxious exhaust gases.

- Engine life has been extended through the availability of more heat-proof alloys in the combustion chamber area. It is now common for the bottom-end of a heavy truck diesel engine to need no renovation for half a million miles (800,000 km) or more. "First life" of engines (to the point where cylinder heads need removing for valve gear attention) has also been extended by up to 100%.

- Truck transmissions have been made more durable mainly as a result of increased research and development efforts in identifying structural weaknesses using, for example, finite-element computerised stress analysis techniques. Gear teeth have in some instances been reprofiled while critical tooth loadings are reduced along with mechanical noise.

- Along with the need to keep down unladen weight, lighter materials are increasingly being used. For instance, chassis-frames are being built increasingly from high tensile steel pressings and in smaller sections than their predecessors for the same strength. In the United States, aluminium is now employed extensively for chassis-frame cross members and attachment brackets. European and Japanese and American truck builders have also turned increasingly to aluminium for non-structural truck components. Fuel tanks, bumpers, catwalk, wheels and even cab panels are now widely specified in light (and non-corroding) aluminium.

- The trend up to 1990 is the introduction and usage of more "revolutionary" non-metallic materials initially on prototype/experimental vehicles. Examples are glass fibres/resin composite springs, carbon-fibre propeller shaft, and disc brakes with friction pads made of new semi-metallic asbestos-free material.

On the whole, research and development efforts aimed at economy improvements in commercial vehicles have been rather successful. Fuel consumption on some trucks is up to 15% better than that of their predecessors 10 years ago.

5.3 **Choice of Technology In Malaysia**

The impact and consequences of the tehnological innovations happening in the automotive industry in the past decade are summarized as follows:

i) **Changes in the Product**

The composition of the typical motor vehicle has changed considerably over the years and is expected to change further in the near future as increasing usage of new materials, electronics and other product changes take place. The shift towards better quality motor vehicles is likely to be the key strategic response by the giant corporations to the low projections of demand growth worldwide.

ii) **Newer Production Processes**

The new technologies allow large scale production and flexibility to be achieved simultaneously through the use of computerized manufacturing systems. Design can be undertaken more efficiently at substantial costs savings. In addition, the adoption of new materials have spun off a new range of manufacturing technologies.

iii) The Inter-Industry Linkages of the Sector

The automotive industry is moving rapidly away from heavy reliance on electrical and mechanical industries towards the electronic and chemical industries.

iv) The Impact on Labour

With the increasing usage of CAD/CAM systems and robotization, the requirements of the industry for labour will, as a whole, become smaller. Instead, more highly skilled labour will be needed.

v) The Impact on Developing Countries

Almost all technological innovations in the automotive industry have been occuring in the developed countries where the industrial infrastructure and labour skills are sufficiently developed to meet the evolving needs of this complex industry. In so far as developing countries (including Malaysia) are concerned, the technological changes adopted by the principal motor vehicle companies in the developed countries will eventually find their way into the affiliated operations overseas. This is despite the fact that there is often a technolcgical gap of more than 10 years, varying from one developing country to another. Essentially it seems unlikely that developing countries can avoid at least part of the organizational and production changes.

Not all modern technologies adopted by the motor vehicle industry in developed countries are suitable to developing countries like Malaysia. Several factors affect the choice of technology by local firms, namely:

- Quality of the product
- Volume of annual production
- Raw material costs
- Price of the machines
- Familiarity with a technology from experience in other countries
- Labour costs
- Average batch size of production run
- Interest on capital
- Usage of technology by competitor
- Trade mark of equipment
- Reduction of labour input for other reasons than labour costs
- Other factors

Apart from labour and capital costs, the factors considered by Malaysian manufacturing firms as generally very important for technological decisions are the quality of the product, volume of annual production (scale economies), price of machines, raw material costs and familiarity with the technology (Hoffman and Tan, 1980)

The discussion on the choice of technology by the Malaysian transport equipment industies can be divided into parts: the motor vehicle assembly industry, and the automotive component and parts manufacturing industry, the motorcycle assembly industry and the bicycle manufacturing industry.

5.3.1 The Motor Vehicle Assembly Industry

All the assembly plants in Malaysia are operating at the sub-automation level as more of the basic processes (body build, metal finish, painting, trim and final assembly and final rectification) are automated. Assembly techniques do not vary much from one plant to another and usually follow the same sequence.

CKD boxes are unstuffed/unboxed at the unboxing areas. Body metal panels are despatched to the body build section whilst other components like the soft and hard trim, bolts and nuts etc. are despatched to the sorting bays of the stores where they are sorted and despatched again to the respective areas of assembly.

° Body Build

In the other plants, all the box-sections of the body panels are coated with anti-rust zinc primer paint prior to assembly. (However, in plants such as Associated Motor Industries and Tan Chong Motors, the entire shell of the vehicle after completion of the body build stage is dipped in bath of primer.)

At the body build section, body metal panels are assembled in specialized jigs or fixtures by fusing specific sections of the panels together. This involves fusing the minor parts into sub-assemblies in the sub-jigs or fixtures and finally fusing all the sub-assemblies into a body shell in the main jig. This is done by high ampere spot welding and electrical welding equipment. All critical dimensions arc checked before proceeding to the next operation.

- <u>Metal Finish</u>

Gas welding, load wiping and metal finish are carried out to ensure the body is to the standard required for painting. Hoods, luggage compartment lids, doors and fenders (in most cases) are bolted on. Provisional holes for emblems, moulding etc. are drilled. All processes are usually inspected before proceeding to the next operation.

- <u>Painting</u>

At Tan Chong, the electro deposit painting system (EDP) is used involving dipping the whole vehicle shell into primer and by way of electrolysis, primer is adhered onto every part of the vehicle's framework. The system prevents rust from attacking spots which cannot be used by the spray gun - usually the box sections, door panels and other corners and built-in closed sections.

At Associated Motor Industries, a similar process known as Cathodic Electrocoating using zinc phosphate is adopted. This ensures an oil-free, rust-free body and at the same time, ensures better paint adhesion and prevention of rust formation.

After the coating with zinc phosphate, the body is forced dry in the oven at approximately 80°C for 17 minutes. The body then proceeds, through overhead conveyor, to the tack-off (cleaning of the body) area after which it is sprayed with several coats of epoxy primer and allowed to "flash-off" and baked in the oven at 150°C. After cooling, the body proceeds for underbody sealing and deadener application and then interior and exterior sealing. A coat of storing sealer filter is applied. After cooling, sanding operations are performed in preparation for the final exterior colour coat. At the enamel spray booth, a 3 coat exterior and 2 coat interior paint is applied. After flash-off heating and cooling,the unit is checked for thickness, hardness and glossiness of the paint. The unit then proceeds to the waxing bay where a coat of dripping anti-net wax is sprayed or injected into all box channels and "unsprayable corners" with special equipment for added protection.

° <u>Trim and Final Assembly</u>

The line is usually divided into 3 sections:

- First section Trim Line where all hardwares (for example, glass, door mechanism steering column, soft trim, etc) are placed into the body.

- Second section Final Line where engine, component parts, front and rear axles with springs and exhaust systems are sub-assembled and inspected. After inspection, the unit is hoisted to the high stand for fitting of brake and final pipes. The unit is then lowered and decked to the First Section. The braking system is bled, and wheel alignment, etc. are checked. The unit then descends to the floor and the doors, bonnets and boot lids re-adjusted. The engine is finally started and the whole unit thoroughly tested.

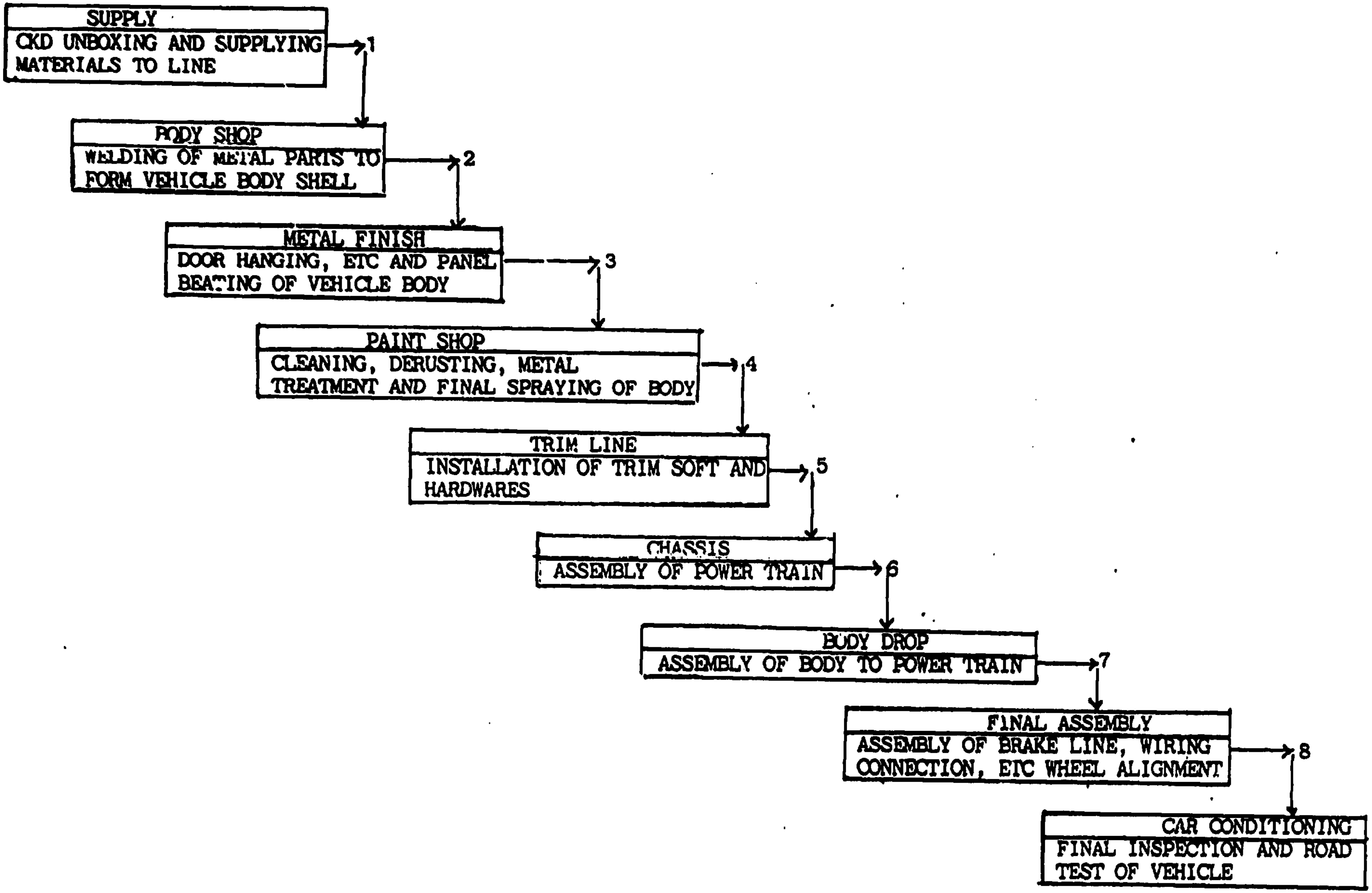
- Third Section Sub-Assembly. The seats, bumpers, etc. are sub-assembled. Tyres are fitted to the rims and static and dynamic balanced with special electronic wheel balance prior to despatch to the Main Line.

- Final Rectification. All repairs, mechanical trim and paint are carried out. The unit is thoroughly cleaned before being checked and inspected to ensure that it meets the required specification and quality levels.

On the whole, it takes approximately 17 to 24 man-hours to assemble a passenger car. Charts <u>3.5.3</u> and <u>3.5.4</u> depict the typical production flow-charts of a passenger car and commercial vehicle respectively.

CHART 3.5.3

TYPICAL PRODUCTION FLOW CHART OF A PASSENGER CAR



Source: See also Komala Devi Perumal, "A Study of the Motor Vehicle Industry in Malaysia", 1982

CHART 3.5.4

TYPICAL PRODUCTION FLOW CHART OF A COMMERCIAL VEHICLE

A

1. CKD Cab Components
2. Body Welding
3. Quality Control Check
4. Body Finishing
5. Quality Control Check
6. Painting/Sealing
   a. Anti-rust coating & Phosphating
   b. Oven Dry Off
   c. Underbody Spray
   d. Primer & Filler Spray
   e. Oven Bake
   f. Wet Sanding
   g. Oven Dry Off
   h. Final Colour Spray
   i. Oven Bake
   j. Minor Paint Repair & Buy Off
7. Quality Control Check
8. Interior Trim
9. Window Fitting
10. Electrical Fittings
11. Quality Control Check

B

1. CKD Chassis Components
2. Frame Rivetting
3. Quality Control Check
4. Front & Rear Axle Ass.
5. Wheels Fitted
6. Engine & Transmission Assembly
7. Chassis Spray
8. Quality Control Check

Cab/Chassis Mounting → Roller Test → Brake Test → Wheels Alignment → Light Adjustment → Final Rectification → Final Inspection → Vehicle Stock Yard → Showroom

Source: See also Komala Devi Perumal, "A Study of the Motor Vehicle Industry in Malaysia," 1982

5.3.2 The Automotive Component Parts Manufacturing Industry

In Malaysia, the motor vehicle assembly industry was established for the purpose of forming the first stage in the establishment of an integrated motor vehicle industry. The Government hoped that the transition from the assembly to an integrated motor vehicle industry would be achieved through the local content programme. The aim of the programme is to force existing assemblers to produce or use more local components so as to encourage the growth of the component parts industry. To date, the motor vehicle assembly in Malaysia has chosen to comply with the local content programme by sub-contracting the production of mandatory deleted components to ancillary firms. These ancillary firms cater to 3 types of markets : Market for Exportables, Original Equipment (OE) and Replacement Equipment Market (REM). Approximately 90% of production by the automotive ancillary firms go to the replacement equipment market, the original equipment market being relatively insignificant and is simply a function of the number of newly assembled motor vehicles plus some warranteed components. Yet, in terms of quality specifications, the original equipment market is the second most quality conscious after the export market.

The majority of automotive component manufacturing firms are confined to the production of standardized, fast-moving (high wear and tear) parts which not only require a low level of technology but are saleable simultaneously to non-automobile industries. Thus, the early ancillary firms in Malaysia are mainly concentrated in product lines such as springs, batteries, brake linings and paint. It is only recently that firms (mainly, joint ventures with foreign concerns) producing the relatively more technologically sophisticated products such as steering parts/mechanisms have begun operating in the country.

In selecting the most advantageous manufacturing methods and equipment for the manufacture of components parts, ancillary firms usually consider technical and financial factors as well as the manpower available. Unlike firms in the developed countries, Malaysian ancillary firms cannot afford to copy the manufacturing methods of components parts manufacturers in developed countries. This is because in the developed countries, the market is large enough to give them the required volume to justify the use of expensive automated equipment. Moreover, because of the high cost of raw materials, manufacturers in developed countries tend to use labour-saving techniques and equipment which require larger amounts of investments in relation to labour. On the other hand, the wider range of makes and models (in relation to the market size) of vehicles produced in Malaysia forces local manufacturers to operate at even smaller volumes of greater variety. necessitating numerous set-ups and tool changes. Hence, the use of complicated capital-intensive techniques and equipment is not economically feasible.

In a 1977 survey on the Malaysian transport equipment industry conducted by the Council for Asian Manpower Studies, it was found that three quarters of ancillary firms in the country were using techniques which incorporated less advanced technology than available alternative techniques, the main reason for this being cost. Also, the adoption of alternative techniques was not economical as they tend to increase capacity well beyond market demand. Of those firms using techniques incorporating a more advanced tehnology, the majority were original equipment suppliers who, given the high quality specifications imposed, had no alternative but to use the latest,.quality-yielding technique.

As an indication of the present (1982) technological level of ancillary firms in Malaysia, Appendix 24 provides a listing of selected firms producing original equipment and replacement parts for the motor vehicle industry which have been extracted from the MIDA/DEG directory of ancillary and supporting industries. The following are observations about the level and choice of technology of the motor vehicle ancillary firms profiled :-

i) The majority of firms are producing simple, dual-purpose (for both replacement and original equipment markets) fabricated components requiring only a low level of technology. However, the evidence of precision machining capability especially in the manufacture of gears and steering components indicates the gradual shift of the industry to a higher technological level.

ii) The main production processes of the majority of firms involved the technique of metal forming or cutting of steel or ferrous based products. Although most of the raw materials were imported, the existence of firms involved in early or basic processes suggests the lack of supporting industries to undertake specialized contracting services such as casting, forging, presswork and machining operations. As a result, the manufacturers are compelled to install such expensive facilities themselves. Closer linkages could, therefore, be developed between the automotive industry and the iron and steel industry as depicted in Chart3.5.2 (i.e. upon completion and operation of HICOM's iron and steel projects.)

iii) The existing manufacturing facilities of most firms comprise predominantly conventional machinery and production testing,/quality control facilities. In a few firms, testing equipments are not available.

5.3.3 The Motorcycle Assembly Industry

The assembly process for two-wheelers including motor-cycles is almost the same in all the assembly plants. Taking the Yamaha plant as an example, there are 3 parts to the assembly of two wheelers : body assembly, painting and final assembly and testing. All the components for the two wheelers come in CKD form except for the engine/transmission units and a few deleted items.

After unpacking, all the components, such as the frame are handed over to the welders. Upon completion of welding , the components are hung on cradles for degreasing, rinsing, anti-rust proofing and several water rinsing processes. After the drying, heating and cooling processes, some of the components are spray painted (either manually or by an automatic spraying machine).

The first step in the actual assembly of the motorcycle is reaming out the steering mounting after the addition of the chassis number. The 2 ball races are then pressed into the mounting. Upon the addition of the main stand and other components, the final step comprises the mounting of the engine, mudguards, wiring harness, fuel and oil tanks, seat, lights, handlebars and all the other components.

There are very few component manufacturers, producing specifically or primarily for the two wheeler industry. This is because most of the component parts for two-wheelers (such as tyres, batteries, fitters and spark plugs) are produced by manufacturers who are also manufacturing similar component parts for the motor vehicle industry. Hence, most ancillary firms of the two-wheeler industry have been covered in the section on automotive component parts manufacturers.

5.3.4 The Bicycle Manufacturing Industry

The main components of the typical roadster, the most common type of bicycle, are listed in Table 3.5.7. Being relatively low in technology and requiring only raw material inputs of mainly steel tubes and sheets (Table 3.5.8), items such as the frame, fork, mudguard, handle-bar, chain-guard, luggage carrier and stand can be produced by any well-equipped workshop. On the other hand, components such as the chain, hubs, rims and tyres require a higher level of technology (since their production involve more sophisticated machinery working on semi-finished inputs like carbon steel) and therefore, are produced by the specialized firms.

The manufacture of the simpler components involve the basic operations of cutting, grinding, thread forming, pressing and bending, and welding processes which are essentially the same for all firms producing similar items. In fact, the majority of bicycle ancillary firms are concentrated in the production of these items whilst the 2 primary firms (Raleigh and Far East) are themselves manufacturing frames, forks and handle bars. Table 3.5.9 summarizes the manufacturing techniques used by Raleigh, Far East and selected ancillary firms. Compared with the other firms, Raleigh's technical quality is more superior since all processes are performed automatically by equipment and paint finishing done electrostatically by dipping. Compared with Far East and the ancillary firms, Raleigh maintains a stringent policy of quality control.

TABLE 3.5.7

MAJOR COMPONENTS OF THE TYPICAL ROADSTER BICYCLE

Component	Primary Firms	Ancillary firms
Body frame	2	3
Front Fork	2	3
Mudguard	-	2
Handle-bar	2	3
Handle-bar grip	-	3
Chair Guard	1	3
Luggage Carrier	-	3
Bicycle Stand	-	3
Crank	-	-
Chain Wheel	-	-
Chain	-	3
Brake System	-	2
Huls (Front and Back)	-	-
Spokes and Nipples	-	4
Rims	1	2
Saddle	-	2
Pedals	-	-
Bell	-	-
Tyre and Inner Tubes	-	4
Rugs (joints)	1	-
Rear Reflector	-	6
Locks		6
Lamp		6
Pump		6

Note: There are only 2 primary firms involved in bicycle manufacturing. Most ancillary firms manufacture more than 1 item.

TABLE 3.5.8

TYPICAL MANUFACTURING PROCESSES FOR A ROADSTER BICYCLE

Component	Raw Material requirements	Manufacturing process
Body frame cutting	Steel tube and joints	1. Tube 2. Grinding & deburning 3. Thread forming 4. Pressing, reaming and bending 5. Welding and brazing 6. Polishing & painting
Fork	Steel tube	As for body frame
Mudguard	Steel sheet	As for body frame but sheet cutting instead of tube cutting
Crank, chain wheel	High Carbon steel	Specialized machineries
Handle-bars	Steel tube, steel lever, rubber grip	As for frame together with electroplating (nickel and chromium plating)
Brakes	Steel lever, brake shoes	Specialized machinery
Hubs, spokes and nipples and rims	High carbon steel sheet and wire	Specialized machinery
Saddles	Steel wire for springs, leather	Specialized machinery
Pedals	Dust caps and pyramid full rubber	Specialized machinery
Chain guard	Steel sheet	As for mudguard
Luggage Carriers	Steel tubes and sheets	As for mudguard
Stand	Steel tubes and sheets	As for mudguard
Bell	High carbon steel	Specialized machinery
Tyre and inner tubes	Rubber, canvas and steel wire	Specialized machinery
Other accessories e.g., lock, lamp, etc.	Miscellaneous	Specialized machinery

TABLE 3.5.9

MANUFACTURING OPERATIONS USED BY RALEIGH (MALAYSIA), FAR EAST METAL WORKS AND ANCILLARY FIRMS

Item	Raleigh Manufacturing Operations	Far East Manufacturing Operations	Typical ancillary firm manufacturing operations
Body Frame and Front Fork	1. Cut tube to size, file ends, and cut threads on ends (automatic)	1. Cut tube to size, file ends, and cut thread (semi-automatic)	
	2. Join tubes using lugs (manual)	2. Join tubes using lugs (manual)	Same as Far East except paint is applied manually instead of the spray system
	3. Weld and braze joints (semi-automatic)	3. Weld joints (manual)	
	4. Electrostatized paint applied by dipping, then components are stove enamelled	4. Paint components using ordinary paint and spray system	
Handle-bar	1. Cut tube to size, bend tube, and then cut threads (automatic)	1. Cut tube to size, bend tube, and cut threads (semi-automatic)	
	2. Join tubes (manual)	2. Join tubes (manual)	Same as Far East
	3. Weld and braze joints (semi-automatic)	3. Weld joints (manual)	
	4. Chrome (to acceptable Raleigh standard) handle-bar (automatic)	4. Chrome handle-bar (automatic)	
Chain Guard	1. Cut sheet to size and press to appropriate shape (automatic)		1. Cut sheet to appropriate size (semi-automatic), press to right shape (automatic)
	2. Join all parts (manual)		2. Join all parts (manual)
	3. Weld and braze joints	Not manufactured	3. Weld joints (manual)
	4. Electrostatized paint applied by dipping; components are then stoved enamelled		4. Paint component manually
Rims	Not manufactured	1. Cut sheet to length, bend and form sheet to circular shape (automatic)	Not manufactured
		2. Weld ends (automatic)	

Source : Fong Chan Onn, "Appropriate Technology : An Empirical Study of Bicycle manufacturing in Malaysia

This is mainly because Raleigh's technical quality is based on its own high international standards while that of other firms is more directed towards meeting the demand and standard of the domestic market.

Although bicycle manufacturing technology is a relatively stable and open technology, the choice of technology by the majority of ancillary firms does not reflect the best available set of techniques in the industry. Although more labour intensive than capital intensive, the manufacturing techniques in use tend to achieve lower unit cost and are therefore, more economical than the alternative techniques. The only 2 ancillary firms currently using the most advanced technology available are subsidiaries of foreign companies having formal agreements for the provision of technical information.

5.4 Transfer of Technology

Studies have shown that there are basically 2 models of technological diffusion:

Module A: The foreign technology, imported first by the major assemblers (which are local subsidiaries and associates of foreign enterprises) is eventually transferred to a growing number of small, local firms when the former sub-contract the production of parts/components or specialized services to the latter. These small contracting firms may later expand into large, independent companies specializing in the production of specific parts and components.

Model B: This model has been based on the experiences of the electronics industry in the Republic of Korea, Technological diffusion in this case occurs in 3 stages. First, "packaged" foreign technology is brought in by foreign-related enterprises which simply assemble imported parts and components. Second, the design and production technologies are transferred to new firms by local technicians and managers who have been trained in or transferred from the foreign-related enterprises. The domestic production of part and components also expands. Third, while more up-to-date foreign technology continues to be imported, the local firms attempt at localizing research, development and engineering activities, resulting in an improved performance of the foreign technology.

However, in the case of the motor vehicle industry, it has been found that neither model A or B is applicable to most ASEAN countries. This is due to the observation that while there has been significant inflows of foreign technology to the primary firms, little domestic transfer of technology from the primary to the ancillary firms has taken place (Ishikawa, 1975 and Odaka, 1983). This is also true of Malaysia where it was found that technology transfer has been more effective between the foreign vehicle manufacturers and local assemblers (who are either subsidiaries/associates or joint-ventures or franchise holders) than between the local motor vehicle assemblers (primary firms) and the automotive component parts manufacturers (ancillary firms). In fact, as at 1983, 6 of the 11 assembly plants have foreign equity participation, the highest (at 80%) being Asia Automobile Industries Sdn. Bhd and the lowest, (15%) Assembly Services Sdn Bhd. The remaining 5 assembly plants are wholly-owned by Malaysians but have close ties with the foreign manufacturers.

The reason for the generally insignificant transfer of technology between primary firms and ancillary firms in Malaysia could be that the primary firms, being essentially assemblers, have little experience or expertise in manufacturing.

Whatever assistance provided by primary to ancillary firms is limited to the provision of technical drawings and some advice or checks on the quality of components supplied. In addition, the number of ancillary firms supplying original equipment to the assemblers is small resulting in the abscence of a strong linkage between the firms. However, there are a few isolated cases where technology transfer is seen to take place. In these instances, either the ancillary firm is a subsidiary or associate of the primary firm (as is the case of transport equipment related conglomerates of Tan Chong, UMW, and Oriental) or the foreign counterparts themselves have sub-contracting relations.

In Malaysia, the ancillary firms supplying original equipment to the primary firms tend to be foreign-related firms equipped with relatively "modern" technology. The majority of these firms are not only relatively large-sized (both in terms of the number of employees and capital) and newcomers to the industry but also have easy access to technical assistance in areas such as management, marketing (especially export markets) and product design. These firms are mainly joint-ventures with direct foreign equity participation and as such, few are technologically dependent on the primary firms or assemblers.

Since the majority of ancillary firms receive little assistance from the primary firms by way of technology transfer, many of these firms, in particular the larger non-foreign related ones, have to resort to purchasing foreign technology from foreign companies with manufacturing experience. Since Japanese makes of motor vehicles are in greater demand, the majority of firms tend to source technology from Japan in order to facilitate the manufacture of parts to Japanese specifications.

Apart from joint-ventures, the most common forms of technology transfer in the automotive component parts manufacturing industry are licensing arrangements, royalties, importation of capital equipment and training of local personnel overseas. Apart from a few new companies, the employment of expatriate personnel is presently quite rare.

Table 3.5.10 presents the sources and costs of technology transfer as well as the extent of research and development facilities of selected component parts manufacturing firms in the country. Foreign ownership is evident in companies producing radiators, brake shoes, car air-conditioners, brake linings and clutch facings, shock absorbers, spark plugs and interior trims like carpets. The extent of foreign equity participation in these joint venture companies range from 12.8% to 62.9% with the Japanese being the most common joint-venture partner and technical licensor. Most firms, both wholly local and joint venture have technical tie-ups with foreigners, the remuneration for technology being commonly in the form of a running royalty computed at rates of 1.5% to 2 1/2% of net sales. Fixed lump sum fees are, however, the form of payment in a few cases where the technical know-how can be fully and completely transferred and absorbed in a relatively short period of time.

About half the firms profiled in the table undertake research and development work. These are mainly the larger Malaysian-owned firms and the joint-venture companies. The number of personnel and corresponding annual expenditure budget range from 2 and $20,000 to $50,000 respectively to 8 and $300,000 respectively. It is noteworthy that half the firms undertaking their own research and development are also incurring royalty payments to their respective technical licensor or joint-venture partner.

TABLE 3.5.10

SOURCE AND TRANSFER OF TECHNOLOGY IN SELECTED COMPONENT PARTS MANUFACTURING FIRMS, 1984

	Firm	Type of Products	Foreign Ownership	No. of Expatriate Staff	Nationality of Technical Licensor	Royalty Payments Basis	Amt. Per Year	Level of Technology	Research & Development No. of Personnel	Expenditure Budget
1.	Auto Parts Manufacturers Co. Sdn Bhd	Leaf Spring	Nil	Nil	Japanese	Per Year Basis	$200,000	Production with with indigeneous	8	$300,000
		Shock Absorber				% of Sales less Exp.	$ 58,000	Simple assembly CKD & piping Material		
2.	Kilang Alatganti Bangi Sdn Bhd	Body Side Moulding	N.A.	Nil	Japanese	Total Sales Value	1.5%	Pure PVC extrusion	2	$ 50,000
3.	Malaysia Radiators Sdn Bhd	Radiators & Cores	42 %	Nil	Indian	Net Total Sales Value	2.5%	N.A.	Nil	Nil
4.	Kyoto Industries (M) Sdn Bhd	Brake Shoes for cars & Motorcycles	30% Jap.	Nil	Japanese		$40,000 lump sum	Simple Assembly using mainly imported materials	Nil	Nil
5.	Brimal Stampress Sdn Bhd	Component Parts of mirrors and safety belts	N.A.	N.A.	Nil	Nil	Nil	Production using indigeneous technology	5	$ 70,000
6.	Unicla Industries	Car Air-Conditioner	10%	Nil	N.A.	Net Sales	2%	Manufacture of components using indigeneous technology	2	$ 20,000
7.	San Der Industrial Co Sdn Bhd	Brake Linings & Clutch Facings	12.8%	Nil	Nil	Nil		Modification of specifications to meet local requirements	Nil	
8.	Kayaba (M) Sdn Bhd	Shock Absorbers	54.7% (Japan)	4	Japanese	Net Selling Price	2%	Indigeneous technology modification of specs. to local requirement	Nil	
9.	NGK Spark Plugs	Spark Plugs	40% (Japan)	3	Japanese	Sales	2%	Production using indigeneous tech.	Nil	
10.	Carpets International	Carpets & Underlays	62.9% (U.K.)		English	N.A.		N.A.	6	$ 50,000
11.	AAE Holdings (M) Sdn Bhd	Rock ~~Steering~~, Tierod, Outer Ball Joints & Steering Linkage	40%	N.A.	W.Germany	Sales	N.A.	Assembly type operation using imported CKDs & parts		
12.	United Industries	Exhaust System, Muffler, filter, Body parts, steel pipe			Nil			N.A.	5	$ 60,000

The technology transfer in the bicycle manufacturing industry is slightly different than that of the motor vehicle industry.

With the exception of the 2 subsidiaries of foreign companies, technology transfer amongst the other bicycle ancillary firms tend to be either informal or in many cases, virtually non-existent. Informal transfer of technology can be seen in those ancillary firms which are the appointed suppliers of components to the primary firm, Raleigh (Malaysia). In these, cases, it is the primary firm which provides the necessary guidance and assistance on quality control and other technical issues. On the other hand, technology transfer is absent amongst the other smaller ancillary firms which do not have any formal or informal channels, either with the primary firms or amongst themselves, to obtain technical information and exchange.

5.5 Limitations and Problems

The leading technological trends affecting the motor vehicle industry of Malaysia are summarized as follows:

- A shift from assembly-type operations to upstream activities such as fabrication and primary process technologies.

- An increase in metalworking skills due to the shift from non-metallic and sheet metal to shaped metallic component manufacturing.

- Increasing quality and consistency demands for component manufacturing.

- An increase in tool and die making activities at higher levels of sophistication.

- An increasing requirement for engineers and technicians in such disciplines as mechanical engineering, production engineering, control engineering and chemical/polymer technology.

It is obvious that in order for the industry to upgrade to a higher technological level, factors such as manpower skills, machine tools, in particular high precision and high volume manufacturing machine tools, as well as quality control techniques and machinery are needed. At present, it appears the lack and shortage of these facilities are the main bottlenecks to technological development in the industry.

6.0 Factor Endowment

6.1. Introduction

This section identifies and evaluates Malaysia's factor endowment, viz, raw material and manpower supply. The analysis will assist us to determine the comparative advantage or disadvantage of the transport equipment sector in Malaysia vis-a-vis other selected reference countries.

The TEI primarily uses a large portion of raw material inputs which are derived from metallic minerals (mostly from ferrous metals). The composition of metallic minerals in the total input cost ranges from 41% to 83%, depending on the sub-group of the TEI. Other raw material inputs include plastic, rubber, glass, sawn timber (mostly for vehicle body building industry) and petroleum (Tables 3.6.1 and 3.6.2)

As can be seen in Table 3.6.2 for a typical passenger car of 900 kg weight, metallic minerals constitute about 75% of the total raw material input cost. Plastic products form another 15%, while rubber parts, and glass and textile products account for 4% each respectively.

6.2. Natural Resource Availability

Malaysia is rich in natural resources. There is abundant supply of rubber, tin, timber and petroleum. There are also some deposits of

TABLE 3.6.1

MALAYSIA : SUMMARY OF THE INPUT STRUCTURE OF THE VARIOUS SUB-GROUPS OF TEI, 1978 (% OF VALUE)

TYPE OF RAW MATERIAL INPUT	MOTOR VEHICLE BODY BUILDING INDUSTRY (MIC 38431)	MOTOR VEHICLE PARTS MANUFACTURING INDUSTRY (MIC 38449)	CYCLE NON-MOTORISED MANUFACTURING INDUSTRY (MIC 38449)
(a) Metallic Minerals			
Ferrous (iron & steel)	31.00	33.13	53.64
Non-ferrous (alluminium, copper, nickles, etc)	10.65	7.65	29.00
(b) Sawn timber	7.80	-	-
(c) Glass	5.50	N.A.	N.A.
(d) Rubber	N.A.	N.A.	N.A.
(e) Others	45.05	59.22	17.36
Total	100.00	100.00	100.00

Notes : (1) Types of iron and steel products include wire mesh, cast iron products, iron and steel plates, rods, bars, sheets, angles, strapping, pipes and sheets.

Sources : See Tables 3.6.2 & 3.6.3.

TABLE 3.6.2

RAW MATERIAL INPUT USED IN PRODUCING A TYPICAL PASSENGER CAR
(WITH TOTAL WEIGHT OF 900 KG)

TYPE OF RAW MATERIAL INPUT	% OF TOTAL WEIGHT	VALUE (1) ESTIMATED %
(a) Ferrous Metals (grey iron, sheet metal, etc)	70	55
(b) Non-ferrous (alluminium, copper, nickles, etc)	10	20
(c) Plastic items	10	15
(d) Rubber parts	4	4
(e) Glass, textile, etc.	4	4
(f) Others (paints, lubricants, etc.)	2	2
	100	100

NOTE : (1) Value of total material cost = 100

SOURCE : MIDA

other metallic mineral such as bauxite and iron ore in our country. The trend of the output of natural resources is shown in Table 3.6.3.

As mentioned in the previous section, the major backward linkages of the transport equipment sector are from the metal products and rubber products industries. Thus, this section will only cover the iron and rubber and steel products in detail.

6.2.1. Iron Ore

The production of iron ore in Malaysia declined from 5.7 million tonnes in 1960 to 340,000 tonnes in 1982. This means that the production of iron ore at existing mines is depleting very rapidly with no new iron ore deposits being discovered.

However, there is still potential for further exploitation of iron ore deposits in Malaysia. According to the report by Austromineral, there are reserves of medium-grade iron ore (with 55% iron content) of 25-30 million tonnes distributed over 40 deposit sites.

Iron ore is usually used to produce cast iron and steel products. The composition of cast iron and steel is shown in Table 3.6.4. In the case of cast iron, impurities in the form of carbon, silicon, phosphorus, manganese and sulphur constitute less than 10% of the total composition depending on the type and usage of the casting. On the other hand, steel is a material that contains iron ore and a small proportion of carbon

TABLE 3.6.3

MALAYSIA : PRODUCTION OF MAJOR TYPES OF RESOURCES, 1960 TO 1982

YEAR	RUBBER ('000 TONNES)	SAW LOGS ('000 TONNES)	SAWN TIMBER	TIN-IN CONCENTRATES	TIN METAL	CRUDE OIL	BAUXITE	IRON ORE
			<-----(TONNES)---->			('000 BARRELS)	<----('000 TONNES)---->	
1960	790.5	5,567.8	1,396.2	52,813	77,352	433.3	748.6	5,730.8
1965	916.9	9,680.8	1,710.0	64,692	73,633	351.3	994.6	6,983.0
1970	1,269.4	17,698.3	2,779.9	73,795	91,494	6,558.7	1,139.3	4,491.1
1975	1,459.3	19,125.5	3,809.7	64,364	83,070	35,771.0	703.5	348.2
1980	1,530.0	27,916.7	6,223.8	61,404	71,319	100,912.4	920.3	371.1
1982	1,516.6	31,749.9	5,872.3	52,342	62,836	110,632.4	589.0	340.3
Average Annual Growth Rate 1960 - 1982								

SOURCE : BN, Quarterly Economic Bulletin, 1983

TABLE 3.6.4

COMPOSITION OF CAST IRON AND STEEL

TYPE OF CONSTITUENTS	CAST IRON (1)	STEEL (2)
Iron	91.0%-94.0%	above 98.5%
Carbon	2.0%-4.5%	up to 1.5%
Silicon	up to 3.0%	-
Phosphorus	up to 1.5%	-
Manganese	up to 1.5%	-
Sulphur	less than 0.1%	-
Total	100.0	100.0

NOTES : (1) The composition of cast iron depends on the type and use of the casting.

(2) Carbon content of 0.1% - 0.125% is used to make wire rod and thin sheet.

SOURCE : Chapman, W.A.J., Workshop Technology, Part I, An Introductory Course, Edward Arnold (Publishers) Ltd, London, 1961

(1.5% or less of the composition). Steel of 0.1% to 0.125% carbon content is usually used to make wire rods and thin sheets for metal products.

In 1983, there were 82 iron foundries, 21 manufacturers of other iron and steel basic products and 85 manufacturers of structural metal products in Malaysia. The total output of these three industries amounted to $461.4 million during the first three-quarters of 1983. Although there are numerous iron fountries and metal working companies, there are only two large integrated steel mills (Malayawata Steel Bhd. and Amalgamated Steel Bhd.).

The products manufactured are mainly in the form of extrusion products such as rods and bars for the construction industry and public works sector. However, the production of medium and heavy hot rolled plate and sheet, and light gauge hot and cold rolled coils and sheets which are used in the manufacture of motor vehicle parts and bodies is not well established in Malaysia.

Thus, the sub-groups of the TEI have to import the bulk of their requirements of high quality iron and steel products. In 1980, the total imports of iron and steel products into Malaysia was US$525.9 million, of which universal, plate iron or steel sheets, and iron and steel bars and rods accounted for about 47% and 29% respectively.

Most of the iron and steel products were imported from Japan (62%), Singapore (5%), Australia (3.3%) and other countries (MISIF, 1984).

The cost of iron and steel products in Malaysia is higher than other countries. Table 3.6.5 shows the approximate prices of selected iron and steel products in Malaysia vis-a-vis Japan. As can be seen, the prices of iron and steel products in Malaysia are relatively higher than Japan.

6.2.2 Rubber

As illustrated in Table 3.6.2, rubber parts comprise about 4% of the total input raw material cost of a typical passenger car of 900 kg weight. Both types of rubber (natural and synthetic) comprise the major constituents of the raw material inputs in the rubber products industry (backward linkages of the TEI) for tyre , rubber mat and weather strip manufacturing industries. Other raw material inputs include carbon black (29% of input cost), antioxidant (8%), zinc oxide (3%), accelerator (2%), and process oil, stearic acid, and sulphur (1% each respectively) (Table 3.6.6).

Since Malaysia is the major producer of natural rubber, the rubber products industry has a relative cost advantage over that of other non-rubber producing countries such as Japan and Europe. The price of local rubber is about 26%

TABLE 3.6.5

COMPARISON OF RAW MATERIAL COSTS BETWEEN MALAYSIA AND JAPAN, 1983

VALUES IN US$

	MALAYSIA (CIF + DUTY) (1)	JAPAN, EXPORT PRICES (F.O.B., JAPAN (2) 31 Oct., 1983
Mild Steel Plate US$/M.T. (1984)	336 (326 + 3%)	High 285 Low 250
Steel Wire 5.5 mm US$/M.T. (1982)	420 (400 + 5%)	290
Bright Drawn Steel Rounds (Polished Shaft) US$/M.T.	565 (487 + 78)	(Approx) 510
Common Nails US$/M.T. (1983)	598 (1125 + 180 + 5%)	(Approx) 445

SOURCES : (1) MIDA
(2) Japan Steel Journal No : 4532, Oct 31, 1983

TABLE 3.6.6

TYPICAL RUBBER FORMULATION SHOWING RELATIVE COSTS

	PARTS BY WEIGHT	PRICE PER KG ($)	COST PER 100 KG OF RUBBER ($)	% Cost
Natural Rubber	100	1.99 (a)	199.00	55
Carbon Black (HAF)	50	2.13 (b)	106.50	29
Process Oil	5	0.70	3.50	1
Zinc Oxide	5	2.35	11.75	3
Stearic Acid	2	1.40	2.80	1
Antioxidant (IPPD)	2	14.85	29.70	8
Sulphur	2.5	0.96	2.40	1
Accelerator (CBS)	0.5	11.00	5.50	2
			361.15	

NOTES : (a) Price on 3rd January, 1984 less duty and cess
(b) Price effective from 20th February, 1984

SOURCE : Rubber Research Institute of Malaysia (RRIM) lower than the overseas price. The price differential is due mainly to the savings from export duty, research and replanting cess, freight and insurance cost, cost at per destination, inland transport and interest which in total amounts to about 81 cents per kilogramme of natural rubber (Table 3.6.7). However, the saving from the export duty varies depending on the export price of rubber.

Besides the cost advantage, local rubber products manufacturers also benefit from shorter delivery time and the higher quality of natural rubber. The 1985 budget also provides the local tyre manufacturers with greater protection in the form of higher import duty on imported tyres (Appendix 26). A new incentive scheme will also be implemented in 1985 whereby export-oriented rubber products manufacturers will be given special electricity tariff rates and discounted rubber prices by FELDA, MARDEC and RISDA.

The rubber product industry also uses a significant amount of synthetic rubber which varies from 10% to 30% of the total composition of the cost of rubber. However, the share of consumption of synthetic rubber in Malaysia is very much lower than other non-rubber producing countries (70%).

As synthetic rubber is not produced locally, all synthetic rubber is imported from abroad, mainly from the U.S. The import duty is 25% + 5%, but exemption is given to manufacturers who produce certain specialized types of products for the export market.

TABLE 3.6.7

COMPARATIVE COST OF NATURAL RUBBER (RINGGIT PER KILOGRAMME)

ITEM	TO OVERSEAS MANUFACTURER	TO MALAYSIAN MANUFACTURER
F.o.b. price	2.60	2.60
Duty and cesses		less .422
Freight and insurance	0.25	-
Cost at per destination	0.075	-
Inland transport		
Interest	0.025	
Total	2.980	2.178

NOTES : (a) Average 23 -25 ringgit per tonne to Europe and 25 - 2 ringgit per tonne to USA

(b) Generally 6 - 9 sen per kilogramme

(c) Depending on distance, usually 2 - 4 sen per kilogramme

(d) Over period of 3 - 4 weeks

SOURCE : Rubber Research Institute of Malaysia (RRIM)

As mentioned previously, other constituents of raw materials (carbon black, process oil, zinc oxide, stearic acid, antioxidant, sulphur and accelerator) found in rubber products account for about 45% of total cost. Apart from zinc oxide and stearic acid which are produced locally, most of these constituents are imported.

6.3. Labour Cost and Availability

The labour cost in Malaysia is relatively lower than that of the NICs (Korea R.O., Singapore and Brazil) and the industrialized countries (Japan, U.S and Europe) but is still higher than that of neighbouring countries (Indonesia and Philippines) (Table 3.1.19).

The ASEAN countries (such as Indonesia, Thailand and Philippines) are presently experiencing relative labour surplus. Since the late 1970s, Malaysia has been experiencing a shift from a relative labour-surplus to relative labour shortage situation, particularly in the case of skilled and semi-skilled production workers.

The Ministry of Labour has indicated that the wage index for production workers (skilled and unskilled) has gone up relatively faster than the general CPI. Thus, industries using cheap skilled and semi-skilled workers are likely to face labour recruitment problems.

The average monthly wage by type of occupation is shown in Table 3.6.8. In 1980, the average earnings of a plant maintenance mechanic was

TABLE 3.6.8

EMPLOYMENT IN MOTOR VEHICLES, PARTS & ACCESSORIES INDUSTRY
BY CATEGORY OF WORKERS, 1974, 1977 AND 1980

OCCUPATION	EMPLOYMENT (NUMBER)			AVERAGE MONTHLY WAGES($)		
	1974	1977	1980	1974	1977	1980
(A) Office Occupations						
Chemist, General	-	-	1	-	-	-
Laboratory Technician	58	-	2	-	-	-
Industrial Efficiency Engineer	11	36	15	1,200	1,686	1,699
Accountant, Professional	11	13	17	1,532	1,957	2,042
Production Manager	12	11	20	2,205	2,260	2,751
Sales Manager	8	2	8	-	-	-
Industrial Relation & Personal Manager	11	12	11	1,514	1,926	2,325
Manager, Other	35	26	65	1,910	2,327	3,102
Chief Clerk	2	4	3	-	-	-
Secretary/Steno/Typist	31	43	78	-	-	-
Bookeeper	42	16	45	309	-	584
Office Clerk/boy, General	116	223	270	-	-	-
(B) Maintenence, Custodial and Material Movement Occupations						
Plant Maintenence Mechanic	91	155	138	391	487	645
Carpenter, General	15	19	16	305	541	579
Watchman	27	91	135	-	-	-
Driver & Attendant	41	25	30	-	-	-
Labourer	1,039	281	544	170	238	261
(C) Production (Plant) Occupation						
Production Supervisor & Foreman, General	190	241	397	607	697	821
Vehicle Upholster, Assembler	626	549	340	211	342	280
Coach - Body Builder, Coach Builder	31	130	161	191	359	215
Buffing & Polishing Machine Operator	236	54	188	205	294	415
Metal Product Fitter Assembler - General	397	834	1,214	228	256	312
Other Machinery Fitter & Machine Assembler	50	264	87	245	267	302
Motor - Car Mechanic General - Motor Mechanic	97	93	319	308	380	434
Vehicle Electrician	57	83	140	304	462	305
Welder, Electric - Arc, Hand Electric Welder	492	178	152	223	257	352
Short Metal Worker	105	129	294	196	264	300
Vehicle Sheet Metal Worker	238	278	306	318	395	394
Spray Painter, Car Spray Painter	522	409	515	242	348	406
Total	4,591	4,199	5,511	12,814	15,743	18,524

SOURCE : Ministry of Labour, Labour and Manpower Report 1981/1982 about M$645 as compared to M$821 and M$312 for a production foreman and assembler respectively. The average monthly wages increased rather rapidly from 1974 to 1980, with an average annual increase of about 8.7% for a plant maintenance mechanic, 5.1% for production foreman and 5.4% for an assembler. The future wage trend is expected to increase further in view of the present labour shortage.

The labour profile in Tables 3.6.8 and 3.6.9 show that 90% of the labour force is directly involved in the production process of the transport equipment sector while less than 1% of workers are professionals and technicians. This indirectly implies the relatively undeveloped nature of the industry with its tendency towards low utilization of highly skilled manpower.

The labour profile is expected to change in the future, particularly,in the proportion of professionals and technicians. It is estimated that the proportion of this occupation category will increase up to 2% to 4% of the labour force in the TEI. This is especially so in view of the research and development skills required for the national car project. In the case of skilled and semi-skilled workers, an increasing number of fitters, tool makers, machine operaters, inspectors, mechanists, and technicians will be required. On the other hand, the proportion of clerical workers and other type of occupations related to assembly operations is expected to remain rather constant.

TABLE 3.6.9

MALAYSIA : OCCUPATIONAL AND SKILL PROFILE IN THE TRANSPORT EQUIPMENT SECTOR

OCCUPATIONAL & SKILL PROFILE	1974		1977		1980		Average Composition
	No.	%	No.	%	No.	%	(%)
Professional and Technical (1)	80	1.7	49	1.2	35	0.6	1.2
Administrative and Managerial (2)	66	1.4	51	1.2	104	1.9	1.5
Clerical (2)	191	4.2	286	6.8	396	7.2	6.1
Production Workers							
- Skilled and Semi-skilled (4)	3147	68.5	3416	81.4	4267	77.4	75.8
- Unskilled (5)	1107	24.2	397	9.4	709	12.9	15.4
Total	4591	100.0	4199	100.0	5511	100.0	100.0

NOTES : (1) includes chemists, technicians, industrial engineers, accountants

(2) includes managers

(3) includes clerks, secretaries, stenographers and typists

(4) includes mechanics, carpenters, supervisors, foremen, fitters, tool makers, assemblers, technicians, welders, operators, etc.

(5) includes manual labourers, material handlers, sorters, etc.

SOURCE : Ministry of Labour, Occupational Wage Survey, 1980

The supply of labour from the various institutions and vocational schools is shown in Table 3.6.10. The supply of high and middle level manpower (such as professional and technical workers) comes mainly from the various local and foreign institutions of higher education. The skilled and semi-skilled manpower, on the other hand, originates from the various skill training institutions set up by both the public and private sectors. The public agencies involved in manpower training are the Ministry of Labour (Industrial Training Institutions), the Ministry of Education (Vocational and Technical Schools/ Polytechnics), the Ministry of National Development (Institute Kemahiran MARA) and the Ministry of Culture, Youth and Sports (Youth Training Centres).

In 1982, the average number of new entrants (both high and middle level, and skilled and semi-skilled) into the labour force of the TEI or related industries was about 10,852, registering an average annual growth rate of 4.2% from the figure of 9,577 in 1978. The various local institutions for higher education (UM, UTM, MARA and TARC) produced about 852 engineering graduates while the output of skilled and semi-skilled manpower from the various skill training institutions of the public and private sectors in 1982 was 10,000 (9,790 and 210 workers from the public and private sectors respectively).

TABLE 3.6.10

MALAYSIA : OUTPUT OF MANPOWER FROM VARIOUS INSTITUTIONS (PUBLIC & PRIVATE SECTOR)

TYPE OF ENGINEERING DEGREE/ DIPLOMA/VOCATIONAL	1978	1979	1980	1981	1981
(a) University Malaya					
Engineering	210	175	159	141	135
(b) University of Technology					
Mechanical Engineering	72	86	90	88	102
Electrical Engineering	156	106	113	169	200
(c) MARA Institute of Technology					
Engineering	213	271	286	320	363
(d) Tunku Abdul Rahman College					
Automotive Technology	33	21	27	34	52
(e) Public Industrial Training Institutes					
Mechanical Engineering	1,412	1,305	1,345	1,383	1,335
Electrical Engineering	146	203	220	252	304
Mechanic	193	258	261	187	427
Machinist	531	610	677	645	648
Motor Vehicle	824	853	830	895	888
Tool & Die	6	7	-	1	3
Electrical	864	784	779	955	1,008
Welding	558	673	648	712	703
Metal Works	244	294	352	375	469
(f) Vocational Schools					
Electrical Installation & Maintenance	517	585	508	688	675
Sheet Metal Works & Welding	445	572	555	649	602
Motor Mechanics	540	585	601	628	647
Mechanical Engineering Practice	-	-	-	32	40
Automotive Engineering Practice	-	-	-	29	40
(g) Technical Schools					
Mechanical Engineering	1,174	1,027	1,027	1,071	965
(h) Polytechnics					
Electrical Engineering (Power)	57	91	108	104	119
Electrical Engineering (Instrumentation & Control)	21	23	27	23	59
Mechanical Engineering (General)	67	90	104	113	127
Mechanical Engineering (Production)	22	25	24	45	43
Mechanical Engineering (Automotive & Diesel)	25	25	24	19	28

TABLE 3.6.10 (CONT')

MALAYSIA : OUTPUT OF MANPOWER FROM VARIOUS INSTITUTIONS (PUBLIC & PRIVATE SECTOR)

TYPE OF ENGINEERING DEGREE/ DIPLOMA/VOCATIONAL	1978	1979	1980	1981	1982
(i) Industrial Training Institutes (National Apprenticeship Scheme)					
General Mechanic	36	46	58	41	24
Motor Vehicle Mechanic	24	39	23	22	24
Welding	20	14	9	5	1
Tool & Die Making	5	-	-	1	3
(j) Industrial Training Institutes (Preparatory Trade Courses)					
Motor Vehicle Mechanic	54	64	67	62	56
Welding	38	66	58	17	57
General Mechanic	65	111	97	81	183
(k) Industrial Training Institutes Skill Upgrading Courses					
General Mechanic	28	2	14	-	8
Motor Vehicle Mechanic	-	-	-	2	36
(l) Industrial Training Institutes (Instructors Training Course)					
General Mechanics	-	18	-	-	17
Motor Vehicle Mechanic	-	1	-	-	14
Welding	-	-	-	-	6
(m) Institute Kemahiran Mara					
Motor Mechanics	133	100	118	119	31
Heavy Machinery Mechanics	8	13	14	24	15
Commercial Heavy Machinery Mechanic	-	-	-	-	27
Marine Mechanics	15	10	26	-	27
Panel Beating & Spray Painting	11	17	14	15	19
(n) Ministry of Youth, Culture & Sport Dusun Tua Youth Training Centre					
General Mechanic	18	-	-	7	32
Motor Vehicle Mechanic	59	53	-	51	72
Motorcycle & Outboard Mechanic	14	11	21	11	8
(o) 15 Main Private Sector Training Institutions					
Automobile Engineering	140	122	205	93	45
Mechanical Engineering	208	221	282	141	165
Total (a) to (o)	9,206	9,577	9,771	10,250	10,852

Source : Ministry of Labour, Labour and Manpower Report 1981/82

The increased output of skilled and semi-skilled workers is mainly due to the increase in the number of skill training institutions and other training programmes that cater for the various specialized trades.

Comparing the supply of high level, skilled and semi-skilled manpower with the actual employment in the TEI in 1980, one can observe that there was a surplus of labour of approximately 4,800 (Tables 3.6.9 and 3.6.10). The finding is in contradiction to the labour shortage faced by the TEI, particularly for skilled workers specializing in the automotive trade. Some survey findings (Ministry of Labour, 1981) revealed that the acute skilled labour shortage occurs mainly in occupations covering mechanics, maintenance workers, fitters, toolmakers, die makers, machine operators, assemblers and technicians.

There is also labour shortage in the professional and technical category of workers as the majority of local graduates tend to be absorbed into the public sector. In addition, a large number of the more qualified professional/technical graduates from Malaysia have migrated overseas. Engineering graduates also tend to be absorbed by manufacturing industries other than the TEI.

The situation is expected to deteriorate further in the future, thus posing problems to an industry requiring particularly high levels of technology. It is because of this shortage in highly skilled technicians that for the National Car Project, a number of personnel have to be sent to Japan for training.

The public sector has planned to expand its training programmes in the future. For instance, there are plans to build five additional Industrial Training Institutions over the next four years.

6.4 Overall Comparative Advantage

The index of social profitability is derived by dividing the Domestic Resource Cost (DRC) by the shadow exchange exchange rate (SER) to obtain a measure of the overall comparative advantage of the transport equipment sector. DRC is defined as the amount of ringgit used in saving or earning an extra ringgit of foreign exchange when producing a unit of commodity. Thus, if the social profitability or DRC/(SER) is less than 1, then the industry concerned has a comparative advantage in producing its goods because it uses less than one ringgit to earn or save an extra ringgit of foreign exchange (socially profitable) and vice versa.

The estimates of the comparative advantage indices of the TEI for 1979 and 1982 are shown in Table 3.6.11. In 1979, the three sub-groups of the TE sector, viz, motor vehicle parts manufacturing industry (0.73), motorcycles and parts assembly and manufacturing industry (0.67), and non-motorised cycles and parts manufacturing industry (0.76), appeared to have achieved

TABLE 3.6.11

MALAYSIA: COMPARATIVE ADVANTAGE OF
TRANSPORT EQUIPMENT SECTOR, 1979 & 1982

MIC	Description	Comparative Advantage Index (DRC/ SER) 1979	1982
38431	Manufacture of motor Vehicle bodies	3.12	3.96
38432	Assembly of Motor Vehicles	1.15	1.88
38439	Motor vehicle parts and accesories	0.73	0.72
38441	Manufacture & assembly of motorcycles & scooters	0.67	0.67
38449	Manufacture of bicycle,cycle, trishaws, and parts	0.76	0.97

Source :(1) Institute of Developing Economies, Input-Output Table of Peninsular Malaysia 1975, IDE Series No 37 Tokyo, 1982
(2) Department of Statistics, Industrial Surveys, Malaysia 1979 and 1982
(3) Trade Classifications and Custom Tariffs 1978 incorporating all amendments up to December 1982

comparative advantage of production. In contrast, the motor vehicle body building industry and the motor vehicle assembly industry seemed to suffer comparative disadvantage with coefficients of 3.12 and 1.15 respectively.

The comparative advantage situation for non-motorised cycles and parts manufacturing industry deteriorated in the early 1980s while the other two sub-groups (motor vehicle parts manufacturing industry, and motorcyles and parts assembly and manufacturing industry) remained quite constant. In the case of both the motor vehicle body building and assembly industries, the comparative disadvantage of production had also deteriorated. This was due to the increase in the cost of imported parts and raw materials as well as the lower labour productivity resulting from the inefficient use of technology.

The overall analysis shows that the TEI in Malaysia is competitive in terms of lower raw material cost (comprising mainly rubber) and labour cost. However, the prices of imported raw materials in the form of iron and steel products are still higher than other countries. Labour productivity in the TEI in Malaysia is relatively lower than other industrialized countries. Thus, in order to gain comparative advantage in the sub-groups of the TEI, the prices of imported raw materials should be reduced and labour productivity raised.

7.0 Current Promotional Policies and Issues

7.1 Introduction

Government policies and regulations pertaining to the TE sector are varied and wide ranging. These policies and regulations have both positive and negative effects on the growth of the TE sector. Regulations and facilities which have positive impact on the growth of the TE sector are incentive schemes, import tariff protection and quota restriction, infrastructural facilities (Industrial Estates, FTZ, etc.) and financial facilities. In contrast, the various licensing regulations and taxation such as sales tax, surtax and raw material import tax have negative effects towards the development of the industry.

Though each of the policy instrument is designed to achieve a specific objective, often a combination of various policy instruments is required. We shall discuss the extent of one or a combination of these policy instruments in attaining each objective. However, prior to that, a review of various policy instruments will be desirable.

Table 3.7.1 gives a listing of the various government policies for promoting and regulating industrial development, while Appendix 27 summarizes the detailed operation of the various incentive schemes.

TABLE 3.7.1

GOVERMENT POLICY FOR PROMOTING AND REGULATING
GOVERNMENT INDUSTRIAL DEVELOPMENT

A) Incentive Schemes	
Pionearing Incentive	
Pioneer Status	(PS)
Labour Oriented Incentives:	
Labour Utilization Relief Incentive	(LUR)
Incentive for Training Manpower	(ITM)
Investment Oriented Incentives:	
Investment Tax Credit	(ITC)
Reinvestment Allowance	(RIA)
Accelerated Depreciation Allowance	(ADA)
Increased Capital Allowance	(ICA)
R & D Oriented Incentives	
Incentive for R & D	(IRD)
Export Oriented Incentives:	
Export Allowance	(EA)
Export Financing	(EF)
Accelerated Depreciation Allowance	(ADA)
Pre- and Post-shipment Preferential Duty	
Drawback on imported raw materials	
Export Financing	(PPEF)
Deduction for Promotion Overseas	(DPO)
Export Refinancing Facility	(ERF)
Location Oriented Incentives	
Locational Incentive	(LI)
B) Special Ammenities and Facilities	
Industrial Estates	
Free Trade Zone	
Licensed Manufacturing Warehouse	
SIRIM (R & D Suppport)	
C) Financial Facilities	
MIDF Loans	
CGC Loans	
SBL Loans	
D) Regulations	
Industrial Coordination Act	ICA
Manufacturing licensing approval	
Foreign Investment Control	FIC
Standards Specification	SIRIM
E) Taxations	
Sales Tax	
Surtax	
IMPORT/Export Duties	
F) Tariff Protection and Import Quota Restriction	
Tariff protection	
Import Licensing	
Exemption from import duties and surtax on raw materials, component parts or machinery drawback and/or refund of import duties/surtax paid	

The magnitude of the impact of the various policy instruments, viz, taxation, effective protection, investment credit and investment subsidies, on the TE sector will be reviewed below.

7.1.1 Taxation

The tax structure of the TE sector is shown in Tables 3.7.2 to3.7.4. As can be seen, all completely built-up units (CBU) of passenger cars are subject to a prohibitive import duty of between 140% to 300% of the Custom Open Market Value (COMV) in addition to a 5% surtax of the COMV and a 10% sales tax of the total COMV. This shows an increase of about 40% to 100% in the import duty as compared to the 1983 tax structure.

On the other hand, all completely knock-down units (CKD) of passenger cars are subject to a flat import rate of 40% of COMV, 5% surtax of the COMV and an excise duty of 25% to 65% of the Excise Open Market Value (EOMV),an addition of 15% in the import duty and 5% of excise duty over that of the 1983 figure.

Therefore, total duties levied constitute 20% to 60% of the selling price of a passenger car, depending on the c.c. range, and whether the car is imported (CBU) or locally assembled (CKD). In the case of a popular CKD model as shown in Table 3.7.2, total duties constituted about 40.3% of the selling price or 83% of the landed cost in 1984. However, the recent increase in the tax structure for CKD cars will further increase the tax burden to 44.3% of the selling price (1984 constant

TABLE 3.7.2

MALAYSIA : TAX STRUCTURE OF TRANSPORT EQUIPMENT SECTOR
1984/1985

Selected Products		Unit of Quantity	Import Duty	Export Duty	Surtax	Sales Tax
Passenger Car	(CKD)	No.	40%	Nil	5%	10%
Passenger Car	(CBU)	No.	140% to 300%	Nil	5%	10%
Bus, Van	(CKD)	No.	5%	Nil	5%	10%
	(CBU)	No.	35%	Nil	5%	10%
Truck	(CKD)	No.	5%	Nil	5%	10%
	(CBU)	No.	35%	Nil	5%	10%
Vehicle Bodies		No.	35%	Nil	5%	10%
Vehicle Parts and Accessories		No.	30%	Nil	5%	10%
Motorcycle	(CKD)	No.	5%	Nil	-	10%
	(CBU)	No.	60%	Nil	-	10%
Cycle, Unmotorised		No.	Nil	Nil	5%	10%
Cycle Parts and Accessories		No.	38.33%	Nil	5%	10%

Source : Malaysia Trade Classification and Customs Tariff 1978, incorporating amendments; Malaysia National Budget 1985.

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TABLE 3.7.3

BREAKDOWN OF TARIFF STRUCTURE OF MOTOR VEHICLES, 1982 - 1984

TYPE OF VEHICLE	IMPORT DUTY (M)			SURTAX (S)		
	OCT 82	OCT 83	OCT 84	OCT 82	OCT 83	OCT 84
COMPLETELY BUILT-UP						
Passenger Car	90-200% (COMV)a	100-260% (COMV)a	140-300% (COMV) a	5% (COMV)	5% (COMV)	5% (COMV)
Commercial Vehicle	30% (COMV)	30% (COMV)	30% (COMV)	5% (COMV)	5% (COMV)	5% (COMV)
COMPLETELY KNOCKED-DOWN						
Passenger Car	15% (COMV)	25% (COMV)	40% (COMV)	5% (COMV)	5% (COMV)	5% (COMV)
Commercial Vehicle	-	-	-	5% (COMV)	5% (COMV)	5% (COMV)

NOTES : a) FOR CARS WITH COMV ABOVE M$20,000, HIGHER MARGINAL RATES APPLY:

	OCT 82	OCT 83	OCT 84
On First $ 20,000	90%	100%	140%
Plus on next $5,000	110%	120%	160%
Plus on next $5,000	135%	145%	185%
Plus on next $5,000	160%	170%	210%
Plus on any $ above $35,000	200%	260%	250% - 300%

SOURCES :(1) Malaysian Motor Vehicle Assemblers Association
(2) Malaysia National Budget 1985

III.285

TABLE 3.7.3 (CONT)

BREAKDOWN OF TARIFF STRUCTURE OF MOTOR VEHILCES, 1982 - 1984

TYPE OF VEHICLE	EXCISE (E)			SALES TAX	
	OCT 82	OCT 83	OCT 84	OCT 82	OCT 83
COMPLETELY BUILT-UP					
Passenger Car	-	-	-	10%(COMV + M+S)	10% (COMV + M+S)
Commercial Vehicle	-	-	-	10% (COMV + M+S)	10% (COMV + M+S)
COMPLETELY KNOCKED DOWN					
Passenger Car	25-60%(EOMV)b	25-60% (EOMV)b	25-65% (EOMV+ E)b	10% (EOMV + E)	10% (EOMV + E)
Commercial Vehicle	15%(EOMV)	15% (EOMV)	15% (EOMV + E)	10% (EOMV + E)	10% (EOMV + E)

NOTES : b) FOR CARS WITH EOMV ABOVE $7,000, HIGHER MARGINAL RATES APPLY :

	OCT 82	OCT 83	OCT 84
On First $ 7,00	25%	25%	25%
Plus on next $3,000	30%	30%	30%
Plus on next $3,000	35%	35%	35%
Plus on next $3.000	40%	40%	40%
Plus on the next $4,000	45%	45%	50%
Plus on the next $6,000	50%	50%	50%
Plus on any $ above $29,000	55%	55%	60%
Plus on any $ above $35,000	60%	60%	65%

SOURCE :(1) MALAYSIAN MOTOR VEHICLE ASSEMBLERS ASSOCIATION
(2) MALAYSIA NATIONAL BUDGET 1985

TABLE 3.7.4

TAX COMPOSITION OF THE PRICE OF A TOYOTA 1.3 LE
4 Door Sedan, 1984

		Pre-Budget	Post-Budget
CKD Passenger car with COMV		$	$
(i.e. cif cost plus mark-up allowed by customs)		9,347.74	9,347.74
Import duty (25% of COMV)		2,336.94	3,739.10
Surtax on import of CKD pack (5% of COMV)		467.38	467.38
Total EOMV (2)		12,152.06	13,554.22
plus additional mark-up and margins		2,172.09	2,172.09
Approved list price (nett)		14,324.15	15,726.31
Less surtax 467.38			
Import duty 2,336.94		2,804.32	4,206.01
Non-Tax Value (NTV)		11,519.83	11,520.21
Taxes(1)		7,763.07	9,165.23
Sales price		19,282.90	20,685.44
Road Tax	179.00		
Registration Fee	60.00		
Accessories	120.00		
Insurance	695.20		
Air-Condition	1,590.00		
Anti-Rust	295.00	2,939.00	2,939.20
"On-The-Road" Price		22,222.10	23,624.64

Notes :

	Pre-Budget	Post-Budget
(1) Surtax on import of Pack	467.38	467.38
Import duty on CKD Pack	2,336.94	3,739.10
Excise Duty		
25% (7,000.00)		
30% (3,000.00)		
35% (2,152.00)	3,403.22	3,403.22
Sales Tax	1,555.53	1,555.53
Total	7,763.07	9,165.23

(2) Excise Open Market Value (EOMV) = c.i.f. + surtax + assembly charges + other plant costs + approved % uplift.
(3) Estimation is Based on July 1984 price of Toyota.

Source : Author's calculation

prices) or 98% of the landed cost, showing an increase of $1,402.54 or 4% in the selling price. Such heavy duties on passenger cars have adverse consequences as follows:

- Owing to the high duty rate per car relative to the real disposable income of an average income worker, the demand for passenger cars has been very much reduced. The effects of the price changes will be elaborated in Section IV.

- Consequently, the "on-the-road" price of a CKD passenger car amounts to roughly $22,222.10· (pre-budget price) or $23,624.64 (post-budget) which is about four times the disposable income of an average worker in 1983. Even though financing can be arranged for buyers, the high price of cars make it insurmountable for the average workers.

On the other hand, CKD commercial vehicles (both buses and truckes) are subject to 5% import duty while the CBU units are subject to 35% import duty. In addition, vehicle bodies are subject to 35% import duty while vehicle parts and accessories are subject to an import duty of 30%. The CKD units of motorcycles are subject to 5% import duty while the CBU units 60% import duty. Unmotorised cycles are not levied any import duty but attract surtax of 5% while cycle parts and accessories are levied an import duty of 38.33%. Surtax and sales tax are levied on most of the transport equipment.

Compared to the simple weighted average of nominal protection rate for the manufacturing sector as a whole, (25% in 1970 and 34% in 1974 to 1979), the average nominal protection received by the TE industry sub-groups is relatively higher.

Besides providing a source of government revenues, these taxes are also used as policy instruments to discourage import or encourage export of certain products.

7.1.2 Effective protection of the TE Sector

The nominal protection rates (NPR) and the corresponding effective protection rates (EPR) of the various industry subgroups in the TE sector for 1970, 1974, 1979 and 1982 are shown in Table 3.7.5. In the case of EPR, two separate estimates were used, viz, Cordon and Balassa method.

In 1982, bicycle and parts had the highest nominal protection rates (55%), followed by motorcycles and parts (43%) and motor vehicles (41%). However, motor vehicle bodies and motor vehicle parts received minimal nominal protection rates with 15% and 30% respectively. During the past decade, the NPRs of the TE sector showed an increasing trend, except the motor vehicle body building industry.

In the case of EPR (Balassa Method), the trend is quite different. It is noticeable, however, that a drop in NPR may not necessarily cause a corresponding drop in the EPR. This is particularly obvious in the motor vehicle body building industry during the period 1974 to 1979. The

TABLE 3.7.5

MALAYSIA : NOMINAL AND EFFECTIVE TARIFF PROTECTION IN THE TRANSPORT EQUIPMENT SECTOR, 1970 - 1982

MIC	Industry	Nominal Protection Rate (%)				Effective Protection Rate (%)							
		1970	1974	1979	1982	1970		1974		1979		1982	
						Corden	Balassa	Corden	Balassa	Corden	Balassa	Corden	Balassa
38431	Manufacture of motor vehicles bodies	0	31	15	15	-0.2	-0.2	318	394	486	577	621	771
38432	Assembly of motor vehicles	29	31	33	41	205	192	320	395	129	149	249	313
38439	Motor vehicles parts and accessories	0	30	30	30	-7	-7	27	26	54	58	54	58
38441	Manufacture and assembly of motor cycles & scooters	0	16	42	43	0	0	30	30	43	45	45	47
38449	Manufacture and assembly of bicycle, cycles trishwas	0	12	69	55	0	0	135	145	141	164	99	113

Sources : K.A.M. Arif, "Protection for Manufactures in Peninsular Malaysia" in Hitotsubashi Journal of Economics, Feb, 1975. Economic Planning Unit, Malaysia, Effective Protection and Industrialisation Policies; Report on a Research Project, 1975; EPU and Author's Calculations based, basic data from Department of Statistics Malaysia reason is that there is a disproportionate increase in the tariff protection on finished products and industrial local inputs. For instance, a smaller tariff protection is given to the finished products while higher protection is given to local raw material inputs. Another reason could be due to the increase in the input-output coefficient on the intermediate products resulting from the increase usage of local input.

In 1982, the motor vehicle body building industry, in fact, received the highest effective protection (771%), followed by the motor vehicle assembly industry (313%). Although other sub-groups of TE sector like the motorcycles and parts manufacturing industry, and bicycles and parts, were given relatively low tariff protection, these sub-groups were able to survive the stiff competition from imports for the following main reasons:

- A smaller quantity of production is required to attain economies of scale.

- Proliferation of makes and models is minimal

Overall, the EPR of the TE sector had increased significantly over the last 13 years. The motor vehicle body building industry has been increasingly given greater protection. Its EPR increased from negative 2% in 1970 to 771 per cent in 1982. This means that since the industry has launched a rapid import-substitution scheme, a high tariff protection against imports is required.

In the case of motor vehicle assembly industry, its EPR in 1982 was slightly more than twice that of the 1970 figure (313% in 1982 as compared to 192% in 1970). However, during the period 1970 to 1982, the trend in the EPR was rather irregular. For instance, its EPR increased from 192% in 1970 to 395% in 1974 and subsequently dropped to 149% in 1979. Since 1979, its effective protection increased again to 313% in 1982.

In 1970, the motor vehicle parts and accessories industry had zero NPR and a negative EPR but in 1982 these rates increased to 30% and 58% respectively.

A comparison of tariff protection in the TE sector of Malaysia and that of the Philippines is summarized in Table 3.7.6. It is of interest to note that though the Philippines and Malaysia set up the motor vehicle assembly industries almost at the same time, the structure of tariff protections in these two countries differ widely.

In the first place, The Filipino TE sector received relatively higher nominal protection than that of Malaysia. However, in the case of EPR, Malaysia's rates were higher. In 1974, the NPR of the Malaysian motor vehicle assembly industry was 31% as compared to 93% of the Philippines's NPR. On the other hand, Malaysia's EPR for the same industry

TABLE 3.7.6

TARIFF PROTECTION OF TRANSPORT EQUIPMENT SECTOR, MALAYSIA AND PHILIPPINES, 1974 - 1980

		Nominal Protection Rate				Effective Protection Rate			
		Malaysia		Philippines		Malaysia		Philippines	
MIC	Description	1974	1979 - 80	1974	1980	1974	1979 - 80	1974	1980
38431	Manufacture of motor vehicle bodies	0	15	29	40	394	574	23	32
38432	Assembly of motor vehicles	31	33	93	110	395	149	127	145
38439	Motor vehicle parts	30	30	29	40	50	58	23	32
38441	Manufacture/assembly of motorcycles and scooters	16	42	50	38	30	45	52	42
38449	Manufacture of bicycles cycles and trishaws	12	69	50	38	145	164	52	42

Note : All figure based on Balassa's method

Source : Economic Planning Unit, malaysia, Effective Protection and Industrialisation : Report on a Project, 1975 MIDA
MIDA; Author's calculation based on basic data from Department of Statistics
Romeo M Bautista, The 1981-85 Tariff changes and Effective Protection of Manufacturing Industries, (University of the Philippines 1982) page 16-17.

As can be seen in the figures above, Singapore has minimal protection (1.5%), in line with its free-enterprise and open-door policy, while Philippines, on the other hand, is the most protective-oriented (23%), followed by Indonesia and Thailand (18%).

The high tariff protection imposed by other ASEAN countries and developed countries illustrates the difficulty of our Malaysian TE products in penetrating the overseas markets.

7.1.3 Investment Credit

The share of loans to the manufacturing sector that has gone to the TE sector rose from 0.50% in 1973 to 3.27% in 1975 and 4.01% in 1981 or an average annual increase of 29.7%. Compared to TE sector's share of total manufacturing output in 1973, 1975 and 1981 (which were 3.0%, 2.7% and 1.69% respectively), the amount of loan financing needed by the TE sector is disproportionately high after 1975 (Table 3.7.7).

On the average, the loan-value added ratio of Malaysia's TE sector was 0.647 for the period 1973 to 1979, while that of South Korea's TE sector was 1.9, which was 3 times larger than that of Malaysia. It is therefore felt that if the government desires an accelerated growth rate in this sector, the current rate of financing by both the public and private sectors should be tripled in order to be able to measure up, at the minimum, to South Korea's standard.

TABLE 3.7.7

PERCENTAGE OF LOAN COMMITMENT OF EACH INDUSTRY 1973-1981

Industry	1973	1974	1975	1976	1977	1978	1979	1980	1981
Food Manufacturing	14.61	9.86	20.09	12.17	26.85	26.76	2.81	12.45	6.89
Beverages & Tabaccos	-	-	0.09	-	1.28	0.90	1.22	0.16	1.38
Textile and Textile products	54.46	22.79	7.77	3.45	3.21	4.11	2.29	2.35	1.77
Leather and leather products	0.59	0.22	0.11	0.18	1.07	0.26	0.09	0.05	0.06
Wood and wood products	2.79	1.87	5.70	9.08	8.46	5.38	1.95	5.12	5.24
Furniture & Fixture	0.02	0.35	0.37	0.21	0.84	2.06	0.02	0.57	0.22
Paper Printing and Publishing	0.04	2.29	39.90	16.66	1.35	0.78	0.23	1.56	4.87
Chemical and chemical products	4.00	14.57	3.91	15.35	22.74	6.22	0.89	10.70	8.27
Petroleum & coal	0.00	0.00	-	-	0.38	0.23	60.96	3.62	1.03
Rubber Products	1.02	1.75	0.80	2.82	5.81	5.96	1.30	6.14	3.21
Plastic Products	1.63	0.64	0.88	0.96	1.24	1.62	0.48	1.67	1.13
Non-Metallic Mineral products	3.57	8.87	7.16	3.10	6.69	6.78	10.83	17.68	5.71
Basic metal products	1.90	2.44	3.02	3.54	0.82	4.62	5.64	16.92	12.39
Fabricated metal products	0.92	3.3	1.16	4.62	1.96	15.81	3.52	2.86	1.83
Machinery Manufacturing	2.15	0.84	0.81	1.56	3.89	1.94	0.46	1.19	2.44
Electrical and Electronic products	7.30	8.82	3.75	3.11	5.39	12.76	4.71	13.36	4.14
Transport Equipment	0.50	11.17	3.27	3.96	4.40	1.02	0.51	0.43	4.01
Scientific and measuring equipment	1.84	0.23	0.06	0.26	0.25	0.12	0.14	0.86	0.14
Miscellaneous	1.03	2.46	0.53	0.38	0.99	0.62	0.20	1.93	0.09
Hotel & Tourist complex	1.27	7.50	0.62	18.59	2.38	2.05	1.75	0.37	5.09
TOTAL	100	100	100	100	100	100	100	100	100

Source : MIDA Annual Report, various years

sub-group was 395% while that of the Philippines was only 127%. There are two possible reasons for this:

- The Philippines government resorted to using more tax incentives and other facilities rather than tariff protection for promoting the TE sector's growth.

- The Philippines TE sector was more competitive, hence requiring lower rates of tariff protection.

However, in the 1980s, the effective protection given to the motor vehicle assembly industry by both countries is quite similar. In 1980, the EPR of Malaysia was 149% as compared to 145% in Philippines. This could be due to the change in the Malaysian Policies to develop the other industries, particularly the ancillary industries rather than the primary industry. In the same year, the EPR of motor vehicle bodies was 574% (32% for Philippines), bicycles and parts was 164% (42% for Philippines) and motor vehicle parts was 50% (32% for Philippines).

According to the Philippines Tariff Commission report (1979), the average tariff protection rate of Transport equipment in Malaysia was lower than other ASEAN countries except Singapore (see below).

Country	Simple Averages of Tariff Rates, 1978
Indonesia	18.0
Malaysia	10.0
Philippines	23.0
Singapore	1.5
Thailand	18.0
ASEAN	14.0

Table 3.7.8 shows the loan-value added ratio of each industrial sub-group in the TE sector of Malaysia. Of the total investment credit granted to the TE sector, the motor vehicle parts manufacturing industry sub-group accounted for the largest portion with loan-value added ratios ranging from 0.602 in 1979 to 5.143 in 1982. The vehicle assembly industry sub-group, on the other hand, had very low loan-value added ratios, ranging from 0 in 1970 to 0.197 in 1975. This discrimination has caused the accelerated growth of the motor vehicle parts and manufacturing industry while the vehicle assembly industry was forced to lag behind.

Having reviewed the impact of the various policy instruments on the TE sector, we are now in the position to evaluate the effectiveness of the various instruments on the following development objectives:

- helping entrepreneurs to commence production;
- helping create competitiveness;
- creating skilled manpower;
- promoting export;
- developing technology;
- creating demand;
- increasing local content;
- increasing Bumiputera interest;
- balancing regional dispersal;
- promoting small scale firms; and
- increasing linkage effects.

TABLE 3.7.8

INVESTMENT CREDIT OF THE TRANSPORT EQUIPMENT SECTOR, MALAYSIA

RATIO OF LOAN PER M$ VALUE ADDED

MIC	1970	1973	1975	1979	1982
38431	0	0	0.044	0.085	0
38432	0	0	0.197	0	0
38439	4.034	2.099	2.997	0.602	5.143
38441	0	0	0	0.217	0.234
38449	0	0.021	0	0.014	0

Sources (1) MIDA Annual Report, various years

(2) Department of Statistics, Census of Manufacturing Industries and Survey of Manufacturing Industries, various years.

7.2 Effectiveness Of Various Incentives And Regulatory Policy Instruments

7.2.1 Helping to Create Competitiveness :-

The impact of investment incentives on creating competitiveness in the TE sector can be appraised from the willingness of the firms to invest or to expand their present capacity.

Table 3.7.9 shows the total proposed capital investment approved by type of incentives awarded for the various industries in the TE sector over a period of thirteen years (1970-1982). It can be seen that total proposed capital investment granted with tax incentives in the TE sector over a period of thirteen years amounted to M$377.9 million or 74% of the total proposed investment of the TE sector. In the case of the manufacturing sector, total proposed capital investment granted with tax investment constituted about 72% of the total proposed investment.

The slightly higher tax incentives-total proposed capital investment ratio to the TE sector implies the relative strength of the TE sector in obtaining tax incentives than that of the average manufacturing sector. However, the share of the TE sector to the manufacturing sector in terms of total proposed capital investment granted with tax incentive is rather insignificant (4.15%).

In view of the large capital outlay and long gestation period involved, the conditions for award of tax incentives were rather stringent. Bumiputera equity and local content remain the

TABLE 3.7.9

MALAYSIA: TOTAL PROPOSED CAPITAL INVESTMENT ACCORDING TO INCENTIVES IN THE TRANSPORT EQUIPMENT SECTOR 1970 - 1982 ($ MILLION)

MIC	Description	Pioneer Status	Investment Tax Credit	LUR	Locational Incentives	ADA/ICA/IBA*	Total Proposed Capital Investment Granted with Tax Incentives	Without Tax Incentives	Total Proposed Capital Investment
38431	Manufacture of motor vehicle bodies	0	38.14	0	0	0	38.14	4.302	42.44
38432	Assembly of motor vehicle	0	0	0	0	0	0	33.14	33.14
38439	Manufacture of motor vehicle parts and accessories	132.1	27.10	3.40	0	0	162.6	49.95	212.55
38441	Manufacture/ assembly of motorcycles and scooters	61.13	41.86	0	0	0	102.9	1.16	104.15
38449	Manufacture/ Assembly of bicycles,cycles trishaws & parts	59.65	0.55	0	14.00	0	74.2	45.76	119.96
Total transport Equipment Sector.		252.9	107.4	3.40	14.00	0	377.92	134.31	512.24
Total manufacturing Industries		4801.98	3101.62	87.27	904.78	208.8	9104.45	3521.86	12626.31
% of Transport Equipment sector to total manufacturing industries sector		5.27	3.47	3.90	1.55	0	4.15	3.81	4.06

Note : LUR = Labour Utilization Relief; ADA Accelerated Depreciation Allowance, ICA = Increased Capital Allowance
IBA = Industrial Building Allowance

Source : MIDA Annual Report, various years

major determining factors. Further expansion or diversification was not by itself a special consideration for award of tax incentives.

Though tax incentives like Accelerated Depreciation Allowance and Increased Capital Allowance are designed to assist firms undertaking modernization or expansion, these tax incentives have not been granted at all (Refer Table 3.7.9). Therefore, there is a need to revise the present investment incentives scheme to induce more firms to undertake modernization projects.

As indicated in Table 3.7.10 on gross rates of return, the industry with the highest profit was motor vehicle body building industry (86.6%), followed by motor vehicle assembly industry (68.3%) and motorcycle and parts manufacturing industry (40.5%). The high returns of these sub-groups of TE sector correspond closely with the high effective protection provided by the government. On the other hand, motor vehicle parts and accessories, and bicycle and parts have the least gross rates of return.

On the average, gross rate of return of the TE in 1982 was 50.8% while that of overall manufacturing sector was 8.8%. It can be seen that the TE sector is approximately 6 times as profitable as the overall manufacturing sector.

It is clear that such high profits returns were made possible by high tariff protection against similar imported products and direct subsidies in

TABLE 3.7.10

MALAYSIA : GROSS RATE OF RETURN OF THE TRANSPORT EQUIPMENT SECTOR, 1982

MIC	Industry	Million				Gross Rate of Return (%)
		Value added (1)	Wages (2)	Fixed Assets (3)	New Investment (4)	$\frac{(1) - (2)}{(3) + (4)} \times 100\%$
38431	Manufacture of motor vehicles bodies	23.54	12.22	12.81	0.26	86.58
38432	Manufacture of motor vehicles	178.51	58.52	175.72	0	68.29
38439	Manufacture of motor vehicle parts & accessories	45.76	16.58	69.96	34.15	28.03
38441	Manufacturers of motorcycles and scooters	37.35	10.32	40.89	25.82	40.51
38449	Manufacture of bicycles tricycles and their parts and accessories	13.16	5.92	23.79	0	30.42
Transport Equipment Sector (TE)		298.33	103.57	323.17	60.24	50.79
Manufacturing Sector,		4506.46	3009.18	11633.88	5334.8	8.77
TE Manufacturing Sector		0.07	0.03	0.01	4.68	5.79

Sources : Author's Calculation based on data from :

(1) Department of Statistics, Survey of Manufacturing Industries, 1982

(2) MIDA Annual Report, 1982

the form of tax exemptions under various investment incentives. The result is that domestic buyers are made to pay more.

However, the purpose of tariff protection and investment incentives is to help the TE sector grow from its infant stage to maturity with an intention to expand into export markets. Therefore, the sector should attain competitiveness.

In the previous section on factor endowment, it is observed that the industries experiencing comparative disadvantage of production are motor vehicle bodies and motor vehicle assembly. These two industries are also heavily protected by the government with EPRs of 771% and 313% respectively. Over time, these two industry sub-groups have been getting more and more inefficient despite the fact that they are the most highly protected industries in the TE sector. Inefficiencies may probably be due to the following factors :

- Domestic market for the product of the two industries being small relative to the minimum scales of efficient production desired;
- Proliferation of makes and models; and
- Domestic resources not efficiently used.

On the other hand, the sub-groups of the TE sector such as motor vehicle parts manufacturing industry, motorcycle and parts manufacturing industry, and bicycle and parts manufacturing industry should be given more emphasis as they are considered internationally competitive (DRC/SER coefficient less than one). Policy wise, the government should help these industries to expand into the world market.

In conclusion,some of the efforts of the government in promoting competitiveness, are not paying off. There is, therefore, a need to revise some policy instruments in order to assist the the motor vehicle body building industry and motor vehicle assembly industry in attaining competitiveness.

7.2.2 Creation of Skilled Labour

Skilled labour refers to those who have received formal training in their specific jobs. Prior to 1984, the Labour Utilization Relief incentive offered tax relief based on the number of workers employed rather than the level of skilled labour This has not help to upgrade the level of manpower skills.

Despite an incentive introduced in 1984 to award building allowance (initial 10% and annual receiving 2%) for premises used for training, the overall amount of incentives are still inadequate. Thus, factors like the level of technology and mix of skills involved should be considered in granting industrial approvals and tax incentives.

7.2.3 Incentive for Promoting Export

There are several incentives for promoting exports, for example, the export allowance, pre-and-post shipment preferential payment, duty drawback on imported raw materials, deduction for overseas promotion expenses as well as export financing facilities. These incentives are not very attractive because benefits granted have been too small. Undeniably, they do help Malaysian importers to increase their competitiveness in overseas market.

Other than the incentives which are directly involved in giving subsidies for actual export, there are other tax incentives like the pioneer status, investment tax credit and locational incentives which are also awarded for export-oriented projects.

During 1975 to 1982, total number of approved export-oriented projects was 17, of which 64.7% of the projects were granted tax incentives. In addition, it is observed that projects with high degree of export orientation were given relatively more favourable consideration for award of tax incentives. This is indicated by the fact that 66.7% of the total approved projects having the intention to export more than 80% of their products were awarded tax incentives, as compared to only 63.6% for projects having intention to export 50% to 80% of the products (Table 3.7.11).

It therefore appears that the motorcycle and parts, and bicycle and parts manufacturing industries which have higher degree of export orientation

TABLE 3.7.11

NUMBER OF APPROVED PROJECTS WITH EXPORT ORIENTATION ACCORDING TO TAX INCENTIVES IN THE TRANSPORT EQUIPMENT SECTOR, 1975-1982

	TYPES OF TAX INCENTIVES						
	WTI	ITC	PS	LI	LUR	TOTAL	% of Project With TI to Total Approved Project
More than 80% export	2	-	2	1	1	6	66.7
50% to 80% export	4	2	3	1	1	11	63.6
TOTAL	6	2	5	2	2	17	64.7

Source : MIDA

attracted more incentives. However, for consideration of export-oriented projects, entrepreneurs often pay more attention to size and condition of export markets than the incentives available. Other factors such as technology employed and Bumiputera equity are more important than mere incentives.

In conclusion, to promote exports, the government should grant more direct subsidies and allowances for export rather than tax incentives because direct subsidies can be more effective

7.2.4 Incentives for Developing Technology

There is no tax incentive designed specifically to promote technology development in the TE sector. However, there is a provision for deduction of up to 1% of expenditure on R & D or building used for R & D purposes. Presently, SIRIM provides no R&D supporting programme specifically for the TE sector. Indeed, there is no major research project carried out at firm level simply because most industry sub-groups in the TE sector rely heavily on imported technology.

As for the transfer of technolgy, there is also no incentive given. Employment of expatriate to train local workers does not entitle any firm to any consideration for tax exemption.

Implicitly, as in the consideration for tax incentives there is bias towards capital-intensive types of technology. This is evident in the number of approvals for pioneer status, ITC and ADA incentives which far exceed that of other incentives like LI and LUR.

Hitherto, there is no clear guideline regarding the types of technology needing promotion. Given these constraints, it would be most desirable to re-examine the existing incentive scheme for technology development.

7.2.5 Creation of Demand

There is no specific incentive designed to assist manufacturers créate demand for their products. There is, however, an allowance for overseas promotion of a firms product. Such promotion activities include overseas advertising, export market, exhibition expenditure and cost of maintaining sales offices overseas. However, such an allowance is inapplicable for pomotion in the domestic market.

Presently, the export volume of the various industry sub-groups is still small and such export incentives are therefore, not widely granted. However, given the comparative advantage enjoyed industry sub-groups such as the manufacture of motor vehicles parts and acessories, manufacture and assembly of motorcycles and parts, and manufacture of bicycles and parts, the potential for exports is obvious. Thus, export incentives for creating demand overseas are definitely timely.

7.2.6 Policy Instruments for Increasing Local Content

The motor vehicle industry is supervised by the Motor Vehicle Assembly Committee (MVAC), an agency of the Ministry and Trade. This committee has introduced a programme to increase the local content of locally assembled vehicles, namely:

- Restriction on the number of models and makes to check proliferation;

- Controlling the selling prices of locally assembled motor vehicles;

- Administration of protective measures such as the tariff and licensing of imported CBU and CKD units and parts; and

- Provision of fiscal incentives as approved under the Investment Act 1968, specifically granting relief from payment of income tax and development tax to companies eligible for these incentives.

Apart from the above, several government measures have been introduced to stimulate the development of the automotive components and parts manufacturing industry namely

(i) listing priority products

(ii) supervision of the assembly industry to avoid further makes and models

(iii) a mandatory deletion policy for all vehicles

(iv) a local content programme in respect of motorised two-wheelers.

(i) Priority Products

Appendix 28 shows the type of components gazetted as priority products. An additional year of tax holiday under the Investments Incentives Act (1968) will be given to eligible companies.

ii) Government Supervision

The government has established guidelines to limit the number of makes and models. The aim is to facilitate the healthy development of the local components parts industry.

iii) Mandatory Deletion Policy

The Mandatory Deletion Policy was introduced in July 1979 to promote the development of the local component parts industry by imposing a local content requirement on the local automobile industry. The main purpose is to assist the components and parts manufacturers to penetrate the original equipment market. Manufacturers have to satisfy the following guidelines before any approval can be given:

- Market and Model coverage
- Supply and Demand
- Quality and Standards
- Price
- Practicality of Deletion

Appendices 29 and 30 show the list of approved CKD deleted components and components under consideration for mandatory deletion while Appendix 31 provides a listing of some companies falling under the programme.

In conclusion, the Mandatory Deletion Policy has suffered several drawbacks, such as:

(i) In most cases, there is only one manufacturer for each type of component/part. This single sourcing of components has virtually given the Original Equipment market component manufacturers monopoly status. This encourages complacency at local market lend in view of high profits brought about by high tariff protection. Thus inefficiency results in high cost. In addition local assemblers are compelled to buy locally manufactured components at dictated prices.

(ii) Where pricing of locally manufactured components is concerned, not only are prices relatively high but there also exists price distortion. In effect, manufacturing costs of components for less popular models are being subsidised by components manufactured for popular models. A more locally manufactured components are incorporated into motor vehicles assembled in the country, the assembly of unpopular models will be at the expense of the popular models.

(iii) Under this plan, local assemblers have no choice but to purchase deleted components from local manufacturers. In addition, some components like safety glass and seat belts are supported of being inferior to and more expensive than imported counterparts. On top of this, local parts are 50% more expensive than world prices. The inferior quality in many cases is attributable to outdated technology employed in the local manufacture of components. Outdated technology is being used because existing plants are unwilling to take long periods to recoup such heavy investments.

(iv) Because of the high quality and technical standards required by local assemblers, the local component part manufacturers prefer to produce for the replacement market rather than for the original equipment market. Production for REM is favoured for several reasons.

- REM is 5 to 7 times larger than the OEM
- Quality requirement is less stringent for REM and this means lower production cost.
- no payment for royalty required.

Besides the mandatory policy, there is insufficient inducement for increasing local content. The present incentive for such purpose is only an additiona[illegible] tax credit granted if the firm is granted an [illegible] incent[illegible]. [illegible] the case of tax incentive granted for pioneer status, LUR and LI, the approved tax exemption will be extended by one year.

However, the effectiveness of such incentives in promoting increased local content has been reduced because firms granted various investment incentives such as PS, ITC, LUR or LI are generally eligible for import duty and surtax exemptions on imported raw materials and components. Therefore, there is a need to revise the present incentive scheme for increasing local content in the motor vehicle industry.

iv) Local Content Programme for Motorcycle

In 1980, the government introduced the four-phase local content programme (LCP) for two-wheelers. The targets of the assemblers are listed below :

Phase 1 (1981)	----	average of 15% local content for every two wheeler assembled.
Phase 2 (1982-1983)	----	30% local content
Phase 3 (1984)	----	45% local content
Phase 4 (1985)	----	60% of local content

The following conditions have to be compiled with before the local content of a component can be approved:

(a) Local Materials -- The local content of a component (value added) should be more than 50%;

(b) Price -- The ex-factory price of a local component should not be 20% above the price of similar imported co[illegible]nt stated in the price list of CKD pack.

The types of components and parts that are incorporated into locally assembled motorcycles include tyres and tubes, batteries, drive chains, paints, chemicals and rear view mirrors.

It can be said that so far, the LCP for the motorcycle industry has been successful. Even though the local content requirements were raised from 15% in 1979 up to 30% in 1982, the industry was able to secure international comparative advantage. (Refer Table 3.6.10). This means the local content requirements can be gradually stepped up. To augment the successful implementation of the local content programmes, apart from mandatory administrative policy, the government should provide more tax incentive schemes in addition to the present scheme. This has been discussed under the motor vehicle industry sector.

7.2.7 Increasing bumiputera participation

The major policy instrument of the promotion of greater bumiputera participation in the manufacturing sector is the Industrial Co-ordination Act, 1975. Companies with paid-up capital exceding $250,000 or employing more than 25 workers are required to restructure their equity to allow at least 30% bumiputera participation. In addition, an exemption of 5% of corporate income tax is offered as an incentive to companies which comply to such equity requirements.

While there is no specific investment tax incentive designed for greater bumiputera participation, favourable consideration for tax incentives particularly ITC of 25% and above will be given to projects with 51% bumiputera equity share ownership.

While the above incentives are administrative measures for the manufacturing sector in general, the TE sector has shown great progress in terms of increasing bumiputera participation in equity and employment.

However, it is equally important to assess the impact of various investment incentives in relation to bumiputera-owned projects in the TE sector from 1975-1982. Table <u>3.7.12</u> shows that 48% of all projects approved in this sector were granted tax incentives mostly in the form of ITC and PS. As noted earlier, bumiputera ownership was an important criteria for incentives. This special treatment is part of the governments'seffort to boost bumiputera participation in the industry.

TABLE 3.7.12

NUMBER OF APPROVED BUMIPUTERA PROJECTS (51% EQUITY HOLDING) ACCORDING TO TAX INCENTIVES 1975-1982 IN THE TRANSPORT EQUIPMENT SECTOR MALAYSIA

	TYPES OF TAX INCENTIVES						
YEAR	WTI	ITC	PS	LI	LUR	TOTAL	% Of Projects With TI To Total Approved Projects
1975	3	-	1	-	-	4	25.0
1976	1	3	1	-	-	5	80.0
1977	2	2	-	-	-	4	50.0
1978	1	-	1	-	-	2	50.0
1979	2	1	1	-	-	4	50.0
1980	1	-	-	-	-	1	-
1982	3	1	-	-	-	4	25.0
TOTAL	13	7	5	-	-	25	48.0

Source : MIDA Annual Report, various years

7.2.8 Balancing Regional Dispersal

The Locational Incentive is designed to encourage dispersal of industries to less developed areas. It offers an additional 5% tax credit for Pioneer Status in addition to Investment Tax Credit. It is known that Locational Incentive alone cannot promote required dispersal because the location of an industry has to take into consideration many other factors such as the availability of labour, raw materials and other infrastructure. In the case of the TE sector, which depends on nearness of supporting ancilliary industries and port facilities for its imported raw material, its location cannot be far from other major related industries. Therefore the Locational Incentive is minimal in effect.

However, if an assessment of the impact of all tax incentives on the TE section is made, it is noted from Table 3.7.13 that only 39 projects or one-third of the total projects approved were set up in less developed areas. About 70% of the approved projects in the less developed areas were granted incentives. In the case of Locational Incentives, only 2 projects out of a total of 118 projects were granted such incentive.

Thus, we can conclude that the present tax incentive system is inadequate to induce dispersal of industries because the gains from tax incentives given do not outweigh the difficulty caused by lack of infrastructure and shortage of skilled labour in the less developed areas. Therefore, a combination

TABLE 3.7.13

NUMBER OF APPROVED PROJECTS ACCORDING TO STATES AND TAX INCENTIVES FOR PERIOD OF 1975-1982, IN THE TRANSPORT EQUIPMENT SECTOR, MALAYSIA

Less Developed States	WTI	ITC	PS	LI	LUR	TOTAL
Perlis	-	-	-	-	-	-
Kedah	3	1	4	2	1	11
Kelantan	-	1	2	-	-	3
Trengganu	2	1	-	-	-	3
Pahang	2	1	1	-	-	4
Sabah	-	1	-	-	-	1
Sarawak	-	4	-	-	-	4
N.Sembilan	3	1	3	-	-	7
Melaka	2	-	3	-	1	6
Sub-Total	12	10	13	2	2	39
More Developed States						
Johore	6	4	4	-	-	14
Penang/S.Prai	1	-	4	-	-	5
Perak	10	2	1	-	-	13
Federal.T	9	-	3	-	-	12
Selangor	13	6	16	-	-	35
Sub-Total	39	12	28	-	-	79
Grand Total	51	22	41	2	2	118

Source : MIDA Annual Report, various years

of more liberal tax incentives and provision of more basic infrastructure and more skilled labour in the less developed areas will be more appropriate.

7.2.9 Promoting Small-Scale Firms

There is no special incentive scheme to promote small-scale industries. However, the provision of low interest loans such as the CGG and SLC, exemption from excise and license fees do help small-scale industries but these tend to be insignificant. On the other hand, various investment schemes like the ITC, Pioneer Status, ADA etc tend to be capital-bias. In addition, other facilities like the Free Trade Zone and incentives for R&D are also not available to small-scale industries.

Apart from this, small-scale industries operated by non-bumiputera entrepreneurs are reluctant to expand because of the difficulty in getting bumiputera participants. Hence the Industrial Co-ordination Act has a detrimental effect on the expansion of small firms.

PART IV DEMAND ANALYSIS AND MARKET PROJECTION

PART IV DEMAND ANALYSIS AND MARKET PROJECTION

The objective of this section of the report is to estimate and project the total demand for the products falling within sub-groups of transport equipment sector for both the domestic and export markets. While demand is mostly affected by exogenous variables, it is important to note that in practice, it is also influenced by the strategy of the government to achieve certain desired development objectives and targets.

In line with the terms of reference, the demand projections in this study are based on three levels, viz, the optimistic, the pessimistic and the most likely projections.

This section focuses on the following three aspects:

(i) analysis of world market;

(ii) demand analysis for domestic market; and

(iii) demand projection for domestic and export markets.

1.0 Analysis of The World Market

1.1 Introduction

The main objectives of this sub-section are:

(i) to evaluate the magnitude of the export market for the sub-groups of transport equipment sector up to the year 1995; and

(ii) to provide a basis for estimating the market share the Malaysian Transport Equipment industry can target for.

However, it is to be noted that although an industry may not produce a certain product for export, a general world market analysis will serve as a vital input for formulating a global strategy for the Malaysian economy, particularly the transport equipment sector.

As detailed analysis on the historical trend of the world market, particularly international trade and output, is done in Section III, this section will only briefly review the issues.

1.2 Review of World Market

In evaluating the global market for passenger cars, the following structural and policy changes during the 1980s are significant.

The automotive market and the structure of passenger car production have been changed significantly in the 1980s. The major changes include the following:

(i) increased importance of Japan as a main producer and exporter of passenger cars;

(ii) a shift in the demand pattern for smaller and more fuel efficient vehicle;

(iii) more protection for the local car manufacturing firms;

(iv) increased involvement of country governments in the development of the car industry.

1.2.1 World Demand

The demand for new passenger vehicles (based on new registration as the proxy) of the selected reference countries decreased from 16.8 million in 1977 to 15.1 million units in 1981 showing an average annual decline of 2.7% (Table 4.1.1).

Countries that experienced a decline in the average annual growth rate of demand during the period 1977 to 1981 were the US, Canada, Philippines and Republic of Korea. A decline in demand in these countries was caused by the depressed economic conditions and the increase in the price of fuel.

TABLE 4.1.1

PASSENGER CAR NEW REGISTRATIONS BY REFERENCE COUNTRIES, 1977 AND 1981

REFERENCE COUNTRIES	1977 NO. ('000)	1977 %	1981 NO. ('000)	1981 %	AVERAGE ANNUAL GROWTH RATE (%) 1977-1981
Malaysia	56.0	0.33%	100.0	0.66%	15.6
Reference Group I					
Indonesia	18.0	0.11%	37.0	0.25%	19.7
Philippines	34.5	0.20%	29.6	0.20%	-3.8
Thailand	26.5	0.16%	30.0	0.20%	3.1
Reference Group II					
Brazil	150.0	0.89%	460.0	3.05%	32.3
South Korea	53.5	0.32%	50.6	0.34%	-1.4
Singapore	15.3	0.09%	32.0	0.21%	.2
Taiwan	50.0	0.30%	98.5	0.65%	18.5
Reference Group III					
Australia	430.4	2.56%	453.8	3.01%	1.3
Canada	991.0	5.89%	904.0	5.99%	-2.3
Reference Group IV					
Japan	2,500.1	14.85%	2,866.9	19.01%	3.5
United Kingdom	1,324.0	7.87%	1,485.0	9.85%	2.9
U.S.A	11,183.0	66.44%	8,536.0	56.59%	-6.5
TOTAL REFERENCE COUNTRIES	16,832.30	100.00%	15,083.40	100.00%	-2.7

SOURCE : Sinclair, S. The World Car: The Future of the Automobile Industry, Euromonitor Publications Ltd., London, 1983

In the developing and the newly industrialized countries, particularly, Malaysia, Indonesia, Brazil, Singapore and Taiwan, a two fold increase during the same period was experienced. During this period, these countries also registered high average annual growth rates in GNP.

1.2.2 World Output

The largest world producer of cars is Japan, followed by the US, West Germany, France, USSR, Italy and the UK accounting for 85% of world output in 1981. Most of these countries are developed mixed economies, except USSR.

Other countries responsible for the remaining 15% of world output are Spain, Canada, Brazil, Mexico and other developing countries. The top twenty producers and their respective output are shown in Table 4.1.2.

The major passenger car manufacturers are General Motors (US), Toyota (Japan), Nissan (Japan), Ford (US), Renault (France) and Volkswagen (Germany) which produce more than 1 million of passenger cars and contribute 43% of the world output in 1981 (Table 4.1.3).

1.2.3 World Exports

There has been a distinct change in the international trade pattern of the automobile industry since the 1960s. The European and North

TABLE 4.1.2

THE TWENTY MAJOR CAR PRODUCING COUNTRIES IN 1981
('000 passenger cars)

		'000s	% of world output
1	Japan	6,974	25.5
2	USA	6,253	22.9
3	West Germany	3,578	13.1
4	France	2,612	9.6
5	USSR	1,350	4.9
6	Italy	1,257	4.6
7	United Kingdom	955	3.5
8	Spain	855	3.1
9	Canada	802	2.9
10	Brazil	593	2.2
11	Mexico	355	1.3
12	Poland	295	1.1
13	Yugoslavia	268	1.0
14	Sweden	250	0.9
15	Australia	214	0.8
16	Czechoslovakia	178	0.7
17	East Germany	177	0.6
18	Argentina	139	0.5
19	Netherlands	78	0.3
20	Romania	70	0.3

Source: Sinclair S., The World Car: The Future of the Automobile Industry, Euromonitor Publications Ltd., London, 1983.

TABLE 4.1.3

THE TOP TWENTY PASSENGER CAR MANUFACTURERS IN 1981

		'000s	% of world output
1	General Motors (USA)	3,904	14.3
2	Toyota (Japan)	2,248	8.2
3	Nissan (Japan)	1,864	6.8
4	Ford (USA)	1,320	4.8
5	Renault (France)	1,294	4.7
6	Volkswagen (West Germany)	1,151	4.2
7	Fiat (Italy)	878	3.2
8	Honda (Japan)	852	3.1
9	Mazda (Japan)	841	3.1
10	Lada (USSR)	830	3.0
11	Opel (France)	810	3.0
12	Chrysler (USA)	749	2.7
13	Mitsubishi (Japan)	607	2.2
14	Peugeot (France)	569	2.1
15	Citroen (France)	534	2.0
16	Ford (West Germany)	487	1.8
17	General Motors (Canada)	478	1.7
18	Daimler-Benz (West Germany)	449	1.6
19	BL (United Kingdom)	413	1.5
20	Ford (United Kingdom)	342	1.3

Source: Sinclair, S., The World Car: The Future of the Automobile Industry, Euromonitor Publications Ltd., London, 1983

American's share in the world trade has been declining. Japan has grown very quickly to be the major source of car exports in the world market.

During the 1960s, the European car producing countries were widely recognised as the primary source of world exports during the 1960s. However, during the 1970s, the export volume of several of the main exporting countries (the United Kingdom, France, West Germany, Italy and Sweden) began to decline (Sinclair, 1983).

The composition of automotive exports, viz, passenger cars, commercial vehicles, motor vehicle components, motorcycles and parts, and bicycles and parts in 1980 is shown in Table 4.1.4.

It can be seen that the main exporters were from the developed countries in Reference Groups III and IV which accounted for 69% to 73% of the world motor vehicles (both passenger cars and commercial vehicles) and parts exports in 1980. The exports of motorcycles and bicycles from these countries constituted about 84% and 55% of the world exports respectively.

In contrast, the NICs (Brazil, R.O.Korea and Taiwan) and the developing countries in ASEAN excluding Singapore only exported an amount of US$1,304 million of motor vehicles and parts or 1.1% of world market. In the case of motorcycles and bicycles, the shares of these countries' exports in the world market were slightly higher than motor vehicles which accounted for 2.5% and 14% respectively.

TABLE 4.1.4

EXPORTS OF SUB-GROUPS OF TRANSPORT EQUIPMENT SECTOR BY
SELECTED REFERENCE COUNTRIES 1980 (US $'000)

COUNTRY	PASSENGER CARS (A)	COMMERCIAL VEHICLE (B)	MOTOR VEHICLE PARTS (C)	MOTORCYCLES & PARTS (D)	BICYCLES & PARTS (E)
MALAYSIA	1,294	2,717	1,370	337 (1)	1622 (2)
	(0.002%)	(0.01%)	(0.004%)	(0.009%)	(0.073%)
REFERENCE GROUP I					
INDONESIA	-	462	3,579	-	-
		(0.002%)	(0.01%)		
PHILIPPINES	1,204	-	30,252	-	525
	(0.002%)		(0.09%)		(0.024%)
THAILAND	-	988	9,307	432	1,934
		(0.004%)	(0.03%)	(0.012%)	(0.088%)
REFERENCE GROUP II					
BRAZIL	327,225	4[illegible],498	220,160	950	13,741
	(0.56%)	(1.9%)	(0.67%)	(0.03%)	(0.62%)
KOREA, REPUBLIC OF	49,630	47,966	20,489	879	17,877
	(0.08%)	(0.19%)	(0.06%)	(0.02%)	(0.81%)
TAIWAN	3	915	94,691	85,640	271,014
	(-)	(0.004%)	(0.29%)	(2.4%)	(12.33%)
REFERENCE GROUP III					
AUSTRALIA	72,417	28,046	82,008	325	334
	(0.12%)	(0.11%)	(0.25%)	(0.009%)	(0.015%)
CANADA	3,966,012	2,451,228	2,715,366	-	1,706
	(6.7%)	(9.65%)	(8.27%)		(0.08%)
REFERENCE GROUP IV					
UNITED KINGDOM	1,949,250	1,387,960	3,598,566	20,340	143,772
	(3.3%)	(5.5%)	(10.96%)	(0.57%)	(6.54%)
JAPAN	16,114,582	7,000,673	2,168,418	2,802,307	794,357
	(27.4%)	(27.57%)	(6.6%)	(78.4%)	(36.13%)
UNITED STATES	4,030,922	2,607,241	7,572,207	65,9[illegible]7	45,166
	(6.8%)	(10.27%)	(23.06%)	(1.85%)	(2.05%)
GERMANY REPUBLIC	14,581,610	4,933,566	6,642,581	117,475	217,281
	(24.8%)	(19.43%)	(20.2%)	(3.29%)	(9.9%)
WORLD MARKET	58,881,178	25,395,378	32,835,068	3,572,373	2,198,617
	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)

NOTES : (1) MOTORCYCLES ONLY
(2) NON MOTORIZED CYCLES ONLY

SOURCE : UN, YEARBOOK OF INTERNATIONAL TRADE STATISTICS, 1980

The main exporting countries of passenger cars were Japan (27%) followed by Federal Republic of Germany (25%), the U.S (7%), Canada (7%) and the U.K.(3%). These countries also exported a substantial amount of commercial vehicles to the world market. In 1980, the export share of commercial vehicles in the world market for Japan was (28%), Federal Republic of Germany (19%), the U.S. (10%), Canada (9.6%) and the U.K.(5.5%).

In the case of motorcycles and parts, Japan exported more than 78% to the world market in 1980. Other exporting countries are Federal Republic of Germany (3.3%) and Taiwan (2.4%).

The main reason which explains the large share of the developed countries in the world motor vehicle is the comparative advantage that exists in these countries, especially in the production of passenger cars. Passenger car production requires economies of scale and the use of advanced technology. It is also experiencing rapid technical innovation.

On the other hand, certain components that do not require sophisticated technical know-how (e.g mufflers and filters) may be efficiently produced by developing countries with small markets and lower wage costs.

Amongst the developing countries or NICs, the main exporters of motor vehicles and components are Brazil and Korea. In 1980, Brazil exported a total amount of US$1,039 million of motor vehicles and components or about 80% of the total developing countries' exports. Taiwan, on the other hand, exported quite a substantial amount of motorcycles and bicycles (US$85.6 million and US$271 million respectively).

In the case of Malaysia, the share of transport equipment in the world market is rather insignificant. In 1980, export share of sub-groups of TE sector in the world market varied from 0.002% (passenger cars) to 0.01% (commercial vehicles). During the period 1976 to 1980, the growth rate of transport equipment exports varied from -15.5% (motor vehicle parts) to 24% (commercial vehicles).

Table 4.1.5 shows the destination of exports of motor vehicles and components by major producing countries.

The markets for Brazilian's automotive products are mainly concentrated in Africa and South America. Brazil also sells some components to the developed market economies, such as the US and Western Europe.

For Argentina, the market is mainly in South Africa. Yugoslavia's market is more to Europe and the developed countries. India and South Korea sell mainly to the developing countries in Asia.

The growth trend of transport equipment exports by Reference Group countries is shown in Table 4.1.6. As can be seen, the average annual growth rate for motor vehicles and parts in the developed countries during the period 1976 to 1980 varied from 0.2% (the U.S' exports of commercial vehicles) to 28% (Japan's exports of passenger

TABLE 4.1.5

WORLD : DESTINATION OF AUTOMOTIVE EXPORTS BY MAJOR DEVELOPING COUNTRIES, 1978

COUNTRY	ITEM A/	VALUE US ($'000)	DESTINATION (percentage)					
			DEVELOPED			DEVELOPING		
			NORTH AMERICA	EUROPE	OTHER B/	SOUTH AMERICA	AFRICA	ASIA
Brazil	Total	551.6	13.7	7.0	0.3	41.2	34.2	3.6
	Cars	183.3	-	2.8	-	36.7	52.5	8.0
	CVs	225.0	13.1	5.8	0.5	48.2	31.5	0.9
	Parts	143.1	32.1	14.1	0.4	35.6	15.3	2.4
Argentina	Total	146.0	4.0	8.4	-	86.2	0.7	0.7
	Cars	35.0	2.6	1.4	-	96.0	-	-
	CVs	42.6	-	-	-	97.9	2.1	-
	Parts	68.1	7.2	17.3	-	73.9	0.1	1.3
Mexico	Total	256.2	47.6	30.7	1.3	19.6	0.1	0.7
	Cars	63.7	0.8	97.0	-	1.9	0.2	0.2
	CVs	44.5	23.8	0.2	-	75.7	-	0.2
	Parts	147.4	74.9	11.3	2.2	10.4	0.1	1.0
Yugoslavia	Total	246.3	1.1	76.7	-	0.9	18.1	3.2
	Cars	43.6	-	83.0	-	3.6	13.5	-
	CVs	83.1	0.1	50.4	-	0.6	40.6	8.3
	Parts	114.6	0.1	95.0	-	0.2	3.7	0.8
India	Total	100.8	1.4	5.4	1.1	0.1	25.1	66.9
	Cars	0.9	-	11.1	-	-	22.2	55.6
	CVs	29.2	-	-	-	-	43.5	56.2
	Parts	64.0	1.9	7.6	1.7	0.1	18.9	70.0
Korea Republic	Total	79.4	1.8	15.7	4.9	24.6	20.0	33.0
	Cars	42.3	0.2	18.0	0.5	22.9	26.7	31.7
	CVs	26.3	0.7	17.1	0.4	33.1	14.1	34.6
	Parts	8.0	13.8	5.0	11.3	12.5	11.3	46.1

NOTE : Percentage do not always add to totals because of rounding.

A/ MOTORCYCLES INCLUDED IN TOTALS.

B/ OCEANIA AND JAPAN; NOT INCLUDING CMEA COUNTRIES.

SOURCE : United Nations, Bulletin .... (1978 and 1979).

TABLE 4.1.6

AVERAGE ANNUAL GROWTH RATE OF EXPORT OF SUB-GROUPS OF TRANSPORT EQUIPMENT SECTOR BY SELECTED REFERENCE COUNTRIES, 1976 - 1980 (PERCENTAGE)

COUNTRY	PASSENGER CARS	COMMERCIAL VEHICLES	MOTOR VEHICLE PARTS	MOTORCYCLES & PARTS	BICYCLES & PARTS
MALAYSIA	-3.6	24.1	-15.5	6.9 (1)	16
REFERENCE GROUP I					

INDONESIA	-	36.3	144.6	-	-
PHILIPPINES	-34.2	-	119.8	-	13.5 (3)
THAILAND	-	N.A.	35.6	-	59.7
REFERENCE GROUP II					

BRAZIL	62	25.9	39.9	49.2 (3)	38.5
KOREA REPUBLIC	115.1	81.5	57.1	2.2 (3)	10.8
TAIWAN	-	116	32.8	45.4	34.6
REFERENCE GROUP III					

AUSTRALIA	9.8	16.9	15	-16.9	-
CANADA	1.8	11.2	4.1	-	9.5
REFERENCE GROUP IV					

UNITED KINGDOM	13.5	7.9	20	-5.1	20.2
JAPAN	27.7	26.5	25	24.6	25.1
UNITED STATES	5.4	0.2	10.5	31	72.2
GERMANY REPUBLIC	18.6	15	20.6	5.6	25.7
WORLD MARKET	16.8	14.3	16.2	22.9	22.3

NOTES : (1) MOTORCYCLES ONLY
(2) NON MOTORIZED CYCLES ONLY
(3) AVERAGE ANNUAL GROWTH RATE FOR 1977 TO 1980

SOURCE : CALCULATED FROM UN, YEARBOOK OF INTERNATIONAL TRADE STATISTICS, VARIOUS YEARS cars). On the other hand, the U.S. experienced a high average annual growth rate in the exports of both motorcycles and bicycles (31% and 72% respectively). Australia and the U.K. had a decline in the exports of motorcycles of 17% and 5% respectively.

The NICs countries (mainly Brazil and R.O. Korea) showed a high growth rate. During the period 1976 to 1980, the average annual growth rate of exports of passenger cars from these two countries was 62% and 115% respectively. Taiwan experienced a growth rate of 116% in the exports of commercial vehicles.

In the case of the ASEAN countries except Malaysia, the exports of motor vehicle parts had shown an impressive growth rate of 36% to 145% during the period 1976 to 1980. This high increase in the exports of motor vehicle parts shows the success of the ASEAN complementary scheme in Indonesia, Philippines and Thailand. However, in Malaysia, this scheme did not show any sign of improvement in the exports of motor vehicle parts. In fact, during the same period, it showed a decline in the average annual growth rate of 15.5%.

1.2.4 World Imports

As can be seen in Table 4.1.7, import share of sub-groups of the TE sector of developed countries in Reference Groups III and IV is slightly lower than their exports. In 1980, the share of imports of these countries varied from 22%

TABLE 4.1.7

IMPORTS OF SUB-GROUPS OF TRANSPORT EQUIPMENT SECTOR BY SELECTED REFERENCE COUNTRIES, 1980 (US, $'000)

COUNTRY	PASSENGER CARS (A)	COMMERCIAL VEHICLE (B)	MOTOR VEHICLE PARTS (C)	MOTORCYCLES & PARTS (D)	BICYCLES & PARTS (E)
MALAYSIA	347,748	331,036	61,622	72027 (1)	1391 (2)
	(0.59%)	(1.37%)	(0.18%)	(2.12%)	(0.06%)
REFERENCE GROUP I					
INDONESIA	165,414	570,816	79,340	7,398	64,147
	(0.28%)	(2.36%)	(0.23%)	(0.22%)	(2.71%)
PHILIPPINES	71,840	80,777	124,824	6,085	5,724
	(0.12%)	(0.33%)	(0.36%)	(0.18%)	(0.24%)
THAILAND	67,951	42,578	232,307	279	41,974
	(0.12%)	(0.18%)	(0.67%)	(0.008%)	(1.78%)
REFERENCE GROUP II					
BRAZIL	300	7,697	188,270	9,434	12,080
	(0.0005%)	(0.03%)	(0.55%)	(0.28%)	(0.51%)
KOREA REPUBLIC	5,966	33,890	122,897	624	8,977
	(0.01%)	(0.14%)	(0.36%)	(0.018%)	(0.38%)
TAIWAN	34,021	133,827	194,089	16,272	23,903
	(0.06%)	(0.55%)	(0.56%)	(0.48%)	(1.01%)
REFERENCE GROUP III					
AUSTRALIA	529,015	546,628	460,580	97,197	50,815
	(0.9%)	(2.26%)	(1.33%)	(2.86%)	(2.15%)
CANADA	3,827,272	1,070,710	5,343,149	108,887	78,892
	(6.53%)	(4.43%)	(15.5%)	(3.21%)	(3.33%)
REFERENCE GROUP IV					
UNITED KINGDOM	4,902,289	866,278	1,489,925	295,994	138,363
	(8.36%)	(3.58%)	(4.32%)	(8.71%)	(5.86%)
JAPAN	452,030	31,015	101,476	30,284	13,507
	(0.77%)	(0.13%)	(0.29%)	(0.89%)	(0.57%)
UNITED STATES	18,017,307	2,334,953	5,510,347	1,207,495	416,070
	(30.76%)	(9.65%)	(15.99%)	(35.55%)	(17.61%)
GERMANY REPUBLIC	4,832,400	619,023	2,070,383	271,858	274,136
	(8.25%)	(2.55%)	(6.00%)	(8.00%)	(11.61%)
WORLD MARKET	58,580,261	24,186,877	34,463,877	3,396,424	2,362,097
	(100.0%)	(100.0%)	(100.0%)	(100.0%)	(100.0%)

NOTES : (1) MOTORCYCLES ONLY
(2) NON MOTORIZED CYCLES ONLY

SOURCE : UN, YEARBOOK OF INTERNATIONAL TRADE STATISTICS, 1980

(commercial vehicles) to 66% (passenger cars). On the other hand, the pattern of import share of the developing countries and NICs countries in Reference Groups I and II ranged from 2.05% (passenger cars) to 6.7% (bicycles and parts). The higher import share of the developing countries over that of the export share explains the heavy import dependence on the developed countries, particularly Japan.

The import growth trend of sub-groups of TE sector shows that the world TE imports increased faster than the world exports except motor vehicle parts, and motorcycles and parts (Table 4.1.8. In 1980, the growth rate of world TE imports varied from 14.1% (motor vehicle parts) to 23.9% (bicycles and parts). The high growth rate of TE imports is registered in the developed countries. Some developing countries and NICs countries had in fact had a negative growth rate such as Brazil (passenger cars and commercial vehicles), Malaysia (bicycles and parts), Indonesia (motorcycles and parts) and Thailand (commercial vehicles). The decline in the imports of the developing countries and NICs implies the increasing importance of import-substitution policies in the various countries.

For Malaysia, total imports of sub-groups of the TE sector in 1980 amounted to about US$814 million which accounted for an average of 0.7% of the world imports. Amongst the sub-groups, the highest import share was motorcycles and parts (2.1%) and the lowest was bicycles and parts (0.06%). Although Malaysia's share of the world import of sub-groups of TE sector is small, it is

TABLE 4.1.8

AVERAGE ANNUAL GROWTH RATE OF IMPORT OF SUB-GROUPS OF TRANSPORT EQUIPMENT SECTOR BY SELECTED REFERENCE COUNTRIES, 1976 - 1980 (PERCENTAGE)

COUNTRY	PASSENGER CARS (A)	COMMERCIAL VEHICLES (B)	MOTOR VEHICLE PARTS (C)	MOTORCYCLES & PARTS (D)	BICYCLES & PARTS (E)
MALAYSIA	22.9	45.49	11.51	26.01 (1)	-30.45 (2)
REFERENCE GROUP I					
INDONESIA	16.79	26.51	28.3	-44.91	107.26
PHILIPPINES	2.74	16.53	33	6.21	38
THAILAND	8.8	-11.72	12.78	-466.77	26.32
REFERENCE GROUP II					
BRAZIL	-23.71	-32.31	11.28	4.89	20.63
KOREA REPUBLIC	0.52	4.26	27.7	33.07	15.49
TAIWAN	100.39	11.84	42.48	0.39	31.14
REFERENCE GROUP III					
AUSTRALIA	1.84	11.24	12.94	11.85	31.37
CANADA	7.24	2.19	3.72	13.66	11.4
REFERENCE GROUP IV					
UNITED KINGDOM	32.41	53.7	29.74	19.3	47.6
JAPAN	19.44	68.04	15.22	109.44	10.65
UNITED STATES	17.42	28.5	10.24	22.58	29.06
GERMANY REPUBLIC	15.58	26.53	21.63	27.03	42.2
WORLD MARKET	17.3	17.11	14.06	20.76	23.88

NOTES : (1) MOTORCYCLES ONLY
(2) NON MOTORIZED CYCLES ONLY

SOURCE : CALCULATED FROM UN, YEARBOOK OF INTERNATIONAL TRADE STATISTICS, VARIOUS YEARS generally higher than its export share. The average annual growth rate of passenger cars (22.9%) and commercial vehicles (45.5%) during the period 1976 to 1980 was higher than the world figures. In contrast, imports of bicycles and parts showed a decline during the same period.

1.3 Intra-Industry Trade

This section analyses the overall international trade using the intra-industry trade index. This index is used to estimate the importance of the intra-industry trade of a country or economy in relation to the rest of the world. It is also an approximate measure of the degree of industrialization the country has achieved.

Tables 4.1.9 and 4.1.10 show the results of the intra-industry trade of transport equipment between the developed and the developing market economies, and between Malaysia and the rest of the world. A comparison is also made between the selected reference countries.

It can be seen that the developed market economies have higher intra-industry trade indices, especially for passenger cars, components and motorcyles and parts (intra-industry trade index being more than 0.9) as compared to the developing countries.

The high intra-industry index shows that the developed market economies have equally high imports and exports of particular products. On the other hand, most developing countries such as

TABLE 4.1.9

INTRA-TRADE INDEX OF TRANSPORT EQUIPMENT SECTOR FOR SELECTED COUNTRIES, 1980

SUB-GROUPS	MARKET ECONOMIES		
	WORLD MARKET	DEVELOPED MARKET	DEVELOPING MARKET
Passenger Cars	0.9984	0.9496	0.1778
Commercial Vehicles	0.9204	0.6953	0.1504
Parts of Motor Vehicles	0.9647	0.9452	0.2233
Motorcycles & Parts	0.9898	0.9269	0.5277

SOURCE : CALCULATED FROM APPENDIX 42

TABLE 4.1.10

INTRA INDUSTRY TRADE OF TRANSPORT EQUIPMENT SECTOR FOR SELECTED COUNTRIES, 1980

SUB-GROUPS	SELECTED COUNTRIES							
	MALAYSIA	PHILIPPINES	INDONESIA	SOUTH KOREA	AUSTRALIA	UNITED KINGDOM	JAPAN	W. GERMANY
Passenger Cars	0.01	0.03	0.00	0.21	0.24	0.57	0.05	0.50
Commercial Vehicles	0.02	0.00	0.00	0.83	0.10	0.77	0.01	0.22
Parts of Motor Vehicles	0.04	0.39	0.09	0.29	0.30	0.59	0.09	0.48
Motorcycles & Parts	0.01	0.00	0.00	0.83	0.01	0.13	0.02	0.60
Bicycles & Parts	0.01	0.17	0.00	0.67	0.01	0.98	0.03	0.88
Aircrafts	0.03	0.00	0.08	0.54	0.54	0.92	0.07	0.92
Aircraft Parts	-	0.01	0.05	0.66	0.71	0.60	0.43	0.91

SOURCE : CALCULATED FROM APPENDIX 43

Malaysia, Philippines and Indonesia face the common feature of having deficit merchandise trade in these products. However, for Japan, the intra-industry trade is also limited mainly because of its concentration in the export market and practice of protectionism in the domestic market.

It perhaps reflects a high degree of specialization among major producers. For instance, for passenger cars, the main producers are Japan and other developed countries.

1.3.1 Export Promotional Strategies

The export promotional strategies and experiences of other countries will give an insight in helping Malaysia develop a viable export promotional programme for the motor vehicle industry. These are reviewed in this section.

Far East Countries

(i) Japan

The rapid growth of Japanese car exports in the 1970s was attributed to government assistance and careful planning over the post-war period as well as its high economic growth and rapid motorization.

Besides, Japanese cars have high quality and are fuel efficient. In addition, the use of competitive pricing strategy combined with the aggressive marketing approach (for instance, setting up joint-venture projects with other countries) have made Japan the leading exporter of automobiles today.

After the World War II, the Ministry of Trade and Industry of Japan (MITI) aimed to rebuild the car industry. The prime objective was to obtain sufficient mergers to have consolidated and efficient firms take advantage of the eventual liberalization of the Japanese market to foreign imports.

This aggressive strategy together with the high economic growth propelled Japan to become the world's second biggest car producing country in 1967.

In the 1970s, the oil shocks had further increased the demand for small and fuel-efficient vehicles. The stringent government emission regulations and the long history of making small engines put Japan in the best position to tap the sudden increase in demand for small cars. Today, Japan is the leading car exporting nation in the world.

The initial focus of the Japanese market was the South-East Asian region being relatively close to Japan. The small and relatively inexpensive models of Japanese cars appealed to the emergent middle classes of the ASEAN countries. By 1982, Asia (excluding Japan) absorbed 10% or 594,000 units of the total Japanese car exports. More than 80% of the cars in Malaysia and Indonesia are Japanese in origin (Sinclair, 1983).

In the late 1960s, Japanese car makes also penetrated the United States and Europe markets. By 1982, the retail sales of Japanese made cars (namely, Toyota, Nissan, Honda, Mazda and Subaru) in the United States were 1.68 million units. This accounted for 22.4% and 84.5% of the total United States market and total imports respectively.

The initial strategy of penetrating the Europe market was to concentrate on markets that did not have indigenous producers such as in Norway, Finland and Switzerland.. By 1981, the share of Japanese exports in relation European makes had increased sharply.

(ii) South Korea

The exports of motor vehicles in South Korea began in the mid-1970s (14 years after its initial set-up). By 1980, its export of motor vehicles was 25,252 units. Passenger cars comprised about 58% while commercial vehicles (mainly trucks and buses) accounted the other 42%. Most of the passenger cars were exported to Africa, Latin America, West Asia, Europe and Canada. Korean car manufacturers has also planned to increase their annual production capacity to about 1 million units by 1988 (Business Times, August 4, 1984).

Like Japan, South Korea's success in the export market is largely due to the Korean government's intervention. Realising the importance of the motor vehicle parts manufacturing industry as a potential export-oriented industry, the Korean government has actively promote the development of the ancillary firms.

However, unlike other developing countries where the completed cars are mainly assembled by subsidiaries of foreign companies or joint-venture partners and development of the ancillary firms is closely linked with parent companies that controlled the supply of major parts and components, most of the ancillary firms in Korea are independent from their parent companies. This has facilitated the rapid localization of motor vehicle parts within a relatively short period of time.

In order to be quality and price competitive, and wider export markets, the car manufacturers in Korea have joint-venture projects with the U.S and Japan counterparts. For instance, Hyundai Motors which is the leading car manufacturer in Korea, had obtained technological aid from Mitsubishi Motors (Japan). Recently, Daewoo (another car manufacturer in Korea) has signed a joint-venture agreement with General Motors (U.S) to build front-wheel-drive cars in the U.S. Similarly, other companies (Hyundai and Samsung) had joint-venture plans with Ford Motor Company (U.S) and Chrysler (U.S) respectively (Business Times, August 4, 1984).

Besides having joint-venture projects to expand the export markets, South Korea adopts aggressive marketing strategies to export her indigenous car (Pony). Instead of waiting for orders from other countries, South Korea seeks buyers in overseas markets through exhibitions and trade fairs. South Korea also solicits orders on the basis of samples and other information.

(iii) Latin America

The export of motor vehicles was given emphasis in the late 1960s. The strategies of Brazil and other exporters from Latin America are based on international sub-contracting to subsidiaries of the large parent multinational companies. In addition, the various types of policies and incentives are designed specifically to promote exports. These policies and incentives are summarized in Table 4.1.11.

The approaches adopted by the Latin American countries to maintain and expand their respective shares of the export market vary from one country to another. Mexico and Argentina use formula to calculate the export targets. For instance, if car manufacturers in Argentina intend to expand their production for domestic market by 8% per annum, they have to export a certain proportion of their domestic sales (which would increase from 15% in 1974 to 100% by 1978). On the other hand, Brazil use case-by-case negotiating approach with the companies. The latter approach is better in accessing the companies' position in the local market and their international situation.

TABLE 4.1.11

POLICIES AND INCENTIVES PERTAINING TO THE MOTOR VEHICLE INDUSTRY IN LATIN AMERICA

Country	Type of policies/incentives
Mexico	• Export requirement based on export targets (1969); Firms are only allowed to expand production if the export target has been achieved.
	• Compliance with the local content level of 60%
	• Incentives, such as tax credit - 11 % of the value of exports, are given to companies that export auto products.
	• Import policies (decree 1978): duty free for any new and completely modern machinery and equipment, raw materials and components that could not be produced locally.
Argentina	• Export requirement only for passenger cars - requirement same as Mexico.
	• Tax rebates (1971) on exported vehicles and parts up to 50%. A subsidy of 35% of the f.o.b value of cars and 40% for commercial vehicles and tax rebates of 11% of the f.o.b price of cars and more than 18% for heavy trucks were granted. In 1973, total incentives received by an exporting companies amounted to almost 60% of the export price for cars and 75% for heavy trucks.
	• In 1976, the policy of export promotion was abolished. A reduction of tariff protection was introduced instead.
Brazil	• fiscal incentives, such as exemption from the state sales tax (ICM) and tax credit for the industrial products tax (IPI) (1960/1970).
	In 1971, the exemptions given to the automotive industry was equivalent to 17% of the value of exports from the ICM and 13% from the IPI and tax credits of 13% for ICM and 14% for IPI. Total value of incentives equalled to 62% of the value of exports.
	• Special Fiscal Benefits for Exports Programme (BEFIEX) with Ford (1972)
	In addition to the incentives mentioned above, exporters are also exempted from restrictions on imports--a reduction of 70 to 90 % of the Industrial Product Tax (IPI) on imported equipment and up to 50% of the tax on imported raw materials, components and intermediate products.

1.3.2 International Trade Barriers

Having reviewed the export strategies of some countries, it is also important to know the barriers that affect international trade in the automotive industry.

Most of the major car producing countries impose tariffs on imported passenger cars. The tariff rates vary greatly in different countries as seen in Table 4.1.12. The tariffs imposed on passenger cars by the major producing countries were reduced in the 1960s and 1970s. The overall tariff rates was further liberalized by the abolition of internal tariffs within the EEC and EFTA and the reduction in tariffs on trade between the US and Canada.

However, as world car sales after 1979 began to decline (in the face of increasing Japanese penetration of domestic markets), more countries resorted to quotas and other forms of non-tariff barriers to restrict the importation of passenger cars. Other forms of non-tariff barriers include prohibitions and voluntary restraints.

It was seen in the earlier chapter on government regulations of Malaysia that CBU vehicles are subject to a number of taxes. In addition to such taxes, a quota of 10% of the previous sales volume ceiling is also imposed to encourage the sale of locally assembled passenger cars. All CBU passenger car imports are only permitted on the basis of import licences issued by the Ministry of Trade and Industry. The quantitive restrictions on imported commercial vehicles are more

TABLE 4.1.12

TARIFF RATES ON ASSEMBLED PASSENGER CARS
OF SELECTED COUNTRIES, 1930 - 1979[a]
(IN PERCENTAGE)

Country	1930	1940	1950	1960	1968	1973	1979	1983
Australia	20-47.5	20-47.5	20-47.5	35	45	34	57.5	n.a
France	46	n.a	n.a	30	22	11	11	n.a
West Germany	b	b	35	13-16	22	11	11	n.a
Japan	50	70	40	35-40	35-40	6.4	-	n.a
UK	33.3	33.3	33.3	30	17.5	11	11	n.a
USA	10	10	10	7.5	5.5	3	3	n.a

Notes: n.a. = not available

a Tariffs are levied on the fob price in Australia, Japan and the USA. In France, Germany FR and the UK the tariff is levied on the cif price.

b In this period, Germany imposed specific tariffs based on the weight of the vehicle.

Sources: Toder, E.J. et al Trade Policy and the US Automobile Industry, Praeger Publishers, New York, 1978, p.19;
US Department of Commerces, Office of Sectoral Policy, Survey of Automotive Trade Restrictions Maintained by Selected Countries, June 1980;
Committee for Economic Development of Australia, The Motor Vehicle and Component Industry Policy Origins and Options, CEDA, Melbourne, 1977.

stringent. Import licences are only given to importers of specialized vehicles, such as fire engines and ambulances, which are not assembled locally. However, in practice, this quota is not strictly adhered to.

Table 4.1.13 summarizes the import restrictions applied by the main car importing countries as at mid-1982.

In Australia, the imports from all sources are restricted to about 20% of the market.

There are negotiated voluntary trade restraints in France and the United Kingdom, limiting Japanese car imports to 3% and 10% to 11% of the market share ceiling respectively.

In Italy, only 2,400 units of Japanese make cars are allowed to enter each year.

Complying with the request of US producers and employee groups, Japanese export to the United States is limited to 1.68 million cars (the level of exports in 1981) plus 16.5% of any expansion in the US market. Thus, the future exports of Japanese cars to US will depend on the market size.

In the newly industrialized countries of South Korea and Taiwan, they have also began to raise barriers on certain motor vehicle products. In April 1983, the Taiwanese government banned certain heavy-duty tractor and heavy-duty truck imports from Japan (Sinclair, 1983).

TABLE 4.1.13

RESTRICTIONS ON JAPANESE CAR SALES IN DEVELOPED COUNTRIES, 1981/2

United Kingdom	10-11% market share ceiling, dating from 1975 package to nationalize BL
Federal Republic of Germany	Growth limit of 10% pa on 1980 sales (252,000 units)
Italy	Quota of 2,400 units
France	3% market share ceiling
Belgium	Reduction of 7% on 1980 sales
EEC as a whole	Common External Tariff is 10.9%
Canada	Shipments of "around 174,000" units as against 158,000 in 1980
Australia	All imports restricted to 20% of market. Tariff of 57%. Local content must be 85% to count as home-produced
USA	Shipments of 1.68mn for 1981 (Japanese fiscal year). Subsequent shipment limits to be calculated taking account of US market conditions. Tariff is 2.9%
Denmark Greece Ireland	No restrictions
Japan	No quotas or tariffs on assembled cars, but internal taxes, depending on engine size. Distribution and administrative checking systems alleged to operate as non-tariff barriers.

NOTE: The Benelux and Canadian restrictions are supposed to last only for 1981. The others appear to be more permanent.

International trade in motor vehicle parts and components is also restricted in some countries by their respective local content policies. These policies are enforced to develop the ancillary supporting industry. In general, it can be seen in Table 4.1.14 that the industry is heavily protected against imports of CBU vehicles.

All the ASEAN countries (except Singapore) also impose heavy protection on the indigenous auto industry. For instance, in Indonesia, there is a complete ban of both imported passenger cars and commercial vehicles.

1.4 World Projection of Motor Vehicles

The world projected growth rates of passenger car and commercial vehicle stock for the period 1976 to 2000 by region is shown in Table 4.1.15.

It can be seen that the projected growth of motor vehicles for the developed countries, particularly the advanced OECD countries will decline. About 83% and 72% of the increases in passenger car and commercial vehicle stocks respectively, between 1950 to 1976 were distributed to OECD countries. These percentages are expected to decline to 31% and 35% respectively between 1976 to 2000.

The declining growth of demand for cars in the developed market is attributed to several reasons. The obvious reasons are saturation of motor

TABLE 4.1.14

LEVELS OF LOCAL CONTENT AND TARIFF RATES OF SELECTED COUNTRIES, 1979[a] (IN PERCENT)

Country	Level of Local Content	Tariff on Imported Passenger Vehicles
Argentina	93	95
Australia	85	57.5[b]
Brazil	Individually negotiated with firms	185-205[b]
Mexico	70	35-100[b]
Philippines	62.5	30-100
South Africa	66	100
Republic of Korea	20-94	80[b]
Spain	55	68
Venezuela	48	120[b]

a. The basis for the local content calculation varies between countries. Briefly, examples of the bases used include:

- wholesale selling price less the duty free into store cost of components (Australia);
- the weight of locally produced components incorporated in a vehicle (South Africa);
- government designation of components which must be produced locally (Venezuela).

b. Import restrictions also apply.

Source: US Department of Commerce, Office of Sectoral Policy, Survey of Automotive Trade Restrictions Maintained by Selected Nations, June 1980.

TABLE 4.1.15

PROJECTED SHARES OF GROWTH IN AUTO STOCK (PERCENTAGE)

REGIONS	PASSENGER CARS		COMMERCIAL VEHICLES	
	1950-1976	1976-2000	1950-1976	1976-2000
Advanced OECD	83	31	72	35
Other Areas	17	69	28	65
European Countries a/	4	8	3	4
Eastern Europe	5	25	9	17
Latin America	4	17	8	20
Asia	2	15	5	15
Africa	2	4	3	9
World Total	100	100	100	100

Source: Organization for Economic Co-operation and Development, long term perspective of the world car industries" (Fut(78)C.1,1978).. Interfutures project document (Paris).

a/ is defined by OECD

vehicles, fuel costs, environmental considerations and the better public transport system in the developed countries.

On the other hand, with the higher GNP the developing and newly industrialized countries are experiencing, the future demand for cars looks promising. Latin America, Asia and Eastern Europe are expected to increase their share from 11% to 57% for passenger cars. For commercial vehicles, the increase in the share of world demand is expected to be slightly slower.

Tables 4.1.16 and 4.1.17 present the forecast of world production and sales of motor vehicles. Under the best estimates, the average annual growth rate of world production during 1978 to 1990 is expected to be 3.6% . The estimates of world production are very close to world sales of motor vehicles.

The future growth in world production of motor vehicles will stem mainly from the developing countries and newly industrialized countries of the Far East (excluding Japan), Latin America, Middle East and Africa and the Centrally Planned Economies. The average annual growth rate of these countries is estimated to be 7% to 12%. The future production of motor vehicles in the developed countries of Japan, North America and Western European is expected to increase at a slower pace of about 3.0% per annum during 1978 to 1990.

TABLE 4.1.16

WORLD - PRODUCTION, SALES FORECAST

Percentage Per Year - Selected Continents

	Production		
	Average Annual Growth Rates, 1978 - 1990		
	A	B	C
North America..........	1.0	2.5	3.5
Japan..................	1.3	3.1	4.2
Western Europe.........	1.2	3.0	4.0
Latin America..........	4.3	7.0	8.8
Middle East & Africa...	5.3	7.8	10.2
Far East...............	6.5	8.4	12.3
Australia & New Zealand	2.0	3.4	3.9
Eastern Europe.........	2.8	7.3	9.7
Other CPE..............	7.6	11.8	13.4
WORLD..................	1.6%	3.6%	5.0%

	Sales		
	Average Annual Growth Rates, 1978-1990		
	A	B	C
Developed Countries			
N. America...........	0.7	2.2	3.1
Japan................	2.1	3.9	4.7
Major W. Europe......	1.1	2.7	3.5
Other Developed......	0.7	2.7	3.7
Total..............	1.0	2.7	3.5
Developing Countries			
Latin America........	1.9	4.6	6.3
Middle East/N. Africa	7.6	9.3	10.7
Other Africa.........	2.8	6.3	9.7
Far East.............	6.1	7.9	11.9
Total..............	4.1	6.4	8.7
Centrally Planned			
Eastern Europe.......	0.8	4.3	7.7
Other CPE............	15.9	19.3	22.0
Total..............	1.4	4.9	8.2
WORLD................	1.6%	3.5%	5.0%

A = Pessimistic.
B = Best Estimate.
C = Optimistic.

Source: MVMA, World Motor Vehicle Data, 1981 Edition

TABLE 4.1.17

WORLD PRODUCTION FORECASTS

BEST ESTIMATE SCENARIO OF SELECTED COUNTRIES

			1985		1990	
			A	B	A	B
North America	10.30	14.70	11.66	16.96	13.24	19.74
Japan	5.98	9.27	8.10	12.47	8.06	13.36
Western Europe	11.60	13.12	14.68	16.51	16.44	18.67
Latin America	1.65	2.05	2.62	3.56	3.40	4.62
M. East & Africa	0.45	0.62	0.84	1.14	1.15	1.52
Far East	0.33	0.51	0.55	0.84	0.83	1.34
Australia & New Zealand	0.45	0.51	0.55	0.62	0.65	0.76
Eastern Europe	2.25	3.38	4.25	5.73	5.23	7.01
Other Centrally Planned Economies	0.01	0.15	0.03	0.30	0.07	0.57
TOTAL	33.02	44.31	43.28	58.13	49.07	67.59

A = Passenger Car.
B = Motor Vehicles.

Source: MVMA, World Motor Vehicle Data, 1981 Edition

Future motor vehicle sales of the developing and newly industrialized countries are expected to display the same growth trend. More developing countries are attempting export of their motor vehicles. The Centrally Planned Economies have the highest projected sales growth rates, followed by the Middle East/North Africa and the Far East.

It can be seen that the developed market economies of North America and Western European countries show the slowest growth rates in terms of both projected demand and the number of vehicles on the road (Tables 4.1.18 and 4.1.19). The slow pace of growth can be attributed to the high vehicle ownership ratio or the saturation of motor vehicle ownership in these countries.

The growing interest of developing and newly industrialized countries in automotive making or assembling has largely contributed to the high increase in world production.

Presently, a few Far East countries, viz, Malaysia, Taiwan, Indonesia and Thailand, are establishing joint-venture projects with the Japanese parent companies (Mitsubishi, Toyota and Nissan) to develop the automotive industry. The production plans of selected countries (Malaysia, Korea R.O., Taiwan, U.S. and India and Eastern Europe) are noted below:

TABLE 4.1.18

WORLD FORECAST OF VEHICLE DEMAND (THOUSAND UNITS)

	Actual				Forecast		
		1979			1990		
	1970	Total	Passenger Cars	Av. Annual Growth Rate 1970-1979	Total	Passenger Cars	Av. Annual Growth Rate 1979-1990
North America....	10,981	15,526	11,558	3.9	18,740	13,690	1.7
Central and South America..	1,117	2,359	1,757	8.7	3,659	2,769	4.1
Western Europe....	8,956	11,293	10,000	2.6	14,030	12,622	2.0
Asia and Oceania.	5,006	6,661	3,960	3.2	8,763	5,533	2.5
Middle East......	160	773	435	19.1	2,026	1,344	9.2
Africa...........	529	739	459	3.8	1,425	859	6.2
Eastern Europe and USSR.......	1,537	3,674	2,354	10.2	5,520	3,936	3.8
WORLD TOTAL......	28,286	41,025	30,523	4.2	54,163	40,753	2.6

Source: MVMA, World Motor Vehicle Data, 1981 Edition

TABLE 4.1.19

WORLD FORECAST OF VEHICLES ON THE ROAD (THOUSAND UNITS)

	Actual				Forecast		
		1979		Av. Annual	1990		Av. Annual
	1970	Total	Passenger Cars	Growth rate 1970-1979	Total	Passenger Cars	Growth rate 1979-1990
North America....	119,020	167,512	130,785	3.9	207,675	159,433	2.0
Central and South America..	10,731	24,405	17,945	9.6	45,286	35,714	5.8
Western Europe...	72,522	112,493	101,298	5.0	149,947	136,349	2.6
Asia and Oceania.	27,801	53,044	33,975	7.4	76,107	50,199	3.3
Middle East......	2,037	6,436	4,614	13.6	14,402	10,027	7.6
Africa...........	4,584	8,579	5,653	7.2	15,070	10,013	5.2
Eastern Europe and USSR.......	10,686	26,774	17,241	10.7	42,720	32,017	4.3
WORLD TOTAL......	247,381	399,244	311,511	5.5	551,207	433,752	3.0

Source: MVMA, World Motor Vehicle Data, 1981 Edition

(i) In Malaysia, the installed capacity and planned production of Proton (Malaysia National Car project) are as follows:

Year	Installed Capacity	Planned Production
1985	80,000	5,500
1986	80,000	40,250
1987	80,000	67,600
1988	120,000	84,400
1989	120,000	95,200
1990	120,000	100,200
1995	300,000	n.a.

(ii) South Korea intends to export 190,000 units of cars (Pony) to distributors around the world, particularly Canada and Britain in 1985. By the early 1990s, South Korea also expects to export half of the production of 1.3 million units of passenger cars. This comprises about 3% of world exports.

(iii) Taiwan plans to produce 300,000 units of passenger cars a year when the project is going on-stream (Asiaweek, September 28, 1984).

(iv) Apart from plans to expand production and exports, the US has also planned to restructure its production. Traditionally, the US specialised in the production of larger vehicles. However, the shift in demand for fuel efficient vehicles (which are mainly Japanese-made) has placed pressure on the US firms to produce cars that have an average fuel consumption of 27.5 miles per US gallon by 1985 (IAC, 1981).

(v) India has planned to modernize and expand her car industry. The planned output for 1990 is 150,000 units (EIU, 1984). For years, Indian motorists were confined to a limited choice of car models, viz, Ambassador, Padmini and Gazelle. Recently, new plans to collaborate with foreign companies, such as Suzuki for passenger cars, Izusu for trucks and buses and Reliant (UK) for glass fibre bodied car, have been established.

(vi) It is estimated that by mid-1980s, an additional 1.5 million units of output will be produced. It is also expected that the exports from Eastern European would increase to about 7% of the West European market by 1985 as compared to 1.5% in 1979 (Sinclair, 1983).

1.5 Economies of Scale

It is recognised that the scale of operation and productivity of factor inputs affect the production costs of motor vehicles and components. Economies of scale can be achieved by unit cost savings, high output volume and technological developments.

Unit cost savin can be attained if fixed costs are spread over . ge output volumes with the same vehicle design or over several years. On the other hand, high volume facilitates technological specialization and division of labour. New technological developments further improve labour productivity.

Economies of scale have been achieved in most of the major automobile producing countries, for instance, Japan and the U.S where the volumes of output are very high.

Although there are a few studies (Maxcy,1959; Pratten, 1971) trying to determine the 'optimal' scale output for both motor vehicles and components, it is a difficult exercise. Often, this can be misleading because factors like productivity, wage level, government policies, and changing technology all affect individually or in combination the optimal scale of production.

1.5.1 Optimal Scale Of Production For Passenger Cars

According to Bhaskar, individual vehicle model should be produced at levels exceeding 200,000 units per annum and that ideally, a firm should have an overall output of not less than 1 million cars per annum (Bhaskar, 1979).

According to Toder, the optimal levels of output per vehicle model of the four categories of cars is as follows:

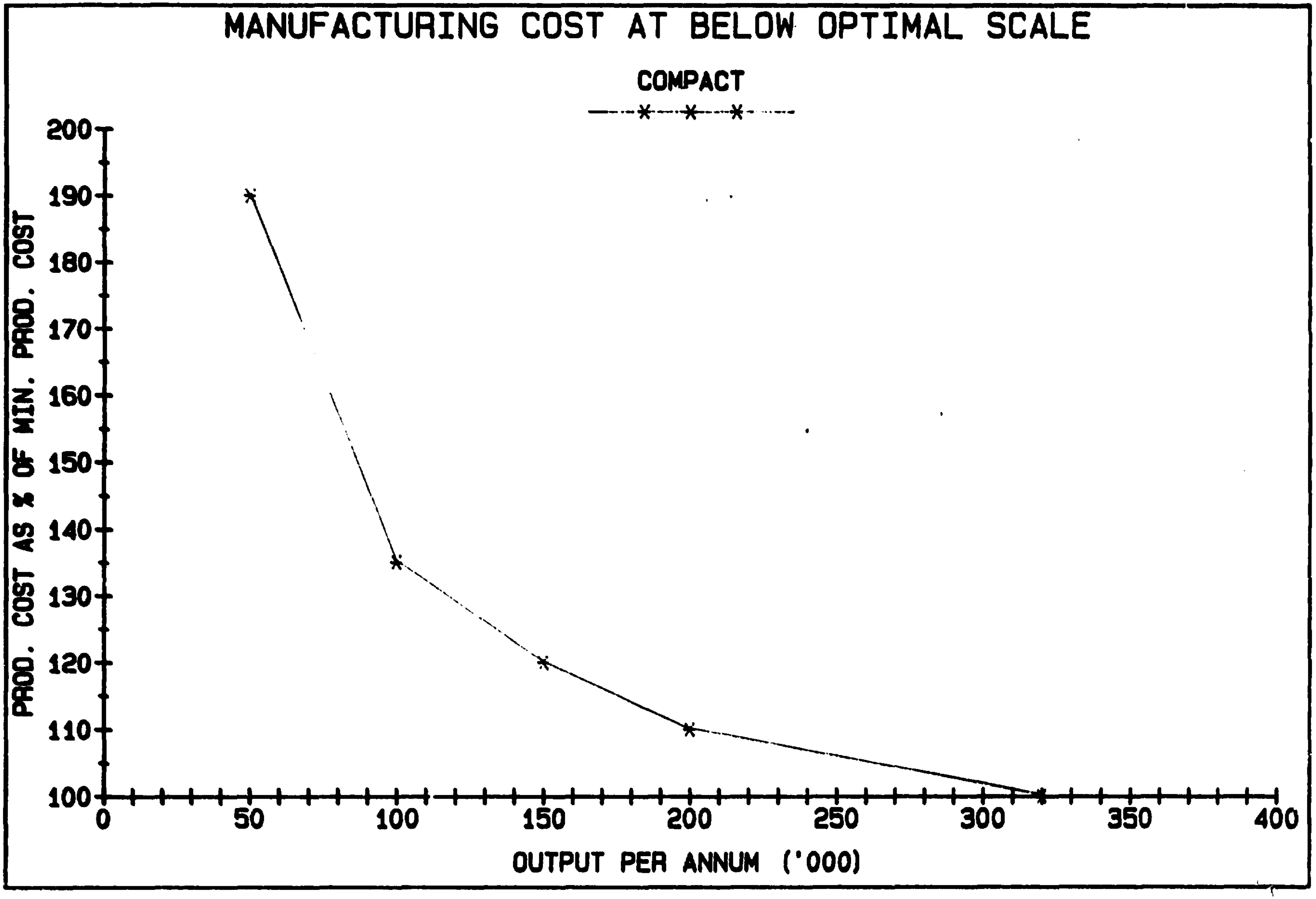
Vehicle Model	Optimal Output per annum
Mini	400,000 units
Compact	400,000 units
Intermediate	350,000 units
Standard/luxury	350,000 units

If the output per model is below 100,000 units per annum, the unit cost of production increases sharply as seen in Chart 4.1.1.

In Malaysia, the output of locally assembled passenger cars of a popular model (Datsun) is only about 30,000 units in 1983. It can be seen that the domestic production is very low as compared to the international optimal scale. Owing to the small scale production, the production cost in Malaysia is very much higher than other developed countries where output volume is high. If we use the above figure to estimate the production cost, it can be seen that the production cost in Malaysia is about two times higher than the minimum production cost.

It was mentioned earlier that the planned production of the Malaysian car or Proton Saga is less than 100,000 for the first five years of

CHART 4.1.1


MANUFACTURING COST AT BELOW OPTIMAL SCALE
COMPACT
PROD. COST AS % OF MIN. PROD. COST
200
190
180
170
160
150
140
130
120
110
100
0
50
100
150
200
250
300
350
400
OUTPUT PER ANNUM ('000)

production. The estimated cost of production for Proton Saga is about 35% higher than the minimum production cost.

1.5.2 Estimated Economies of Scale for Component Production

The estimated economies of scale for components vis-a-vis local production figures are shown in Table 4.1.20.

It can be seen that the optimal scale of production for most components is within 100,000 units to 400,000 units per annum.

ESTIMATES OF ECONOMIC SCALE OF MOTOR VEHICLE PARTS

Components	Economic Scale
Engine block complete	200,000
Carburetor	400,000
Air cleaner	150,000
Dynamo assembly	300,000
Kick starter lever	150,000
Gear shifting lever	150,000
Exhaust pipe	150,000
Muffler (damper)	150,000
Drive chain	300,000
Frame	150,000
Center stand and side stand	100,000
Brake pedal	150,000
Front footrest	100,000
Rear footrest	100,000
Fuel tank	150,000
Fuel cock	150,000
Dual seat	100,000
Frame right cover	100,000
Frame left cover	150,000
Front fork	150,000
Front fender	150,000
Handle	150,000
Brake cable	150,000
Starter cable	150,000
Rear swing arm	150,000
Chain case	150,000
Rear chock absorber	150,000
Rear fender	150,000
Front wheel	150,000
Front axle and nut	200,000
Front panel	300,000
Rear wheel	150,000
Rear axle and nut	200,000
Chain adjuster	300,000
Rear hub panel	300,000
Tire and tube	500,000
Battery and holder	150,000
Selecium rectifier	150,000
Headlamp	300,000
Ignition coil	200,000
Main switch	300,000
Stop switch	300,000
Tail lamp	150,000
Front winker	150,000
Rear winker	150,000
Horn	200,000
Flasher	150,000
Wire harness	100,000
Speedometer	300,000
Speedometer cable	150,000

Source : PT Honda Federal, Indonesia

1.6 Identification of Malaysia's Future Export Markets

The above analysis and discussions on world international trade (both past and future trends), export strategies of selected countries, the international trade barriers, and the economies of scale of motor vehicles and parts are indeed vital inputs for the identification of Malaysia's future export markets.

The automotive industry in Malaysia is still at its infancy stage. Although the industry was officially launched in 1967, there has been little progress in terms of technology transfer and exports. The development of the motor vehicle industry is only at the assembly stage. There has been no export of motor vehicles for Malaysia.

Thus, as far as the Malaysia National Car Project is concerned, its production is only efficient if the market size is large. However, as can be seen subsequently in Sections IV-2 and IV-3, the Malaysian future domestic market is too small to support 11 assemblers and the National Car Project. The small production volume which is already below the optimal level will increase the cost and thus the price of motor vehicles.

The only solution to avoid excess supply of motor vehicles and to minimise production cost is to enlarge the market through exports. The Korean experience is illustrative of this.

As, previously mentioned, exports from South Korea began as early as 1975 (after 14 years of its initial set-up). In 1980, the export volume of passenger cars and trucks was 14,655 units and 10,176 units respectively. It is mainly exported to countries that are less heavily blitzed by the Japanese exporters. By 1983, it has controlled 1% of the world market. It has planned to increase its share to 3% by 1990.

Malaysia should target its car to exports to about 30,000 units or about 30% of Proton's production by 1990. The details of this and suggestions will be illustrated in Section IV-3.

The export markets for Malaysia-made motor vehicles can comprise those countries that will be experiencing high growth rates in future demand. It can be seen in Table <u>4.1.18</u> that countries with high potential growth rates are the Middle-East, Africa, Central and South America, and Asia and Oceania.

Penetrating the markets of developed countries, particularly Europe and the US will be difficult. First, Malaysia's technology level is too backward to compete with that of the developed economies. Secondly, the markets for small cars in these countries are dominated by the Japanese exporters. Thirdly, the markets for small cars in these countries are not particularly large. Only Italy, Spain and France can be considered important small car markets but their tight protective controls on imported cars have further shrunk the market. In

Germany, U.K. and the Scandinavian countries, the bulk of the market is accounted by medium-sized and large cars.

A good start will be the markets in the ASEAN countries, particularly Singapore, and the Middle-East and the Third World Countries (such as Papua New Guinea).

In order to penetrate the ASEAN region, the first measure that the government has to do is to overcome the trade barriers of the respective ASEAN countries. Secondly, the ASEAN complementation scheme must be reviewed in light of the Malaysian car project. Malaysia has to develop marketing strategies to promote exports to this region. These strategies will be elaborated in Part V.

In view of the political closeness between Malaysia and some Middle-East countries, the markets in this region must also be carefully considered.

2.0 Demand Analysis for Domestic Market

2.1 Objectives

The main objectives of this section are as follows:

(i) to analyse the demand patterns in terms of domestic production and imports;

(ii) to develop demand projection models which are used to estimate future demand; and

(iii) to discuss demand and import policies.

2.2 Factors Used In Demand Analysis

The demand analysis in this section focuses on 3 main types of motor vehicles, viz, demand for passenger cars, commercial vehicles and motorcycles. The analysis will be based on past trends of total demand, imports and production output.

2.2.1 Demand for Passenger Cars

The demand for motor vehicles comprises both new and replacement demand.

The factors influencing new demand for passenger cars are real income, population size, vehicle (both new and used) prices, operating costs (including prices of fuel), existing stock of passenger cars, existing public transport system, consumer tastes, and the availability and cost of credit facilities.

In contrast, the replacement demand for passenger cars is influenced by the average life span of the vehicles, income, relative prices, consumption preferences and government legislations. According to the Yearbook of Transport Statistics (Ministry of Transport, 1982), the average life span of a typical passenger car is about 10 years. Ceteris paribus, this means that replacement market accounts for about 10% of the total demand for passenger cars per year.

Empirical Studies (Chow, 1960 and ORSB, 1984) have shown that income and price account for a high variation in the demand for passenger cars.

The estimates of income elasticities of demand for passenger cars in many countries vary from 0.6 to 5.0 and price elasticities from 0.1 to 2.4. Table 4.2.1 shows a comparison of the findings of some major studies on income and price elasticities of demand for passenger cars.

Income, which is an indicator of purchasing power or affordability, has a positive correlation with the demand for passenger cars. As the population becomes more affluent, there is a tendency to acquire more consumer durable goods.

Table 4.2.1

Estimates of Price and Income Elasticities[1] of Demand for Passenger Cars

Source	Year	Country	Price elasticity	Income elasticity
Atkinson	1950	U.S.A	1.31	2.5
Nerlove	1957	U.S.A	1.0 - 1.5	-
Suits	1958	U.S.A	0.5 - 1.5	3.8 - 4.2
Chow	1958	U.S.A	0.7 - 1.1	1.5 - 2.0
Wykoff	1968	U.S.A	0.1 - 1.8	0.6 - 2.4
Carlson	1976	U.S.A	0.8 - 2.4[2]	1.0 - 5.0[2]
IAC	1981	Australia	0.5	1.2
ORSB	1984	Malaysia	0.4	1.8

Notes: 1. The income elasticity of demand is defined as the percentage change in the quantity demanded resulting from 1 percent change in income. Likewise, price elasticity of demand is defined as the percentage change in quantity demanded resulting from 1 percent change in price. The demand for passenger cars is positively correlated to changes in income and negatively correlated to changes in price. Income and price elasticities of demand is greater than 1.0 indicate that demand is particularly responsive to changes in income levels and prices respectively.

2 These estimates represent the range of elasticities calculated by Carlson for different vehicle types.

Sources: 1. Carlson, R.L., A Disaggregate Model of the Automobile Market: The Demand for Cars of Different Sizes, Ph.D. dissertation, Louisiana State University and Agricultural and Mechanical College, 1976.

2. Wykoff, F.C., The Demand for Consumer Durables, Ph.D. dissertation, University of California, 1968, p.90.

3. Industries Assistance Commission Report (IAC), Passenger Motor Vehicles and Components - Post 1984 Assistance Arrangement, Australian Government Publishing Service, Canberra, 1981.

4. Organizational Resources Sdn. Bhd. (ORSB), Submission of AFM on the Industrial Master Plan, August 1984.

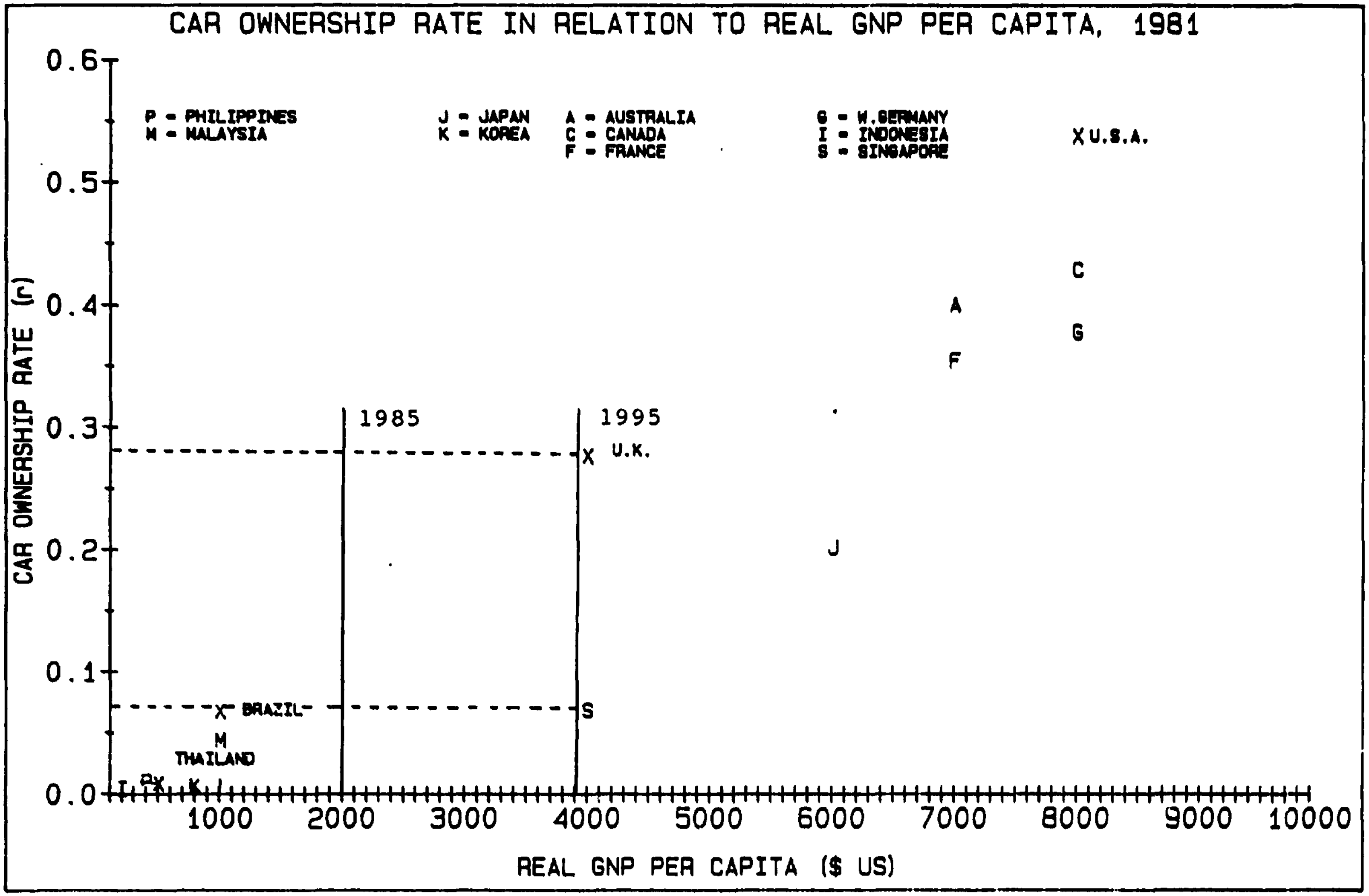
On the other hand, the price of passenger cars, particularly for the smaller size range, has a negative correlation with demand.

Many countries have shown that there is a significant correlation between per capita income and car ownership rate. Appendix 44 and Chart 4.2.1 show a comparison of car ownership in relation to real GNP per capita in selected countries. It is evident that the US which has the highest real GNP per capita of US $8,225, has the highest ownership rate, viz, 537 cars per 1,000 persons in 1981. In contrast, the developing countries, for instance, ASEAN (excepting Singapore) and South Korea, have only attained below 50 cars per 1,000 persons.

However, income is not the only factor that determines the level of car ownership rate. Chart 4.2.1 and Appendix 44 also show that countries with the same level of income experience different levels of car ownership. For instance, although United Kingdom and Singapore have similar real GNP per capita (about US $4,000), the level of car ownership rate in Singapore is very much lower. Similarly, the US has higher level of car ownership as compared to Canada and Republic of Germany.

The above differentials are due to government policy, quality of public transport infrastructural facilities, and the cost of car ownership.

CHART 4.2.1


CAR OWNERSHIP RATE IN RELATION TO REAL GNP PER CAPITA, 1981
P = PHILIPPINES
M = MALAYSIA
J = JAPAN
K = KOREA
A = AUSTRALIA
C = CANADA
F = FRANCE
G = W.GERMANY
I = INDONESIA
S = SINGAPORE
X U.S.A.
C
A
G
F
1985
1995
X U.K.
J
X BRAZIL
S
M
THAILAND
CAR OWNERSHIP RATE (r)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
REAL GNP PER CAPITA ($ US)

Apart from these factors, the distribution of income also affects the level of car ownership. Countries with low per capita income but relatively uneven income distribution tend to have higher car ownership ratio than countries with a more equal distribution of income.

Many developed countries have approached maturity or saturation level in terms of car ownership. At saturation level, most new purchases are for replacement rather than new demand. By 1973, all European countries, except for Sweden, had already achieved densities of 200 cars per 1000 population. Sweden had 250 level cars per 1,000 population (Sinclair, 1983).

Besides income and price of passenger cars, another important variable that also influences demand is consumers' tastes. Passenger cars are differentiated products sold in many body shapes,sizes, styles and different degrees of luxury. To potential buyers of passenger cars, factors like safety, appearance, fuel efficiency, comfort and other characteristics of makes and models are important considerations.

Brand loyalty, after-sales service, availability of spare parts and the resale value of cars (especially passenger cars of below 1600 c.c. range) also affect the decision to purchase a particular make and model of car.

A survey on car ownership in Malaysia conducted in 1983 by a local research company (SRM, 1983) concluded that the following factors affect the demand for cars:

Factors influencing demand for cars	Percent of respondents
Reliability	35%
Economic cost (e.g. fuel efficiency)	32%
Road performance	12%
Availability of spare parts	11%
appearance	6%

However, the ranking of factors by ethnic group differs slightly. The Chinese ranked reliability as the most important factor affecting their decision to purchase, followed by the economic costs of running the car and finally, its road performance. On the other hand, the Malays ranked economic costs of running the car as the single most important factor, followed by the availability of spare parts.

Consumers generally prefer Japanese makes to Continental cars mainly because of their attractive design, economical fuel consumption, cheaper price range, good resale value and ready availability of spare parts.

In 1983, Japanese CKD cars captured about 83% of the Malaysian market as compared to 43% in 1970. The most common makes were Datsun and Toyota comprising 54% of the total production volume in 1983.

However, different factors affect the demand for different types of passenger cars. This will be elaborated further in the demand projection for various sizes and types of passenger cars.

2.2.2 Demand For Commercial Vehicles

As mentioned previously, the demand for passenger cars is directly related to the satisfaction conferred by ownership. On the other hand, the demand for commercial vehicles is a derived one because they are usually wanted for specialized purposes, mainly for transacting business, for instance, for transportation of goods and services.

The decision to purchase a commercial vehicle may be influenced by the capital stock and investment level of the company, profit expectations, prices of goods carried by the commercial vehicles and the characteristics of servicing payloads. The price and model factors are less significant for commercial vehicles than passenger cars. More importantly, the demand is determined by the growth rate and expansion of commercialization and industrialization, and also the overall development of the transport system in the country.

2.2.3 Demand for Motorcycles

Motorcycles and passenger cars (especially the smaller c.c. ranges) are considered as substitutes of each other.

As with passenger cars, the demand for motorcycles is also influenced by income levels. A potential buyer will consider buying a motorcycle if he cannot afford to purchase a passenger car. Motorcycles are usually demanded by the lower income groups. There are, however, exceptions, particularly among the younger age cohorts who tend to purchase motorcycles for pleasure rather than for their functional usage.

Other variables that influence the demand for motor cycles include population, prices of motor cycles, prices of passenger cars, petrol consumption, existing public transport system, styles and design of motorcycles and the condition of roads.

In Malaysia, there are 5 types of locally assembled motorcycles, viz, Honda, Yamaha, Suzuki, Kawasaki and Vespa. Lower c.c range motorcycles (below 90 c.c) comprise more than 60% of the total production, indicating that these motorcycles are popular for their economy and lower prices.

However, there has been a change recently in consumers' taste for motorcycles. The demand for stylish and bigger c.c. range motorcyles is increasing. In 1975, the demand for Honda motorcycles of below 90 c.c. range comprises more than 90% of the total production. However, in 1983, only slightly more than 50% of the production was within this range. Vespa was being replaced by other makes, such as Kawasaki, Yamaha, Suzuki and Honda.

This trend shows the upgrading of consumers' tastes, particularly in the urban areas, to include factors such as the styles and designs of motor cycles. In the rural areas, motor cycles are used more for functional purposes than for pleasure or as a luxury durable good.

The condition of the roads found in the rural areas can also affect the decision to purchase a motorcycle rather than a car. This is evident in many parts of Indonesia where the motorcycle is the most common mode of transportation as the general condition of the roads does not allow the usage of other types of vehicles. In this instance, motorcycles are used to transport people to work places and schools and are also often used to conduct taxi services.

The average life span for motorcycles is 7 years. Thus, ceteris paribus, the replacement market is about 14% per annum. This is not an accurate estimate as upon expiry of the life span of the motorcycle, the owner may decide to purchase a car rather than another new motor cycle.

2.3 Limitations of Malaysian Data

Demand analysis is greatly hampered by the unavailability of certain types of data and long time series. In estimating the demand for motor vehicles, new vehicle registrations are used as proxy to demand as aggregated data can be obtained for a period of 22 years i.e. from 1961 to 1982.

However, the problem arises when demand projections for more detailed items (for instance, demand for locally assembled cars, lorries and vans and buses, etc.) are required as only about 13 observations can be obtained. Furthermore, different proxy is used for obtaining demand. In the case of demand for locally assembled cars, production figures are used instead because of the lack of breakdown figures on new registrations of various category of passenger cars. A better alternative would be the sales figures. However, sales figures for locally assembled cars are only available for Peninsular Malaysia. Since production figures are proximate to sales figures, the former are used instead.

The number of observations is further reduced when independent parameters are incorporated. For instance, the price of cars can only be obtained from 1973 to 1983. Thus, only 11 observations are used.

Other variables affecting demand, such as consumer tastes, operating costs, etc. cannot be regressed because of the lack of complete data.

Owing to the above deficiencies of data, demand analysis is limited to the set of data reproduced in Appendices 45 and 46.

2.4 Demand Projections for Motor Vehicles

2.4.1 Passenger Cars

In this section, the demand for the various categories of passenger cars will be analysed, namely,

(i) total demand for passenger cars;
(ii) demand for CKD passenger cars 1,600 c.c. and below;
(iii) demand for CKD passenger cars above 1600 c.c.; and
(iv) imported (CBU) cars.

The second and third demand categories represent the total demand for locally assembled cars. The demand for CKD passenger cars is particularly important in view of the coming on-stream of the national car project. The demand projections for CKD cars will assist in the formulation of appropriate marketing strategies to expand both the domestic and export markets.

The imported cars or completely-built up cars comprise mainly luxury cars such as the Jaguar, Mercedes and BMW makes. These cars are mainly demanded by people in the upper income brackets. Apart from higher tariffs, the import of CBU cars is further restricted by the imposition of import quotas amounting to not more than 10% of the previous year production volume. Therefore, even though the increases in demand for imported luxury cars correspond to increases in income levels, the supply of such cars will, however, be restricted by the import quota.

Observations have shown that the demand for the different categories of cars is affected by different set of variables. The common variable is GNP or GNP per capita. The degree of the effects of income on the different types of cars or income elasticity will differ. This will be further elaborated in the following section.

(i) Total Demand For Passenger Cars

Total demand for passenger cars in this section will refer to the aggregate demand for all types of cars mentioned above. It will include domestic consumption (locally assembled cars and imports) as well as exports. However, the exports of cars in Malaysia is negligible. Thus, total demand is equivalent to domestic consumption. In this study, we will use new registrations as the proxy to total demand.

Both linear regression technique and cross-country analysis are used to project the demand for passenger cars for the period 1985-1995. The following variables have been identified and will be used in the regression:

- real GNP;
- real GNP per capita;
- population;
- labour force;
- previous year stock of cars;
- previous year GNP;
- total registration of public transportation; and
- dummy

Dynamic demand functions including lagged values are also used to determine the level of aggregate demand. It is generally accepted that current purchasing decisions are influenced by past behaviour. Thus, in this analysis of total demand for passenger cars, past levels of income and demand are used as independent variables. Thus, the usage of past decisions and past experiences in the demand functions is one way of incorporating dynamics into the projections.

The dummy is used to capture the effect of import tax on demand for passenger cars.

Appendix 47 presents the demand functions using the various combination of variables. However, due to deficiencies in data and time series factors, not all the variables can be used as the best estimates of demand for cars. As mentioned previously, certain factors such as the operating costs, road tax, price of motor cycles, etc. cannot be incorporated in the regression.

Four different demand functions with the best R^2 and t-test have been selected. The signs of the independent variables also conform with the theory, viz, demand for passenger cars is directly related to Real GNP and per capita GNP, and inversely related to both import duty and previous year demand.

The four demand functions are:

DPC = f(Real GNP);

DPC = f(Per capital GNP);

DPC = f(Real GNP_{t-1}, Dummy); and

DPC = f(Real GNP_{t-1}, DPC_{t-1})

The details of the demand equations and projection are presented in Tables <u>4.2.2</u> to <u>4.2.5</u>. These projections have been computed based on the following assumptions:-

(i) <u>Real GNP Growth</u>

pessimistic scenario	:	at 6% p.a. over 1985-95;
most likely scenario	:	at 7% p.a. over 1985-95; and
optimistic scenario	:	at 8% p.a. over 1985-95

(ii) Population Growth

all scenarios : at 2.5% over 1981-1985
at 2.3% over 1986-1995

The demand for total passenger cars is expected to increase from 110,973 units in 1983 to 299,078 units in 1995, registering an average annual growth rate of 8.6% under most likely projections (using real GNP as a variable). Under pessimistic and optimistic projections, the demand for total passenger cars is estimated to increase at 7.6% and 9.6% per annum respectively (Table 4.2.2).

If GNP per capita is used as a variable in the demand equation, then the demand for passenger cars is estimated to increase at a pace slower than the projected GNP growth rate, viz, 4.6% for pessimistic projection, 5.9% for most likely projections and 7.1% for optimistic projections during the period 1983 to 1995. In absolute terms, the demand for total passenger cars is expected to increase from 110,973 units in 1983 to 219,671 units in 1995 (Table 4.2.3).

As can be seen in Table 4.2.4, import taxes and the previous year demand have some degree of influence on the overall demand for passenger cars. The difference is about 21,498 units of passenger cars or 7.2% less than that of the most likely demand projections using GNP alone.

Previous years' demand and income are expected to affect the demand for passenger cars in the following years. As shown in Table 4.2.5, it is

TABLE : 4.2.2
DEMAND PROJECTIONS FOR PASSENGER CARS,
1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1983 (ACTUAL)	110,973	110,973	110,973
1984	140,750	142,078	143,406
1985	149,196	152,025	154,880
1986	158,149	162,668	167,272
1987	167,640	174,057	180,656
1988	177,699	186,242	195,110
1989	188,363	199,281	210,721
1990	199,666	213,232	227,580
1991	211,647	228,160	245,789
1992	224,347	244,132	265,453
1993	237,809	261,223	286,691
1994	252,079	279,510	309,629
1995	267,205	299,078	334,401

REGRESSION :

MODEL DPC = a + b (GNP L/M/H)
= -22345.5 + 4.46 (GNP L/M/H)
(21.5)

ADJUSTED R^2 = 95.4%
DPC = DEMAND FOR PASSENGER CARS
GNP = GROSS NATIONAL PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	6.00	7.00	8.00
1990 - 1995	6.00	7.00	8.00
1983 - 1995	7.60	8.61	9.63

TABLE : 4.2.3

DEMAND PROJECTIONS FOR PASSENGER CARS, 1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1983 (ACTUAL)	110,973	110,973	110,973
1984	108,863	110,468	112,073
1985	114,672	118,008	121,374
1986	121,036	126,245	131,552
1987	127,630	134,860	142,296
1988	134,462	143,871	153,639
1989	141,542	153,297	165,613
1990	148,878	163,155	178,255
1991	156,479	173,466	191,602
1992	164,354	184,251	205,692
1993	172,515	195,531	220,567
1994	180,971	207,330	236,271
1995	189,733	219,671	252,850

REGRESSION :

MODEL DPC = a + b (PGNP L/M/H)

= -61277.97 + 81.46 (PGNP L/M/H)

(18.63)

ADJUSTED R^2 = 94.0%

DPC = DEMAND FOR PASSENGER CARS

PGNP = PER CAPITA GROSS NATIONAL PRODUCT

L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP; POPULATION ESTIMATES ARE 2.5% FOR 1981 - 1985 AND 2.3% FOR 1986 - 1995

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	5.36	6.69	8.00
1990 - 1995	4.97	6.13	7.24
1983 - 1995	4.57	5.86	7.10

TABLE : 4.2.4
DEMAND PROJECTIONS FOR PASSENGER CARS,
1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1983 (ACTUAL)	110,973	110,973	110,973
1984	118,057	118,057	118,057
1985	126,720	128,164	129,608
1986	135,903	138,978	142,082
1987	145,637	150,550	155,555
1988	155,954	162,931	170,106
1989	166,891	176,179	185,820
1990	178,484	190,355	202,792
1991	190,773	205,522	221,122
1992	203,799	221,752	240,918
1993	217,607	239,117	262,298
1994	232,243	257,698	285,388
1995	247,757	277,580	310,325

REGRESSION :

MODEL DPC = a + b (GNPt-1 L/M/H) + c (DUMMY)
= -23640.7 + 4.85 (GNPt-1 L/M/H) - 2687 (DUMMY)
(16.36) (-0.39)

ADJUSTED R^2 = 95.2%
DPC = DEMAND FOR PASSENGER CARS
GNPt-1 = PREVIOUS YEAR GROSS NATIONAL PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	7.09	8.23	9.37
1990 - 1995	6.78	7.84	8.88
1983 - 1995	6.92	7.94	8.95

TABLE : 4.2.5
DEMAND PROJECTIONS FOR PASSENGER CARS,
1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1983 (ACTUAL)	110,973	110,973	110,973
1985	117,468	118,906	120,344
1986	125,573	128,478	131,411
1987	134,376	138,949	143,611
1988	143,683	150,127	156,760
1989	153,551	162,091	170,963
1990	164,011	174,892	186,303
1991	175,098	188,589	202,869
1992	186,851	203,245	220,761
1993	199,309	218,927	240,085
1994	212,514	235,707	260,954
1995	226,512	253,661	283,493

REGRESSION :

MODEL DPC = a + b (GNPt-1 L/M/H) + c (DPCt-1)

= -23066.45 + 4.83 (GNPt-1 L/M/H) - 0.011 (DPCt-1)

(4.7) (-0.05)

ADJUSTED R^2 = 95.1%
DPC = DEMAND FOR PASSENGER CARS
GNPt-1 = PREVIOUS YEAR GROSS NATIONAL PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP
DPCt-1 = PREVIOUS YEAR DEMAND FOR PASSENGER CARS

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	6.90	8.02	9.13
1990 - 1995	6.67	7.72	8.76
1983 - 1995	6.13	7.13	8.13

estimated that demand for passenger cars will decrease by 45,417 units or 15.2% as compared to the most likely demand projection using GNP alone.

Amongst all the variables used, GNP per capita is selected to analyse further the ownership rates of passenger cars in Malaysia up to 1995 (Table 4.2.6). In 1983, the car ownership rate in Malaysia was about 57 cars per 1,000 persons. It is estimated that the car ownership rates will increase further to 80 cars per 1,000 persons and 94 cars per 1,000 persons by 1990 and 1995 respectively. The average annual growth rate of car ownership during the period 1990 to 1995 is projected to be 4.2% which is lower than that of the period 1971 to 1983 (8.5%).

The above estimated car ownership rates in Malaysia conform with the cross-country comparison analysis as shown in Chart 4.2.1 and Appendix 44. Amongst the ASEAN countries, Singapore has the highest car ownership rate in 1981, followed by Malaysia.

Given the projected growth rates for real GNP and population, the ownership rate of passenger cars for Malaysia over the period from 1985 to 1995 is expected to fall between the 1981 levels of Singapore and the United Kingdom viz, between 68 and 276 cars per 1,000 persons respectively.

Thus, the projected car ownership of 94 cars per 1,000 persons in Malaysia by 1995 is reasonable. As the car ownership rate in Malaysia is still below the estimated saturation level of 200 cars

TABLE 4.2.6

MALAYSIA : BREAKDOWN OF ACTUAL AND PROJECTED DEMAND FOR PASSENGER CARS AND CAR OWNERSHIP RATE

YEAR	DEMAND FOR PASSENGER CARS (UNITS)	REPLACEMENT DEMAND (UNITS)	EXPANSION DEMAND (UNITS)	TOTAL CARS IN CIRCULATION (UNITS)	% OF REPLACEMENT TO DEMAND	CAR OWNERSHIP RATE (CARS PER 1,000 PERSONS
ACTUAL						
1971	28,915	N.A.	N.A.	226,736	N.A.	21.2
1975	47,945	19,600	28,345	340,252	40.9	28.5
1980	104,646	26,188	78,458	599,769	25.0	44.8
1983	110,973	33,275	77,698	836,943	30.0	56.8
PROJECTED						
1984	110,468	45,724	64,744	901,687	41.4	59.7
1985	118,008	52,784	65,224	966,911	44.7	62.4
1986	126,245	47,945	78,300	1,045,211	38.0	65.9
1987	134,860	49,742	85,118	1,130,329	36.9	69.7
1988	143,871	69,823	74,048	1,204,377	48.5	72.6
1989	153,297	76,365	76,932	1,281,309	49.8	75.5
1990	163,155	63,365	99,790	1,381,099	38.8	79.6
1991	173,466	104,646	68,820	1,449,919	60.3	81.7
1992	184,251	108,044	76,207	1,526,126	58.6	84.0
1993	195,531	107,532	87,999	1,614,125	55.0	86.9
1994	207,330	110,973	96,357	1,710,482	53.5	90.0
1995	219,671	110,468	109,203	1,819,685	50.3	93.6

SOURCE : COMPILED FROM APPENDICES 48 AND 49 per 1,000 (sub-section 2.2.1), there is still potential for further increasing the number of new car buyers. Although the ratio of replacement to total demand for cars is estimated to increase to about 40% to 60% during the period 1984 to 1995 as compared to 25% to 42% during 1971 to 1983, this projected ratio is still lower than that of other developed countries.

(ii) Demand For Locally Assembled (CKD) Passenger Cars 1600 c.c And Below

The same variables (excluding lagged variables and dummy but including price) are used in the demand projections for CKD Passenger cars of 1600 c.c. range and below.

The two sets of demand functions are as follows:

$$DPC_a = f\ (\text{Real GNP});\ \text{and}$$

$$DPC_a = f\ (\text{Real GNP and Price})$$

Tables 4.2.7 and 4.2.8 present the demand projections for passenger cars of 1600 c.c and below under the above two sets of demand functions. Using GNP as variable in the demand function, the demand for passenger cars of 1600 c.c. and below is expected to increase from 72,378 units in 1983 (actual) to 178,858 units in 1995, registering an average annual growth rate of 7.8% (under most likely projections). In the case of

TABLE : 4.2.7

DEMAND PROJECTIONS FOR LOCALLY ASSEMBLED (CKD) PASSENGER CARS, 1600 C.C. AND BELOW, 1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1983 (ACTUAL)	72,378	72,378	72,378
1985	81,356	83,197	85,054
1986	87,181	90,120	93,115
1987	93,354	97,529	101,822
1988	99,[illegible]98	105,456	111,225
1989	106,835	113,938	121,380
1990	114,188	123,013	132,347
1991	121,982	132,724	144,192
1992	130,244	143,115	156,985
1993	139,002	154,233	170,801
1994	148,285	166,129	185,722
1995	158,124	178,858	201,837

REGRESSION :

MODEL DPCa = a + b (GNP L/M/H)

= -15714.3 + 2.9 (GNP L/M/H)

(12.06)

ADJUSTED R^2 = 91.7%

DPCa = DEMAND FOR LOCALLY ASSEMBLED (CKD) PASSENGER CARS 1600 C.C. AND BELOW

GNP = GROSS NATIONAL PRODUCT

L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	7.02	8.14	9.24
1990 - 1995	6.73	7.77	8.81
1983 - 1995	6.73	7.84	8.92

TABLE : 4.2.8

DEMAND PROJECTIONS FOR LOCALLY ASSEMBLED (CKD) PASSENGER CARS 1600 C.C. AND BELOW, 1985 - 1995 (UNITS)

YEAR	PESSIMISTIC (LOW)				MOST LIKELY (MEDIUM)				OPTIMISTIC (HIGH)			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
1983 (ACTUAL)	72,378	72,378	72,378	72,378	72,378	72,378	72,378	72,378	72,378	72,378	72,378	72,378
1985	80,623	76,908	73,013	68,936	82,893	79,179	75,283	71,206	85,184	81,470	77,574	73,498
1986	87,808	82,096	75,813	68,933	91,434	85,722	79,440	72,559	95,129	89,417	83,135	76,254
1987	95,424	87,615	78,606	68,282	100,574	92,764	83,756	73,432	105,870	98,060	89,052	78,728
1988	103,497	93,485	81,374	66,848	110,353	100,341	88,229	73,704	117,469	107,458	95,346	80,821
1989	112,054	99,730	84,095	64,473	120,816	108,492	92,857	73,235	129,997	117,673	102,038	82,415
1990	121,125	106,373	86,746	60,971	132,012	117,260	97,633	71,858	143,527	128,775	109,148	83,373
1991	130,740	113,439	89,300	56,127	143,992	126,690	102,551	69,379	158,139	140,838	116,699	83,526
1992	140,932	120,954	91,724	49,692	156,810	136,832	107,602	65,569	173,920	153,942	124,712	82,680
1993	151,736	128,946	93,983	41,373	170,526	147,736	112,773	60,163	190,964	168,175	133,212	80,602
1994	163,188	137,447	96,036	30,835	185,201	159,461	118,050	52,849	209,371	183,631	142,220	77,019
1995	175,326	146,487	97,836	17,686	200,904	172,065	123,414	43,264	229,251	200,412	151,761	71,611

REGRESSION :

MODEL DPCa = a + b (PGNP L/M/H) + c (PRICE)

= -2889.53 + 3.58 (GNP L/M/H) - 2.11 (PRICE)
(3.9) (-1.2)

ADJUSTED R^2 = 86.6%

DPCa = DEMAND FOR LOCALLY ASSEMBLED (CKD) PASSENGER CARS 1600 C.C. AND BELOW

GNP = GROSS NATIONAL PRODUCT

L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

(1),(2),(3),(4) = BASED ON ANNUAL INCREASES IN THE REAL PRICE OF PASSENGER CARS OF 0%, 5%, 10% AND 15 % RESPECTIVELY

AVERAGE ANNUAL GROWTH RATE (%)

	LOW				MEDIUM				HIGH			
PERIOD	1	2	3	4	1	2	3	4	1	2	3	4
1985 - 1990	8.14	6.70	3.51	-2.42	9.75	8.17	5.34	0.18	10.59	9.59	7.07	2.55
1990 - 1995	7.68	6.61	2.44	-21.93	8.76	7.97	4.80	-9.65	9.82	9.25	6.81	-2.99
1983 - 1995	7.65	6.05	2.54	-11.08	8.88	7.48	4.55	-4.2	10.08	8.86	6.36	-0.09

pessimistic and optimistic projections, the estimated increase during the same period is 6.7% and 8.9% respectively.

The effects of real price variations on the forecasted demand for locally assembled passenger cars of 1600 c.c and below are presented in Table 4.2.8 and Chart 4.2.2. These demand projections reflect the following assumptions about the real price level of passenger cars:

- Real price of passenger cars remaining constant;
- 5% annual increase in the real price of passenger cars;
- 10% annual increase in the real price of passenger cars; and
- 15% increase in the real price of passenger cars.

Under most likely demand projections for passenger cars of 1600 c.c. and below, it is estimated that the demand will decrease from 82,893 units (with no price increase) to 71,206 units (with 15% increase) in 1985 or a difference of 14.1%. However, the cummulative price effects (an annual increase of 15% price) by 1995 will be a difference of 78% lower than that of demand with no increase in price. This implies that if the price of passenger cars is further increased due to the imposition of higher taxes, the demand for locally assembled cars will be greatly affected as seen in Table 4.2.8.

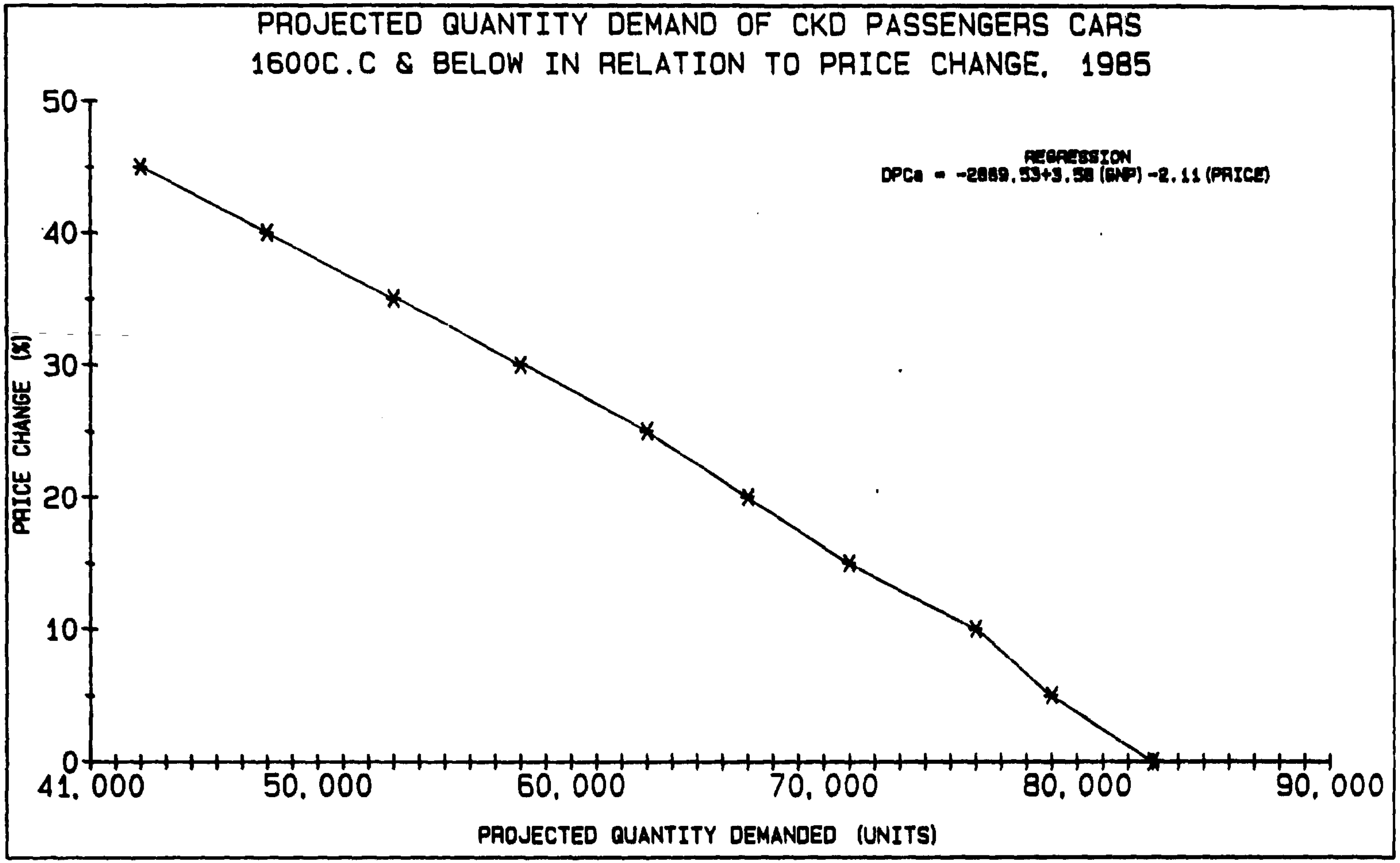
The demand equations are transformed to natural logarithm to determine the income and price elasticities of demand. If only income is used in the equation, as in the first demand function, then the income elasticity is 1.5. This shows that the demand for locally assembled cars of 1600c.c and below, ceteris paribus, is income elastic. As real GNP increases by 1.0% , the demand for passenger cars will increase by 1.5%, ceteris paribus.

In the case of the second equation where the price of passenger cars is taken into consideration, the coefficient shows that price elasticity is 0.76. As the price of passenger cars generally has a negative effect on demand, this means that if the price of passenger cars increases by 1.0%, the demand will decrease simultaneously by 0.76% assuming that income remains constant. This shows that the demand for locally assembled cars of 1600 c.c and below is more price elastic than the total demand for all passenger cars (ORSB, 1984).

(iii) Demand for CKD passenger cars above 1600 c.c

This category of cars comprises the higher c.c range of locally assembled cars. This range of cars is less fuel efficient and more expensive compared to the passenger cars of 1600 c.c and

CHART 4.2.2


PROJECTED QUANTITY DEMAND OF CKD PASSENGERS CARS
1600C.C & BELOW IN RELATION TO PRICE CHANGE, 1985
REGRESSION
DPCa = -2869.53+3.58(GNP)-2.11(PRICE)
PRICE CHANGE (%)
50
40
30
20
10
0
41,000
50,000
60,000
70,000
80,000
90,000
PROJECTED QUANTITY DEMANDED (UNITS)

below. The factors determining the demand for this type of cars are slightly different for the following reasons:

- The demand for CKD passenger cars above 1600c.c. is not affected by the degree of efficiency of the public transport system in the country

- As the target consumers are those in the higher income group, pricing is not an important purchase consideration.

Instead, the variables used in this case are real GNP, real GNP per capita and labour force.

The selected variable in the demand function for the projections is real GNP because it has the highest correlation (R^2).

The income elasticity of demand for passenger cars above 1600 c.c. is 1.8, which is more than that of the lower c.c range of passenger cars. This shows that income influences the demand for passenger cars above 1600 c.c. more than that of the lower c.c. range of cars.

As shown in Table 4.2.9, the most likely demand for locally assembled (CKD) cars above 1600 c.c. will increase from 25,029 units in 1983 (actual) to 65,006 units in 1995 or an average annual increase of 8.3%. However, at pessimistic and optimistic demand projections, it is estimated to

TABLE : 4.2.9

DEMAND PROJECTIONS FOR LOCALLY ASSEMBLED (CKD) PASSENGER CARS ABOVE 1600 C.C, 1965 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1983 (ACTUAL)	25,029	25,029	25,029
1984	25,255	25,589	25,922
1985	27,376	28,086	28,803
1986	29,624	30,758	31,914
1987	32,006	33,617	35,274
1988	34,532	36,677	38,903
1989	37,209	39,950	42,823
1990	40,047	43,453	47,055
1991	43,055	47,201	51,627
1992	46,244	51,211	56,564
1993	49,624	55,502	61,896
1994	53,206	60,093	67,655
1995	57,004	65,006	73,874

REGRESSION :

MODEL DPCb = a + b (GNP L/M/H)

= -10087.6 + 1.12 (GNP L/M/H)

(10.82)

ADJUSTED R^2 = 89.6%

DPCb = DEMAND FOR LOCALLY ASSEMBLED (CKD) PASSENGER CARS ABOVE 1600 C.C.

GNP = GROSS NATIONAL PRODUCT

L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	7.90	9.12	10.31
1990 - 1995	7.30	8.39	9.46
1983 - 1995	7.10	8.28	9.44

increase at a rate of 7.1% and 9.4% respectively. The growth rates of demand for CKD passenger cars above 1600 c.c are higher than the projected GNP.

(iv) Demand For Imported Cars (CBU)

The demand for imported cars as seen in Tables 4.2.10 and 4.2.11 is projected based on real GNP and per capita GNP.

Using GNP in the demand function, the projected demand for CBU new cars will increase from 8,561 units in 1982 (actual) to 26,423 units in 1995, registering an average annual increase of 9.8% (under most likely projections). At pessimistic and optimistic projections, the growth rates for the demand of CBU cars are 8.8% and 11% respectively.

However, demand functions using per capita GNP as the independent variable have lower demand projections than the real GNP. As can be seen in Table 4.2.11, demand for CBU new cars will increase to 21,103 units in 1995 under most likely projections giving an average annual growth rate of 7.2% (6% and 8.4% for pessimistic and optimistic projection respectively).

As mentioned in sub-section 2.4.1, imported CBU cars are subject to an import quota. Thus, although the demand for imported CBU cars is estimated to be high, it will be affected by the overall demand for passenger cars.

TABLE : 4.2.10

DEMAND PROJECTIONS FOR IMPORTED (CBU) PASSENGER CARS, 1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1982 (ACTUAL)	8,561	8,561	8,561
1984	11,513	11,638	11,763
1985	12,308	12,575	12,843
1986	13,151	13,577	14,010
1987	14,045	14,649	15,271
1988	14,992	15,797	16,632
1989	15,997	17,025	18,102
1990	17,061	18,339	19,690
1991	18,189	19,744	21,404
1992	19,385	21,249	23,256
1993	20,653	22,858	25,256
1994	21,997	24,580	27,416
1995	23,421	26,423	29,749

REGRESSION :

MODEL DPCc = a + b (GNP L/M/H)
= -1743.95 + 0.42 (GNP L/M/H)
(5.652)

ADJUSTED R^2 = 72.1%
DPCc = DEMAND FOR IMPORTED (CBU) PASSENGER CARS
GNP = GROSS NATIONAL PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	6.75	7.84	8.92
1990 - 1995	6.54	7.58	8.60
1983 - 1995	8.75	9.85	10.94

TABLE : 4.2.11
DEMAND PROJECTIONS FOR IMPORTED (CBU) PASSENGER CARS,
1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1982 (ACTUAL)	8,561	8,561	8,561
1984	10,488	10,641	10,795
1985	11,044	11,364	11,686
1986	11,654	12,153	12,661
1987	12,286	12,978	13,691
1988	12,940	13,842	14,777
1989	13,618	14,745	15,925
1990	14,321	15,689	17,136
1991	15,049	16,677	18,414
1992	15,804	17,710	19,764
1993	16,586	18,791	21,189
1994	17,396	19,921	22,694
1995	18,235	21,103	24,282

REGRESSION :

MODEL DPCc = a + b (PGNP L/M/H)
= -5812.24 + 7.804 (PGNP L/M/H)
(5.4115)

ADJUSTED R^2 = 70.2%
DPCc = DEMAND FOR IMPORTED (CBU) PASSENGER CARS
PGNP = PER CAPITA GROSS NATIONAL PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	5.33	6.66	7.96
1990 - 1995	4.95	6.11	7.22
1982 - 1995	5.99	7.19	8.35

2.4.2. Commercial Vehicles

Three categories of commercial vehicles are studied in the demand projections, namely:

(i) demand for all types of commercial vehicles;
(ii) demand for buses; and
(iii) demand for lorries and vans.

Like passenger cars, different sets of variables affect different types of commercial vehicles, especially for commercial vehicles that are used for different purposes.

Generally, the demand for commercial vehicles depends on the level of business activities. As the business activities increase, the demand for commercial vehicles also increases.

Unfortunately, the demand for buses cannot be further disaggregated to stage buses and mini buses due to constraints in the degree of statistical classification available in the country. The mini bus is a new mode of transport that has been introduced recently to improve the public transportation. It is operated by individuals instead of companies like the stage buses.

Likewise, the demand for lorries cannot be disaggregated further into light and heavy tonnage lorries.

(i) Demand For Commercial Vehicles

The variables utilised in this set of demand projections are real Real GNP and Industrial GNP (comprising only mining, construction, wholesale and manufacturing sectors).

Comparisons of the regression equations using the two variables (Appendix 47) revealed that the results of both projections are almost similar. However, real GNP is a better variable than industrial GDP as it encompasses the contributions of certain sectors like plantation to the Malaysian economy. As the plantation sector, namely rubber and palm oil, plays a significant role in the overall economy, its contribution to GDP cannot be excluded from our analysis. Moreover, the higher R^2 also supports the selection of real GNP rather than Industrial GDP.

As illustrated in Table 4.2.12, the demand for commercial vehicles is expected to achieve a growth rate of 8.6% per annum from 21,811 units in 1982 to 63,526 units in 1995 (under most likely projection). In the case of pessimistic and optimistic projections, the demand for commercial vehicles will increase at a rate of 7.6% and 9.6% respectively. The average annual growth rate of commercial vehicles appears to be higher than the projected GNP under the three scenarios.

TABLE : 4.2.12
DEMAND PROJECTIONS FOR COMMERCIAL VEHICLES,
1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1982 (ACTUAL)	21,811	21,811	21,811
1985	29,596	30,233	30,879
1986	31,619	32,642	33,685
1987	33,768	35,221	36,715
1988	36,046	37,980	39,988
1989	38,460	40,932	43,522
1990	41,019	44,090	47,339
1991	43,732	47,470	51,461
1992	46,607	51,086	55,914
1993	49,655	54,956	60,722
1994	52,886	59,096	65,915
1995	56,310	63,526	71,524

REGRESSION :

MODEL DCV = a + b (GNP L/M/H)
= -4191.75 + 1.01 (GNP L/M/H)
(12.72)

ADJUSTED R^2 = 88.5%
DCV = DEMAND FOR COMMERCIAL VEHICLES
GNP = GROSS DOMESTIC PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	6.75	7.84	8.92
1990 - 1995	6.54	7.58	8.60
1982 - 1995	7.57	8.57	9.57

(ii) Demand For Buses

Buses (both stage and mini buses) comprise the main type of public transport in both the rural and urban areas of Malaysia. Lately, there is a plan to implement the light rail transit system (LRT) in Malaysia which will affect the demand for public bus services in the urban areas. However, since no study has been carried out on the demand for LRT, its effects on the demand for public bus services cannot be estimated. Thus, the variables that are used in the regression analysis will only include the following:

- real GNP;
- population;
- real GNP per capita

Income (GNP or real GNP per capita) has a negative correlation on the demand for public transport. As the level of income increases, the demand for cars will also increase whilst the demand for public transport will, ceteris paribus, decrease. Both cars and buses are substitutes. A person either chooses to own a car or rely on the public transport system.

As a growing population will usually increase the pressure for the provision of adequate transport services, it is expected that any population increase will have a positive correlation with the demand for public transport.

After review, the demand function based on GNP and population is selected. The resulting demand projections are shown in Table 4.2.13. The demand for buses seems to increase marginally (1%) over the period 1982 to 1995 under pessimistic projection. However, as the income increases, the demand for buses is estimated to decline, viz, 2% and 7.7% decrease per annum for most likely and optimistic projections.

(iii) Demand for Lorries and Vans

As mentioned previously, the variables used to estimate the demand for lorries and vans are the same as that for commercial vehicles as mentioned earlier.

As with the demand for commercial vehicles as a whole, total GNP is used in preference to industrial GNP in the selection of the demand function for lorries and vans. The resulting demand projections are presented in Table 4.2.14.

The increase in the demand for lorries and vans is higher than the projected growth rate of GNP under all the three scenarios. The demand for lorries and vans is estimated to increase to 63,286 units in 1995 as compared to 19,237 units in 1982 (at 9.6% growth rate under most likely projection). As for pessimistic and optimistic projections, the average annual growth rates are 8.5% and 10.6% respectively.

TABLE : 4.2.13
DEMAND PROJECTIONS FOR BUSES,
1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1982 (ACTUAL)	1,358	1,358	1,358
1985	1,452	1,408	1,363
1986	1,487	1,415	1,343
1987	1,517	1,415	1,311
1988	1,542	1,407	1,266
1989	1,561	1,389	1,208
1990	1,575	1,361	1,134
1991	1,583	1,322	1,043
1992	1,584	1,271	934
1993	1,577	1,207	804
1994	1,562	1,129	653
1995	1,539	1,035	477

REGRESSION :

MODEL DB = a + b (GNP L/M/H) + c (POP)
= -3833.2 - 0.0705 (GNP L/M/H) + 6 (POP)
(-0.97) (1.59)

ADJUSTED R^2 = 64.0%
DB = DEMAND FOR BUSES
GNP = GROSS NATIONAL PRODUCT
POP = POPULATION
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	1.64	-0.68	-3.61
1990 - 1995	-0.46	-5.33	-15.9
1982 - 1995	0.97	-2.07	-7.73

TABLE : 4.2.14
DEMAND PROJECTIONS FOR LORRIES AND VANS, 1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1982 (ACTUAL)	19,237	19,237	19,237
1985	28,143	28,806	29,475
1986	30,242	31,302	32,381
1987	32,467	33,972	35,519
1988	34,826	36,829	38,908
1989	37,326	39,886	42,569
1990	39,977	43,158	46,522
1991	42,786	46,658	50,791
1992	45,764	50,403	55,402
1993	48,920	54,410	60,382
1994	52,266	58,698	65,760
1995	55,813	63,286	71,569

REGRESSION :

MODEL DLV = a + b (GNP L/M/H)
= -6845.6 + 1.046 (GNP L/M/H)
(7.56)

ADJUSTED R^2 = 82.4%
DLV = DEMAND FOR LORRIES AND VANS
GNP = GROSS NATIONAL PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	7.27	8.42	9.56
1990 - 1995	6.90	7.96	8.99
1982 - 1995	8.54	9.59	10.63

Lorries and vans comprise more than 90% of the total demand for commercial vehicles. This illustrates the importance of lorries and vans for transportation services in Malaysia.

2.4.3 Demand for Motorcyles

The variables used in the demand projections for motorcycles are:

- labour force;
- price of passenger cars;
- total registration of public transport;
- real GNP;
- population; and
- real GNP per capita.

Assuming all other factors remaining constant, the labour force, population and price of passenger cars have positive correlation with the demand for motor cycles, assuming all things remain constant. On the other hand,the total registration of public transport vehicles and income have negative effects on the demand for motorcycles.

The demand function selected for our projection purposes is shown below:

DMC = f (PGNP)

Table 4.2.15 shows the demand for motorcycles using per capita GNP as variable in the demand function. As can be seen, the demand for motorcyles is expected to increase from 182,144 units in 1981 (actual) to 402,970 units in 1995, registering an average annual increase of 5.83% (under most likely projection). Under pessimistic and optimistic demand projections, the growth rates are at 4.9% and 6.7% respectively.

2.5 Summary Of Domestic Demand Up To 1995

The details on the demand projections for motor vehicles have been discussed in the previous section. Thus, in this section, we only briefly highlight the most likely demand estimates and the average annual growth rates of the various categories of vehicles up to 1995. A comparison is also made with the actual demand.

Table 4.2.16 and Charts 4.2.3 to 4.2.9 show the summary of the selected demand projections of motor vehicles.

Almost all the projected demand growth rates (except imported cars) represent a decline over that of the previous years. This means that the demand for the various categories of motor vehicles will not expand as rapidly as in the past. This can be attributed to the fact that the Malaysian automotive market is moving towards saturation levels. Although this will not occur in 1995, it is very likely that at the existing rate of population growth, the saturation of the Malaysian automotive market will occur at the turn of the next century.

TABLE : 4.2.15
DEMAND PROJECTIONS FOR MOTORCYCLES,
1985 - 1995, (UNITS)

YEAR	PESSIMISTIC (LOW)	MOST LIKELY (MEDIUM)	OPTIMISTIC (HIGH)
1981 (ACTUAL)	182,144	182,144	182,144
1985	218,849	218,849	218,849
1986	230,449	233,707	236,964
1987	242,425	249,202	256,036
1988	255,265	265,830	276,609
1989	268,299	282,957	298,040
1990	281,772	300,837	320,627
1991	295,715	319,499	344,433
1992	310,141	339,004	369,545
1993	325,076	359,392	396,023
1994	340,541	380,099	423,970
1995	356,570	402,970	453,456

REGRESSION :

MODEL DMC = a + b (PGNP L/M/H) + c(DUMMY)
= -114814.455 + 15110.401 (PGNP L/M/H) - 38420.485 (DUMMY)
(-9.72) (16.53) (-2.60)

ADJUSTED RxR = 94%
DMC = DEMAND FOR MOTORCYCLES
PGNP = PER CAPITA GROSS NATIONAL PRODUCT
L/M/H = LOW (6%), MEDIUM (7%), HIGH (8%), GROWTH RATE OF PROJECTED GNP

AVERAGE ANNUAL GROWTH RATE (%)

PERIOD	LOW	MEDIUM	HIGH
1985 - 1990	5.18	6.57	7.94
1991 - 1995	4.79	5.97	7.12
1981 - 1995	4.91	5.83	6.73

TABLE : 4.2. 16

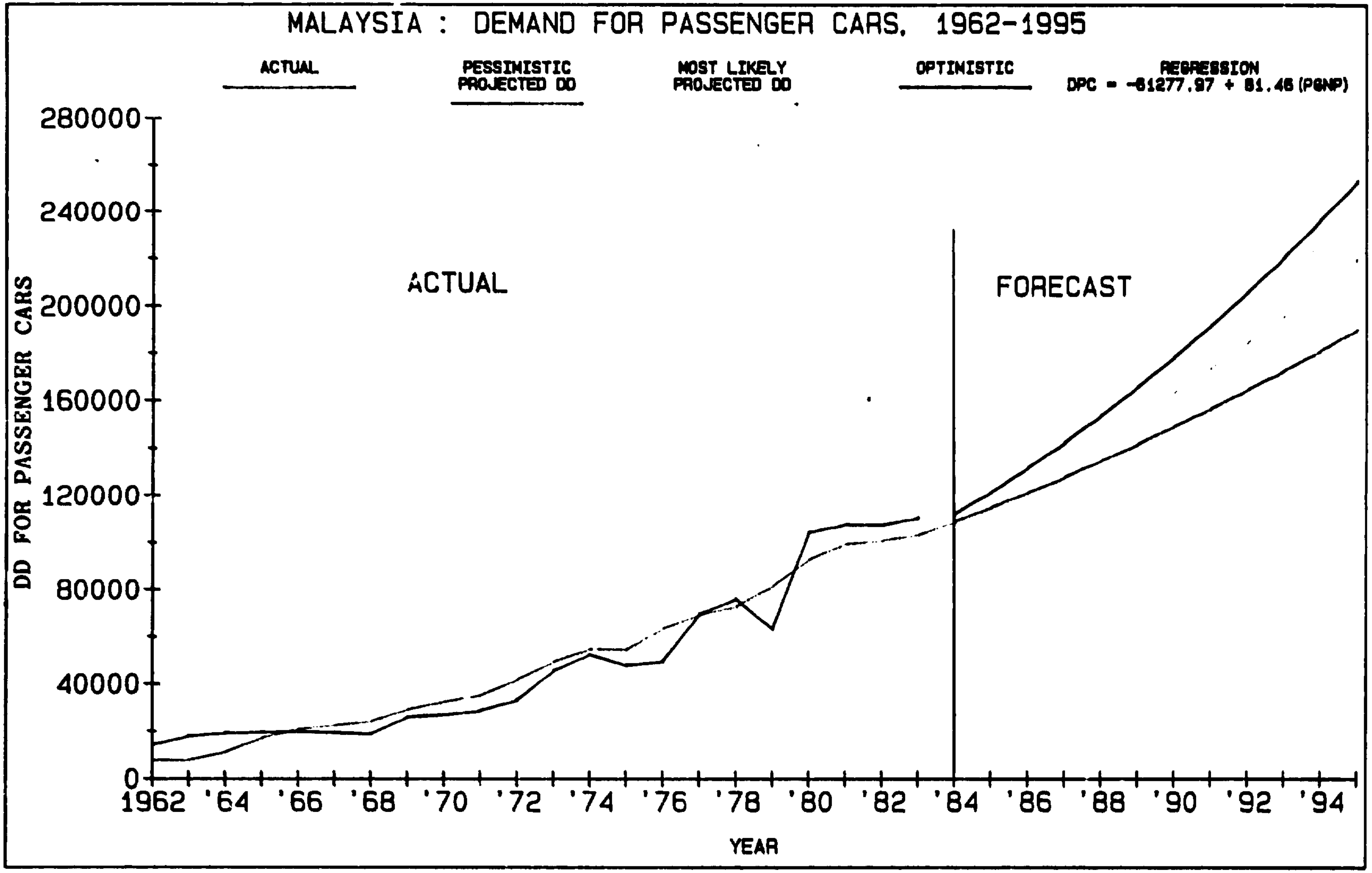
SUMMARY OF THE SELECTED DEMAND PROJECTIONS FOR MOTOR VEHICLES

TYPES OF VEHICLES		ACTUAL UNITS		FORECAST UNITS			AVERAGE ANNUAL GROWTH (%) ACTUAL	FORECASTS	
		1970	1982	1985	1990	1995	1970 - 1982	1985 - 1990	1990 - 1995
TOTAL PASSENGER CARS	DPC	27,185	107,532	118,008	163,155	219,671	12.14	6.70	6.13
LOCALLY ASSEMBLED (CKD) CARS 1600CC & BELOW	DPCa	16,322	63,452	75,283	97,633	123,414	11.98	5.34	4.80
LOCALLY ASSEMBLED (CKD) CARS ABOVE 1600CC	DPCb	4,635	20,165	28,086	43,453	65,006	13.03	9.12	8.39
CBU NEW CARS	DPCc	4,567	8,561	11,364	15,689	21,103	5.40	6.66	6.11
TOTAL COMMERCIAL VEHICLES	DCV	7,396	21,811	30,233	44,090	63,526	9.40	7.84	7.58
LORRIES & VANS	DLV	6,244	19,237	28,806	43,158	63,285	9.83	8.40	7.95
BUSES	DB	624	1,358	1,408	1,361	1,035	6.70	(0.68)	(5.33)
MOTOR CYCLES	DMC			218,849	300,837	402,970		6.57	5.83

NOTES : THE SELECTION OF THE DEMAND PROJECTIONS IS BASED ON MOST LIKELY ESTIMATES AND THE FOLLOWING DEMAND FUNCTIONS:

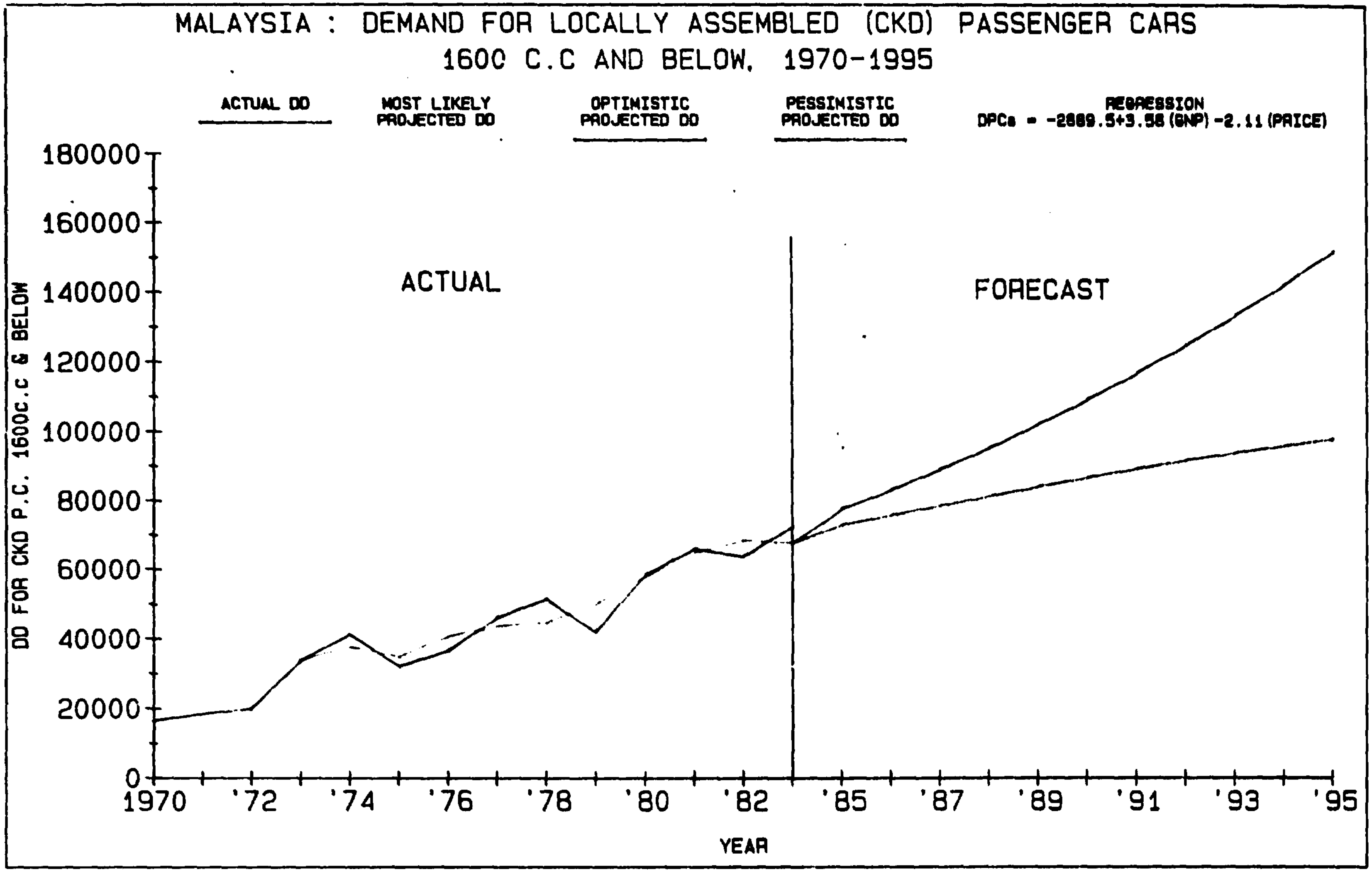
DPC = f(PGNP)
DPCa = f(GNP, PRICE)
DPCb = f(GNP)
DPCc = f(GNP PER CAPITA)
DCV = f(GNP)
DLV = f(GNP)
DB = f(GNP, POPULATION)
DMC = f(GNP PER CAPITA)

CHART 4.2.3



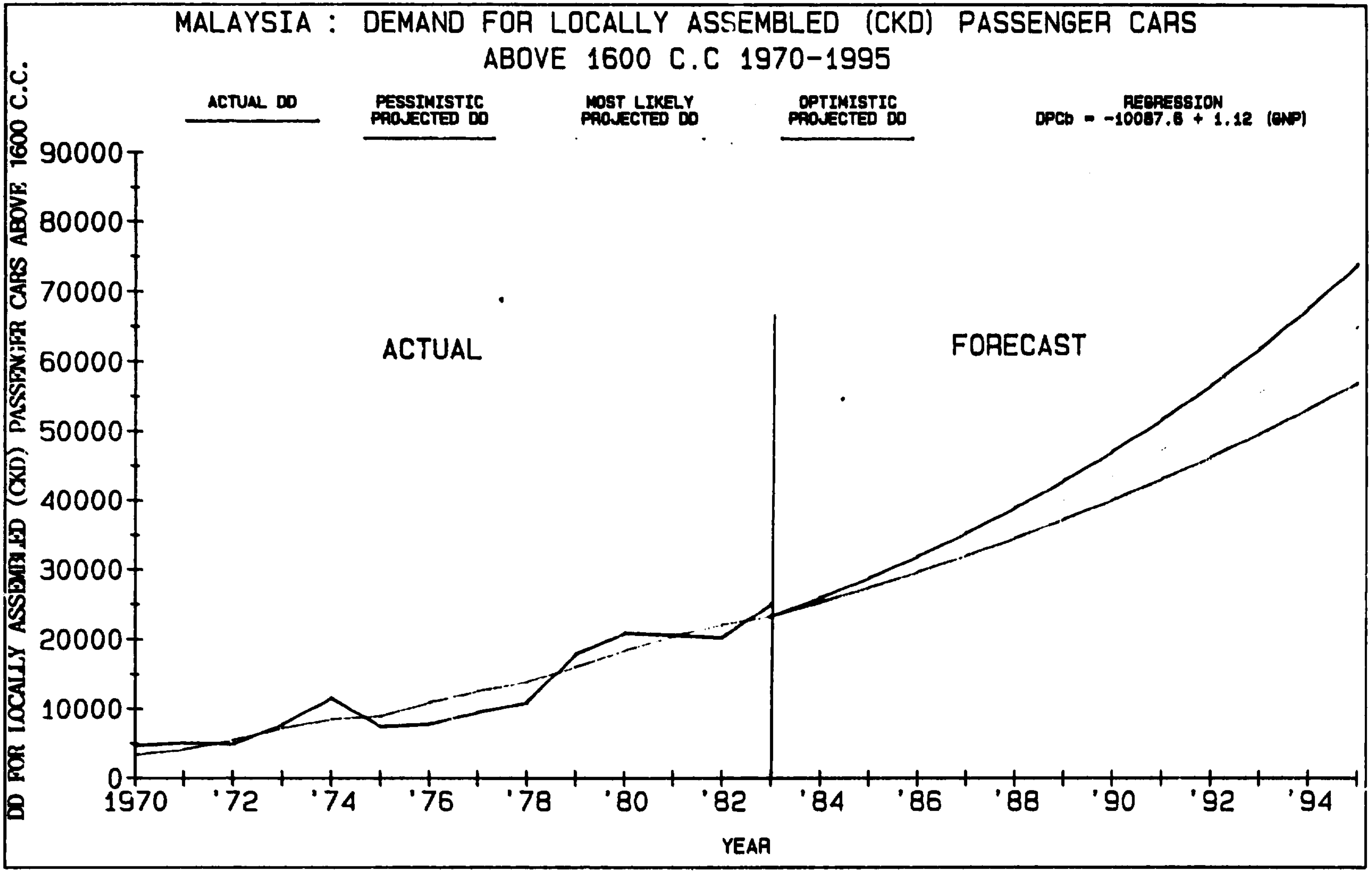
MALAYSIA : DEMAND FOR PASSENGER CARS, 1962-1995
ACTUAL
PESSIMISTIC PROJECTED DD
MOST LIKELY PROJECTED DD
OPTIMISTIC
REGRESSION DPC = -61277.97 + 81.46 (PGNP)
DD FOR PASSENGER CARS
280000
240000
200000
160000
120000
80000
40000
0
ACTUAL
FORECAST
1962 '64 '66 '68 '70 '72 '74 '76 '78 '80 '82 '84 '86 '88 '90 '92 '94
YEAR

CHART 4.2.4



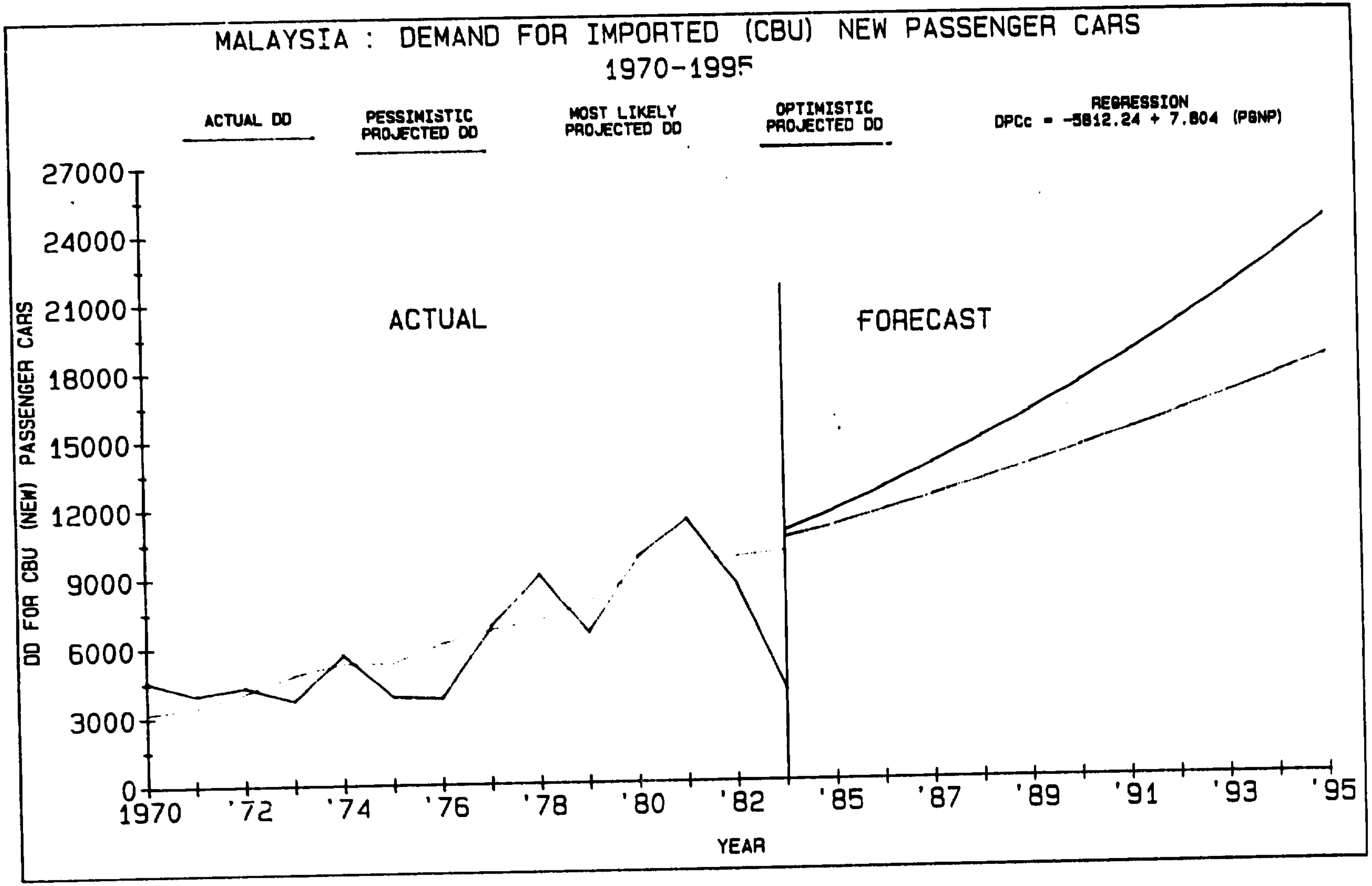
MALAYSIA : DEMAND FOR LOCALLY ASSEMBLED (CKD) PASSENGER CARS
1600 C.C AND BELOW, 1970-1995
ACTUAL DD
MOST LIKELY PROJECTED DD
OPTIMISTIC PROJECTED DD
PESSIMISTIC PROJECTED DD
REGRESSION
DPCs = -2889.5+3.58(GNP)-2.11(PRICE)
ACTUAL
FORECAST
DD FOR CKD P.C. 1600c.c & BELOW
180000
160000
140000
120000
100000
80000
60000
40000
20000
0
1970
'72
'74
'76
'78
'80
'82
'85
'87
'89
'91
'93
'95
YEAR

CHART 4.2.5



IV.94

CHART 4.2.6



IV.95

CHART 4.2.7

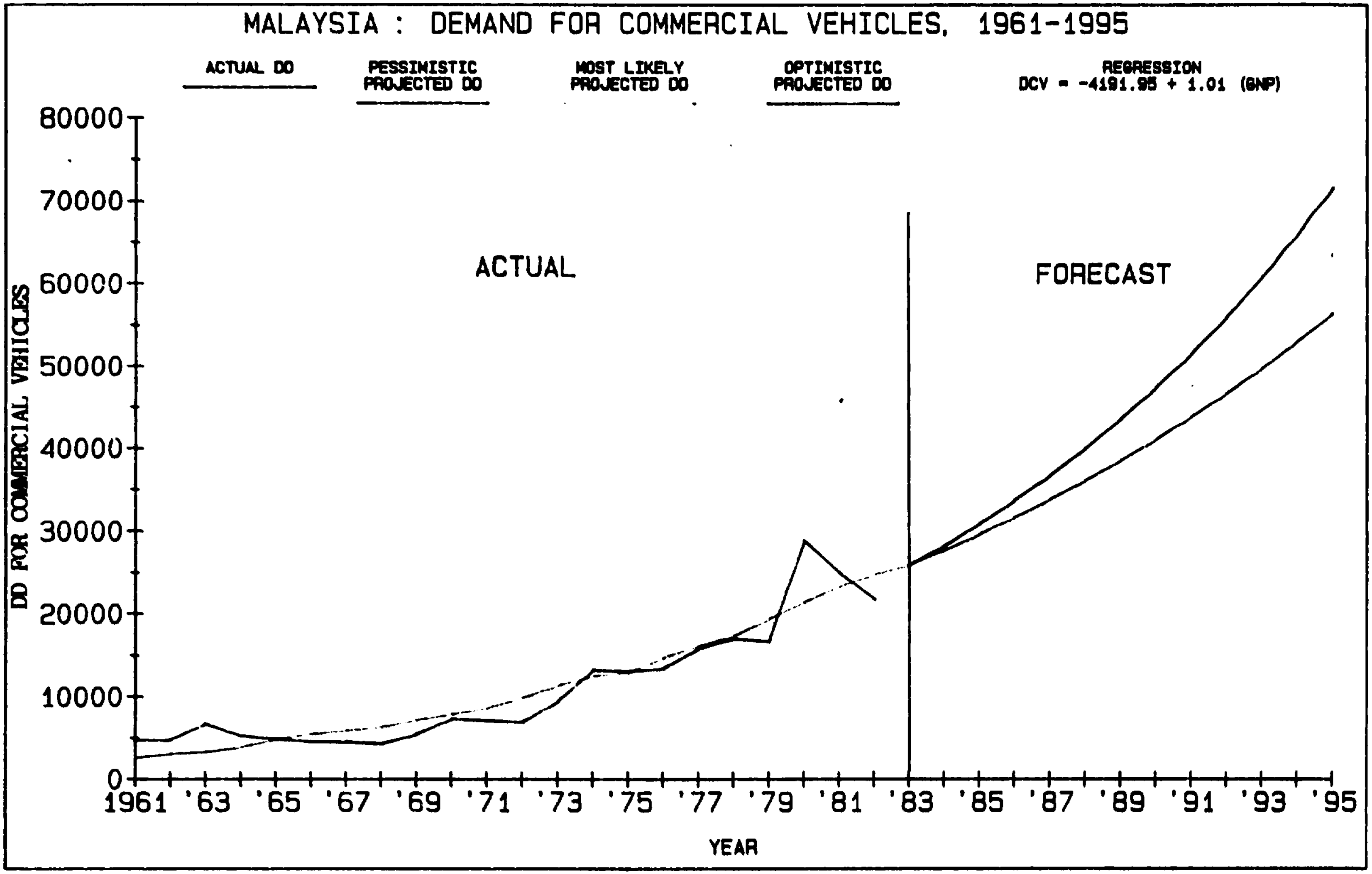
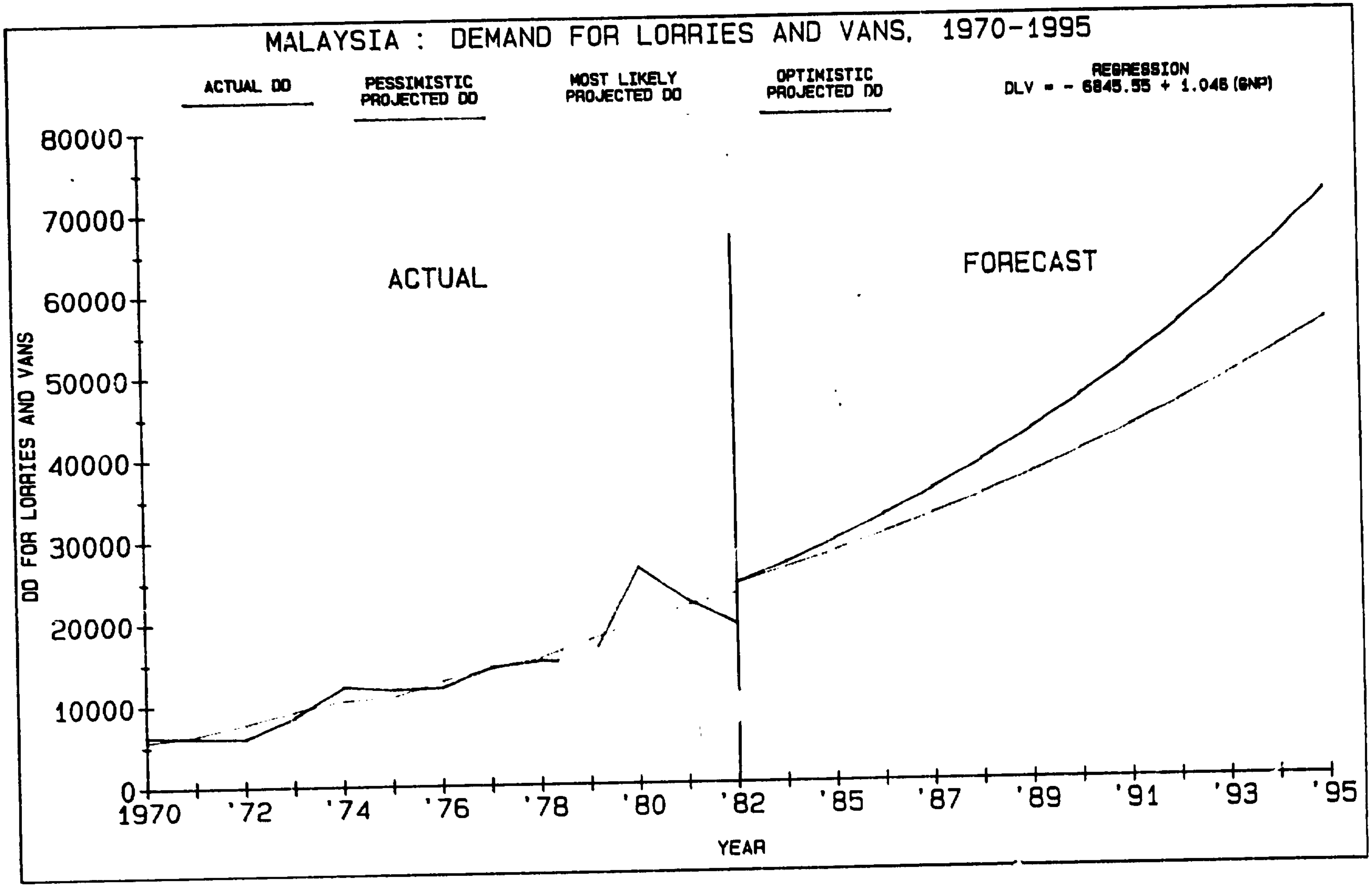
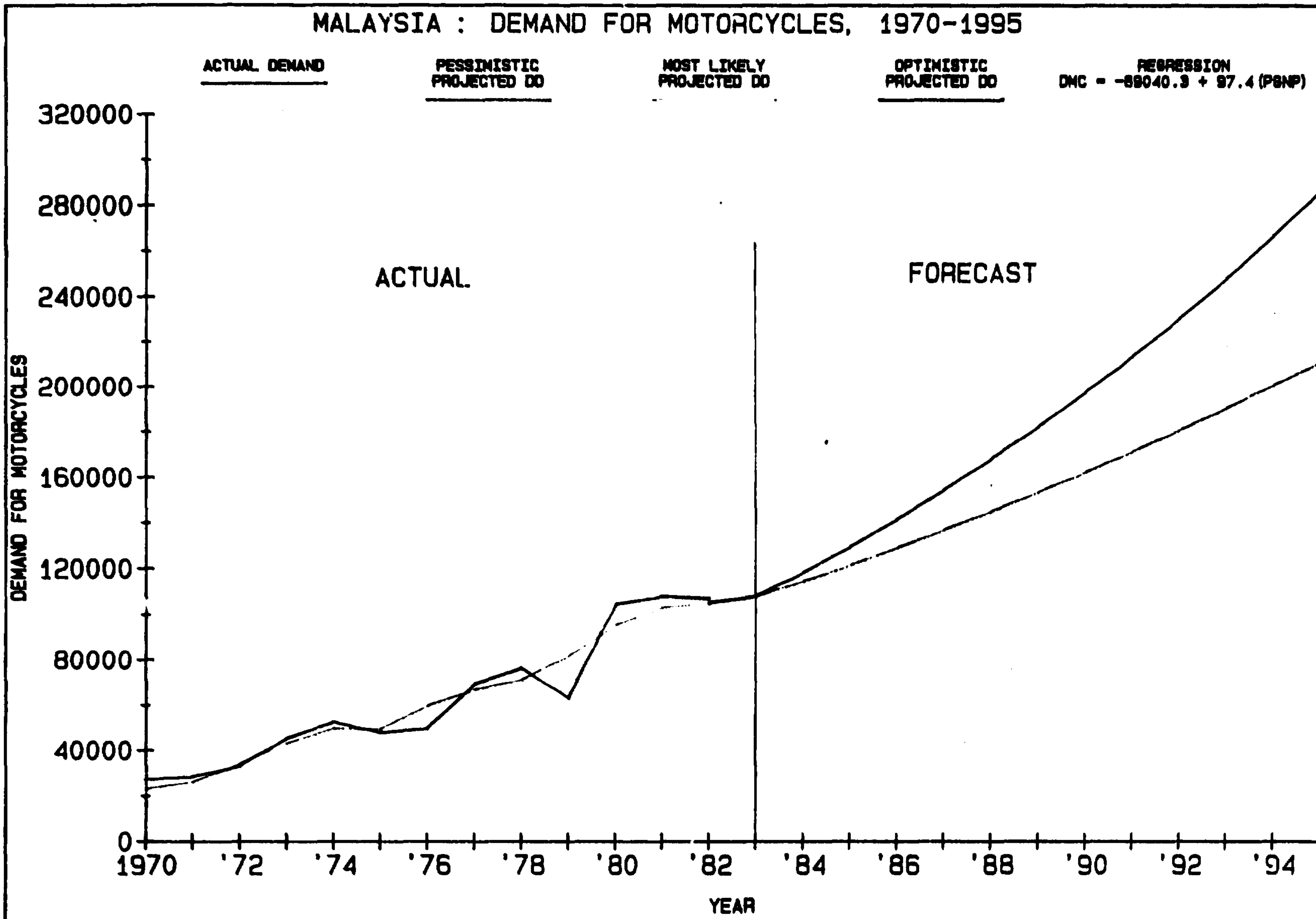

MALAYSIA : DEMAND FOR COMMERCIAL VEHICLES, 1961-1995
ACTUAL DD
PESSIMISTIC PROJECTED DD
MOST LIKELY PROJECTED DD
OPTIMISTIC PROJECTED DD
REGRESSION
DCV = -4191.95 + 1.01 (GNP)
ACTUAL
FORECAST
DD FOR COMMERCIAL VEHICLES
0
10000
20000
30000
40000
50000
60000
70000
80000
1961
'63
'65
'67
'69
'71
'73
'75
'77
'79
'81
'83
'85
'87
'89
'91
'93
'95
YEAR

CHART 4.2. 8



IV.97

CHART 4.2.9



MALAYSIA : DEMAND FOR MOTORCYCLES, 1970-1995
ACTUAL DEMAND
PESSIMISTIC PROJECTED DD
MOST LIKELY PROJECTED DD
OPTIMISTIC PROJECTED DD
REGRESSION DMC = -89040.3 + 97.4 (PGNP)
ACTUAL
FORECAST
DEMAND FOR MOTORCYCLES
320000
280000
240000
200000
160000
120000
80000
40000
0
1970
'72
'74
'76
'78
'80
'82
'84
'86
'88
'90
'92
'94
YEAR

It should be stated at this point that these demand projections have to be interpreted with caution since they have been based on a few selected independent variables. Other factors such as future changes in the tax structure, government regulations and other market forces can distort these projections.

Another observation is that the imposition of import duties from 1982 to 1984 have affected the norm_l demand pattern for motor vehicles. There was a significant upsurge in the demand for motor vehicles just prior to past Budget announcements. However, in these cases, demand was quickly dampened by the higher vehicle prices during the post-budget period.

The above demand analysis also shows that price elasticity in Malaysia is higher than that of other developed countries like Australia. Thus, an increase in the average price of passenger car by an additional 5% will decrease demand from 82,893 units to 79,179 units in 1985 or a decrease of 4.5% under the most likely situation (Table 4.2.8)

3.0 Overall Total Market Demand and Production Growth Projection

3.1 Introduction

Having estimated both the domestic and external market demand, this section mainly aims to consolidate the results obtained from sections IV-1 and IV-2. The demand projections will provide the basis for the formulation of development objectives, investment plans, and policies and programmes in sections II, VI and VII respectively.

This section also serves to analyse both the past and future demand and supply of motor vehicles.

The compositions of demand and supply are as follows:

i) Total Demand = Domestic Demand + Exports

where domestic demand comprisesthree components: production and imports less exports.

ii) Total Supply = Domestic Production + Imports.

At market equilibrium where demand equals to supply (DD = SS), then

Domestic Demand + Export
= Domestic Production + Imports.

The following market scenario will be based on the above equations. It is noted that only the most likely projection is used to estimate the production, export, imports, total demand and supply of the TEI subgroups. It is to be emphasized that the results are derived from a set of assumptions and targets. The main targets to achieve are import-substitution and export expansion.

3.2 Projected Demand, Production, Export and Imports By TEI Sub-Groups

3.2.1 Passenger Cars

Using new registration of passenger cars as proxy for domestic demand while local production and imported CBU cars representing supply, the actual and projected demand-supply gap for 1983 to 1994 is shown in Table 4.3.1.

As shown, the local production of passenger cars in 1983 was 100,200 units, representing a 82.9% production capacity utilisation. There was also an excess supply of 3,741 units in the same year.

Based on the domestic demand projections in Table 4.2.3, the projected demand-supply gap up to 1995 is presented in Table 4.3.1. The figures shown have specifically been obtained from the demand projections previously derived from the following assumptions :

TABLE 4.3.1

PROJECTED DEMAND[1] - SUPPLY GAP FOR PASSENGER CARS,
1985 - 1995

	Actual	Projection		
	1983	1985	1990	1994
Case A - Pessimistic Demand Projection				
Domestic Demand	110,973	114,672	148,878	180,971
New Supply[2]	114,714	116,586	214,554	238,297
Local Production	100,200	105,700	200,400	220,200
• Proton	-	5,500	100,200	120,000
• Local Assemblers[3]	100,200	100,200	100,200	100,200
Imports[4]	14,514	10,886	14,154	18,097
Excess New Supply	3,741	1,914	65,676	57,326
Case B - Most Likely Demand Projection				
Domestic Demand	110,973	118,008	163,155	207,330
New Supply[2]	114,714	116,747	215,730	240,933
Local Production	100,200	105,700	200,400	220,200
Imports[4]	14,514	11,047	15,330	20,733
Excess New Supply	3,741	(1,261)	52,575	33,603
Case C - Optimistic Demand Projection				
Domestic Demand	110,973	121,374	178,255	236,271
New Supply[2]	114,714	117,837	218,226	243,827
Local Production	100,200	105,700	200,400	220,200
Imports	14,514	11,207	16,561	23,627
Excess New Supply	3,741	(3,537)	39,971	7,556

Notes 1. Pessimistic, most likely and optimistic demand projections are based on 6%, 7% and 8% average annual growth rate respectively. Dd = f(PGNP);
2. New supply does not include opening stock;
3. Assume that the local assemblers maintain their existing level of production capacity utilisation at 82.9%;
4. Imports level is 10% of the previous year domestic demand projection. Only imports of CBU units are used.

Demand	Case A	Case B	Case C
Average Annual Growth Rate in Real GNP	6%	7%	8%

Supply

Annual Increase in Import	--- 10% of the previous year domestic demand
Local Production Capacity Utilisation	----82.9% (1983 level)----
Proton Saga	-Based on HICOM Projection-

The resulting demand and supply projections in Table 4.3.1 reveal that if local assemblers were to maintain their existing level of production (i.e. at 82.9% average plant utilisation) with imports at 10% of the previous year domestic demand and Proton following its planned production schedule, there will be an excess supply of 1,914 units for pessimistic projection in 1985. In the case of most likely and optimistic projection, there was an excess demand of 1,261 units and 3,537 units. The local assemblers can still expand its production volume to meet this excess demand.

However, as the planned production of Proton increases further to 100,200 units in 1990, the excess new supply of passenger cars ranges from 39,971 units to 65,676 units depending on forecasted demand levels. The situation improves with excess new supply of 7,556 units (under optimistic demand projection) to 57,326 units (under pessimistic demand projection) in 1994 with Proton's planned production capacity of 120,000 units.

Given the limited domestic market as well as Proton Saga's capture of up to 100,200 units and 120,000 units of the passenger car market by 1990 and 1994 respectively, the excess supply situation can only be avoided by the following alternatives:

(a) Hicom exports the excess supply of the passenger cars.

(b) Local assemblers (other than HICOM) cut down on the production of passenger cars.

(c) Hicom delays the expansion of the production capacity.

(d) The government reduces the number of imported cars into the country.

It is noted that a combination of the above alternatives can be used to reduce the projected excess supply. Assuming that alternative (b) is used, the resulting effects are seen in Table 4.3.2. This means that the market share of passenger cars (1200 c.c. to 1600 c.c) makes other than Proton Saga will shrink from 100.0% in 1983 to as low as 19% (pessimistic projection) by 1994. Passenger cars of 1200 c.c. to 1600 c.c. range occupy about 60% of the total passenger car plant utilization in 1983. However, with the

TABLE 4.3.2

PROJECTED DEMAND FOR PASSENGER CARS (1,200 C.C. TO 1,600 C.C.)
UNDER PROTON SAGA AND OTHER MAKES, 1983 TO 1994
(PROTON'S STRATEGY)

	FORECASTED DEMAND						SHARE OF PROTON SAGA (2)	SHARE OF OTHER MAKES (3)					
YEAR	PESSIMISTIC		MOST LIKELY		OPTIMISTIC		PROTON SAGA	PESSIMISTIC		MOST LIKELY		OPTIMISTIC	
	UNITS	%	UNITS	%	UNITS	%	UNITS	UNITS	%	UNITS	%	UNITS	%
1983 (ACTUAL)	72,378	100	72,378	100	72,378	100	0	72,378	100	72,378	100	72,378	100
1985	81,356	100	83,197	100	85,054	100	5,500	75,856	93	77,697	93	79,554	94
1986	87,181	100	90,120	100	93,115	100	40,250	46,931	54	49,870	55	52,865	57
1987	93,354	100	97,529	100	101,822	100	67,600	25,754	28	29,929	31	34,222	34
1988	99,898	100	105,456	100	111,225	100	84,400	15,498	16	21,056	20	26,825	24
1989	106,835	100	113,938	100	121,380	100	95,200	11,635	11	18,738	16	26,180	22
1990	114,188	100	123,013	100	132,347	100	100,200	13,988	12	22,813	19	32,147	24
1991	121,982	100	132,724	100	144,192	100	102,400	19,582	16	30,324	23	41,792	29
1992	130,244	100	143,115	100	156,985	100	108,200	22,044	17	34,915	24	48,785	31
1993	139,002	100	154,233	100	170,801	100	114,000	25,002	18	40,233	26	56,801	33
1994	148,285	100	166,129	100	185,722	100	120,000	28,285	19	46,129	28	65,722	35

SOURCE: SEE TABLE 4.2.7

NOTES: (1) ASSUMING 100% OF PROTON SAGA ARE SOLD.

(2) ASSUMING OTHER MAKES ONLY COMPRISE LOCALLY ASSEMBLED CARS.

reduction in the market share of the locally assembled cars, the average plant utilization level will reduce to as low as 23.4% (pessimistic projections by 1995, assuming no further increase in the industry installed capacity. Even if the most likely or optimistic demand projection exists, a drop in the current plant utilisation level to 38.2% to 54.4% by 1994 is forseen.

Table 4.3.3 assumes that 66% of the planned production of Proton Saga are sold. Given such situation, the percentage market share of other makes (other than Proton) will remain in the region of 40% to 60% depending on the type of projections. Table 4.3.4 assumes that the local ssemblers will not increase their 1983 level of plant utilization. The implications of such situation will be reviewed in Section VII on policies and programmmes.

Table 4.3.5 shows the actual and most likely projected production, domestic demand, export and imports of passenger cars. In addition to the above assumptions, it is also assumed that half of the most likely excess supply (derived from Table 4.3.1) will be exported in 1990 and subsequently an additional of 10% average annual growth rate will be added onto the 1990 export figures. This will reduce the excess supply from 52,575 units to 26,288 units in 1990.

It can be seen that the total demand (both domestic and external market demand) for passenger cars is expected to increase from 108,202 units in 1981 to 262,008 units in 1995, registering an average annual growth rate of 6.5%. Exports is

TABLE 4.3.3

PROJECTED DEMAND FOR PASSENGER CARS (1,200 C.C. TO 1,600 C.C) [1]
UNDER PROTON SAGA AND OTHER MAKES, 1983 TO 1994
(PROTON'S STRATEGY)

	FORECASTED DEMAND [1]						SHARE OF PROTON SAGA [2]	SHARE OF OTHER MAKES [3]					
YEAR	PESSIMISTIC		MOST LIKELY		OPTIMISTIC		PROTON SAGA	PESSIMISTIC		MOST LIKELY		OPTIMISTIC	
	UNITS	%	UNITS	%	UNITS	%	UNITS	UNITS	%	UNITS	%	UNITS	%
1983	72,378	100	72,378	100	72,378	100	0	72,378	100	72,378	100	72,378	100
1985	81,356	100	83,197	100	85,054	100	5,500	75,856	93	77,697	93	79,554	94
1986	87,181	100	90,120	100	92,915	100	26,250	60,931	70	63,870	71	66,665	72
1987	93,354	100	97,529	100	101,822	100	44,616	48,738	52	52,913	54	57,206	56
1988	99,898	100	105,456	100	111,225	100	55,704	44,194	44	49,752	47	55,521	50
1989	106,835	100	113,936	100	121,380	100	62,832	44,003	41	51,106	45	58,548	48
1990	114,188	100	123,013	100	132,347	100	66,132	48,056	42	56,881	46	66,215	50
1991	121,982	100	132,724	100	144,192	100	67,584	54,398	45	65,140	49	76,608	53
1992	130,244	100	143,115	100	156,985	100	71,412	58,832	45	71,703	50	85,573	55
1993	139,002	100	154,233	100	170,801	100	75,240	63,762	46	78,993	51	95,561	56
1994	148,285	100	166,129	100	185,722	100	79,200	69,085	47	86,929	52	106,522	57

SOURCE: SEE TABLE 4.3.2

NOTES : (1) ASSUMING 66% OF THE PLANNED PRODUCTION OF PROTON SAGA FOR 1986 TO 1994 ARE SOLD

(2) ASSUMING OTHER MAKES ONLY COMPRISE LOCALLY ASSEMBLED CARS

TABLE 4.3.4

PROJECTED DEMAND FOR PASSENGER CARS (1,200 C.C. TO 1,600 C.C)
UNDER PROTON SAGA AND OTHER MAKES, 1983 TO 1994
(LOCAL ASSEMBLER'S STRATEGY)

	FORECASTED DEMAND [1]						SHARE OF LOCAL ASSEMBLED CARS [1]	SHARE OF PROTON					
YEAR	PESSIMISTIC		MOST LIKELY		OPTIMISTIC			PESSIMISTIC		MOST LIKELY		OPTIMISTIC	
	UNITS	%	UNITS	%	UNITS	%	UNITS	UNITS	%	UNITS	%	UNITS	%
1983	72,378	100	72,378	100	72,378	100	72,378	-	-	-	-	-	-
1985	81,356	100	83,197	100	85,054	100	72,378	8,978	11	10,819	13	12,676	15
1986	87,181	100	90,120	100	93,115	100	72,378	14,803	17	17,742	20	20,737	22
1987	93,354	100	97,529	100	101,822	100	72,378	20,976	22	25,151	26	29,444	29
1988	99,898	100	105,456	100	111,225	100	72,378	27,520	28	33,078	31	38,847	35
1989	106,835	100	113,938	100	121,380	100	72,378	34,457	32	41,560	36	49,002	40
1990	114,188	100	123,013	100	132,347	100	72,378	41,810	37	50,635	41	59,969	45
1991	121,982	100	132,724	100	144,192	100	72,378	49,604	41	60,346	45	71,814	50
1992	130,244	100	143,115	100	156,985	100	72,378	57,866	44	70,737	49	84,607	54
1993	139,002	100	154,233	100	170,801	100	72,378	66,624	48	81,855	53	98,423	58
1994	148,285	100	166,129	100	185,722	100	72,378	75,907	51	93,751	56	113,344	61

NOTES : (1) ASSUMING LOCAL ASSEMBLY PLANTS DO NOT INCREASE THEIR 1983 LEVEL OF THE PLANT UTILIZATION.
IN 1983, PASSENGER CARS OF 1200 C.C. TO 1600 C.C. OCCUPY 59.9% OF THE PLANT PRODUCTION CAPACITY

SOURCE: SEE TABLE 4.3.2

TABLE 4.3.5

ACTUAL AND MOST LIKELY PROJECTED PRODUCTION DOMESTIC DEMAND, EXPORT AND IMPORT FOR PASSENGER CARS, 1981 - 1995 (UNIT)

	1981	1985	1990	1995	AVERAGE ANNUAL GROWTH RATE (%)		
					1981-1985	1985-1990	1990-1995
PRODUCTION (A)	86,418	107,154	174,113	241,275	5.52	10.19	6.74
DOMESTIC DEMAND (B)	108,044	118,008	163,155	219,671	2.23	6.70	6.13
EXPORT (C)	158	193	26,288	42,337	5.13	167.20	9.99
IMPORT (D)	14,364	11,047	15,330	20,733	-6.35	6.77	6.22
TOTAL DEMAND	108,202	118,201	189,443	262,008	2.23	9.89	6.70
% EXPORT/PRODUCTION	0.18	0.18	15.1	17.5	0	142.52	15.92
% IMPORT/DOMESTIC DEMAND	13.30	9.40	9.4	9.4	-8.31	0	0

estimated to reach 42,337 units in 1995 as compared to 158 units in 1981. This accounts for about 17.5% of its total production in 1995 (0.18% in 1981). Imports, on the other hand, will remain at 10% of its previous year domestic demand or 9.4% of its present year domestic demand.

3.2.2 Commercial Vehicles

The actual and most likely projected production, domestic demand, export and import of commercial vehicles is shown in Table 4.3.6. The assumptions and targets used to derived the figures are as follows:

(a) The average number of imported (CBU) commercial vehicles (mainly special vehicles and ambulances) is about 4,120 units. This is calculated based on the average number of imported commercial vehicles over the past 10 years.

(b) Proportion of exports of commercial vehicles to total local production is assumed to increase from 0.92% in 1981 to 2.0% by 1985 (about twice that of the 1981 figure), 4.0% by 1990 and 8.0% by 1995.

Given the above assumptions and projected domestic demand (Table 4.2.12), production, exports, imports and total demand for commercial vehicles can be determined (See Table 4.3.6).

TABLE 4.3.6

ACTUAL AND MOST LIKELY PROJECTED PRODUCTION DOMESTIC DEMAND, EXPORT AND IMPORT FOR COMMERCIAL VEHICLES, 1981 - 1995 (UNIT)

	1981	1985	1990	1995	AVERAGE ANNUAL GROWTH RATE (%)		
					1981-1985	1985-1990	1990-1995
PRODUCTION (A)	19,882	26,646	41,635	64,572	7.59	9.34	9.17
DOMESTIC DEMAND (B)	24,999	30,233	44,090	63,526	4.87	7.84	7.58
EXPORT (C)	183	533	1,665	5,166	30.64	25.58	25.41
IMPORT (D)	6,503	4,120	4,120	4,120	-10.78	0	0
TOTAL DEMAND	25,182	30,766	45,755	68,692	5.13	8.26	8.47
% EXPORT/PRODUCTION	0.92	2.0	4.0	8.0	21.43	14.87	14.87
% IMPORT/DOMESTIC DEMAND	26.00	13.6	9.3	6.5	-14.96	-7.32	-6.92

Total demand for commercial vehicles is projected to increase from 25,182 units in 1981 to 68,692 units in 1995, showing a growth rate of 7.4% per annum. Exports is expected to increase to 5,166 units in 1995 as compared to 183 units in 1981. This accounts for about 8.0% of its total production in 1995 (0.92% in 1981). The proportion of imports to domestic demand, on the other hand, will decrease from 26.0% in 1981 to 6.5% in 1995. This indicates that there will be greater pace of import substitution and export expansion of commercial vehicles.

3.2.3 Motorcycles and Parts

This sub-section deals with both motorcycles, and motor cycles and parts. In the case of motorcycles, the projected figures are in units while that of the motorcycles and parts are in monetary terms.

(i) Motorcycles

The assumptions are as follows:

(a) Domestic demand is derived from Table 4.2.15.

(b) Proportion of exports of motorcycles to total local production is assumed to increase from 2.5% in 1981 to 5.0% by 1990 (about twice that of the 1981 figure) and 10.0% by 1995.

(c) Proportion of imports of motorcycles to domestic demand is expected to decrease from 5.4% in 1981 to 2.7% by 1995.

From the above assumptions and projected domestic demand (Table 4.2.15), we can estimate the production, exports, imports and total demand for motorcycles. (See Table 4.3.7).

Total demand for motorcycles is estimated to increase from 186,754 units in 1981 to 446,536 units in 1995 or a growth rate of 6.4% per annum. It is projected that exports of motorcycles will increase from 4,610 units in 1981 to 43,566 units in 1995. Imports will increase at a slower rate from 9,812 units in 1981 to 10,880 units in 1995. This further boost the production level to 435,656 units in 1995 or slightly more than twice that of the 1981 figures.

(ii) Motorcycles and Parts

Apart from the projections for motorcycles, motorcycle parts are also included in this sub-section. Like motor vehicle parts and accessories, it is also very important for our country to develop in this field, mainly because there are abundant supply of natural resources (particularly for the manufacture of rubber-based products or components) and cheap labour.

The values in monetary terms are adjusted to 1984 constant prices using the the 1970-1984 price-inflator (current GDP/1970 constant GDP) provided by EPU (see Appendix 51).

Apart from the assumptions for motorcycles, this sub-section also assumes that:

TABLE 4.3.7

ACTUAL AND MOST LIKELY PROJECTED PRODUCTION DOMESTIC DEMAND, EXPORT AND IMPORT FOR MOTORCYCLES 1981 - 1995 (UNIT)

	1981	1985	1990	1995	AVERAGE ANNUAL GROWTH RATE (%)		
					1981-1985	1985-1990	1990-1995
(a) MOTORCYCLES							
PRODUCTION (A)	185,953	212,339	308,121	435,656	3.37	7.73	7.17
DOMESTIC DEMAND (B)	182,144	218,849	300,837	402,970	4.70	6.57	6.02
EXPORT (C)	4,610	5,308	15,406	43,566	3.59	23.75	23.11
IMPORT (D)	9,812	11,818	8,122	10,880	4.76	-7.23	6.02
TOTAL DEMAND	186,754	224,157	316,243	446,536	4.67	7.13	7.14
% EXPORT/PRODUCTION	2.5	2.5	5.0	10.0	0	14.87	14.87
% IMPORT/DOMESTIC DEMAND	5.4	5.4	2.7	2.7	0	-12.94	0
(b) MOTORCYCLES & PARTS							
PRODUCTION (A)	113.2	182.0	362.9	714.2	12.6	14.8	14.50
DOMESTIC DEMAND (B)	139.0	208.0	361.2	571.3	10.6	11.67	9.60
EXPORT (C)	7.9	12.7	50.8	200.0	12.6	31.95	31.53
IMPORT (D)	33.7	38.7	49.1	57.1	3.52	4.88	3.06
TOTAL DEMAND	146.9	220.7	412.0	771.3	8.48	13.29	13.36
% EXPORT/PRODUCTION	7.0	7.0	14.0	28.0	0.0	14.87	14.87
% IMPORT/DOMESTIC DEMAND	24.2	18.6	13.6	10.0	<-------	-6.1	------->

(a) the production growth rate of motorcycle parts remains unchanged at 21.9%. Thus, the combined average production growth rate for both the motorcycles and parts is estimated at 14.0% per annum during the period 1981 to 1995.

(b) Proportion of imports to domestic demand is targetted to decrease from 24.2% in 1981 to 10% by 1995

(c) Proportion of exports to production is targetted to increase from 7.0% in 1981 to 28.0% by 1995.

Total demand for motorcycles and parts will increase from $146.9 million in 1981 to $771.3 million in 1995 (at 12.6% average annual growth rate during the period 1981 to 1995). Exports amounts to about $51 million in 1990 and $200 million in 1995 as compared to $7.9 million in 1981.

In light of the import-substitution programme, a further reduction of the proportion of imports to domestic demand is recommended. Thus, it is targetted to decrease the ratio to 10.0% by 1995 or an amount of $57 million in 1995.

In order to achieve the above targets, production of motorcycles and parts have to be raised from $113 million in 1981 to $714.2 million in 1995 while that of the domestic demand will increase from $139 million to $571.3 million over the same period.

3.2.4 Motor Vehicle Bodies

Based on the past ratios of output of motor vehicle bodies to total output of motor vehicles as shown in Table 4.3.8, the ratio is assumed to increase from 16.7% in 1981 to 20.2% by 1995 or a growth rate of 1.5% over the next 15 years.

It is also assumed that the industry will be completely self-sufficient after 1981 and exports will increase from nil in 1981 to 8.0% by 1995.

Total domestic demand of motor vehicle bodies will increase about three-folds by 1995 as compared to $85.9 million (at 1984 constant prices) in 1981 which is also very close to the production figure (Table 4.3.9). The high increase in both the domestic demand and production is expected especially with the establishment of the body stamping plant undertaken by Proton.

With the upgraded technology and know-how, there is also export potential for motor vehicle bodies. Therefore, it is targetted that the ratio of export to production, it is expected to increase from nil in 1981 to 2.0% by 1985, 4.0% by 1990 and 8.0% by 1995. In monetary terms, exports of motor vehicle bodies will increase proportionately from nil in 1981 to 24.6% in 1995 or a growth rate of 14.9% over the next 10 years.

TABLE 4.3.8

RATIO OF OUTPUT VALUE OF MOTOR VEHICLE BODIES AND PARTS TO TOTAL OUTPUT VALUE OF MOTOR VEHICLES, 1968 - 1995

	O/P OF MV BODIES / O/P OF MV	O/P OF MV PARTS / O/P OF MV	O/P OF MV PARTS & BODIES / O/P OF MV
(a) ACTUAL			
1968	6.5	1.5	8.0
1973	9.3	2.4	11.7
1978	14.6	13.9	28.5
1981	16.7	21.7	38.1
(b) AVG. ANNUAL GROWTH RATE (%)			
1968 - 1973	7.4	9.8	7.9
1977 - 1978	9.4	42.0	19.5
1978 - 1981	4.0	16.0	10.2
1968 - 1981	7.4	22.8	12.8
(c) PROJECTIONS			
1985	17.4	30.0	47.4
1990	18.7	45.0	63.7
1995	20.2	60.0	80.2
(d) AVG. ANNUAL GROWTH RATE (%)			
1981 - 1985	1.5	8.4	5.6
1985 - 1990	1.5	8.4	6.1
1990 - 1995	1.5	5.9	4.7

SOURCE : CALCULATED FROM TABLE 3.1.3 AND AUTHOR'S PROJECTION

TABLE 4.3.9

ACTUAL AND MOST LIKELY PROJECTED PRODUCTION DOMESTIC DEMAND, EXPORT AND IMPORT FOR MOTOR VEHICLE BODIES, EX-FACTORY VALUE (M$ MILLION) AT CONSTANT 1984 PRICE

	1981	1985	1990	1995	AVERAGE ANNUAL GROWTH RATE (%) 1981-1985	1985-1990	1990-1995
PRODUCTION (A)	84.7	113.0	193.8	307.5	7.5	11.4	9.7
DOMESTIC DEMAND (B)	85.9	110.7	186.0	282.9	6.5	10.9	8.7
EXPORT (C)	-	2.26	7.8	24.6	-	28.1	25.8
IMPORT (D)	1.3	-	-	-	-	-	-
TOTAL DEMAND	85.9	113.0	193.8	307.5	7.1	11.4	9.7
% EXPORT/PRODUCTION	-	2.0	4.0	8.0	-	14.9	14.9
% IMPORT/DOMESTIC DEMAND	1.5	-	-	-	-	-	-

3.2.5 Motor Vehicle Parts and Accessories

Like motor vehicle bodies, the same method is used to estimate the production, demand, exports and imports of motor vehicle parts and accessories. However, different target phases are used to estimate the extent of the ratio of production of motor vehicle parts to total output of motor vehicles. In this case, the ratio is targetted to reach 30% by 1985, 45% by 1990 and 60% by 1995 (see also Table 4.3.10).

It is also assumed that the proportion of exports to total local production will remain at 6.7% till 1985 and subsequently double to 13.4% by 1990 and 26.8% by 1995. The proportion of imports to domestic demand, on the other hand, is assumed to decrease to 20.0% by 1995 at a constant growth rate of negative 7.5% over the next 15 years.

Given the above assumptions and target phases, the domestic demand is expected to increase from $259.1 million in 1981 to $835.8 million in 1995 (at 1984 constant prices). Total demand which is equalled to total supply is expected to increase to $1,080.6 million in 1995 or about four-folds increase over that of the 1981 figure. Export of motor vehicle parts will increase rapidly from $7.5 million in 1981 to $62.5 million in 1990 to $244.8 million in 1995.

TABLE 4.3. 10

ACTUAL AND MOST LIKELY PROJECTED PRODUCTION DOMESTIC DEMAND, EXPORT AND IMPORT FOR MOTOR VEHICLE PARTS & ACCESSORIES, EX-FACTORY VALUE (M$ MILLION) AT CONSTANT 1984 PRICE

	1981	1985	1990	1995	AVERAGE ANNUAL GROWTH RATE (%)		
					1981-1985	1985-1990	1990-1995
PRODUCTION (A)	111.8	194.8	466.2	913.4	14.9	19.1	14.4
DOMESTIC DEMAND (B)	259.1	322.8	573.4	835.8	5.65	12.18	7.83
EXPORT (C)	7.5	13.05	62.5	244.8	4.24	8.63	31.4
IMPORT (D)	154.8	141.1	169.7	167.2	-2.29	3.76	-0.3
TOTAL DEMAND	266.6	335.9	635.9	1,080.6	5.95	13.62	11.19
% EXPORT/PRODUCTION	6.7	6.7	13.4	26.8	0.0	14.9	14.87
% IMPORT/DOMESTIC DEMAND	59.7	43.7	29.6	20.0	<-------	-7.5	------->

3.2.6 Bicycles and Parts

The assumptions used to estimate the variables for bicycles and parts are as follows:

(a) No change in the production growth rate of 1.82% per annum.

(b) Proportion of exports to production will increase from 1.8% in 1981 to 3.6% by 1990 and 7.2% by 1995.

(c) Proportion of imports to domestic demand is targetted to achieve 10% by 1995.

The domestic demand for bicycles and parts is expected to increase only marginally which varies from 0.41% to 0.73% during the period 1981 to 1995. Given a higher increase in the production of bicycles and parts, the total demand is estimated to increase at a higher rate of 0.75% to 1.13% per annum during the same period. In order to promote export expansion of this industry, it is estimated that export amounts to $5.1 million (at 1984 constant prices) which is about five times higher than the 1981 figure. Imports, on the other hand, will decrease proportionately to $7.3 million in 1995 (Table 4.3.11).

TABLE 4.3. 11

ACTUAL AND MOST LIKELY PROJECTED PRODUCTION DOMESTIC DEMAND, EXPORT AND IMPORT FOR BICYCLES, TRICYCLES ETC & PARTS, EX-FACTORY VALUE (M$ MILLION) AT CONSTANT 1984 PRICE

	1981	1985	1990	1995	AVERAGE ANNUAL GROWTH RATE (%)		
					1981-1985	1985-1990	1990-1995
PRODUCTION (A)	55.3	59.4	65.0	71.1	1.82	1.82	1.82
DOMESTIC DEMAND (B)	67.7	69.7	71.8	73.3	0.73	0.59	0.41
EXPORT (C)	1.0	1.07	2.3	5.1	1.71	16.94	16.86
IMPORT (D)	13.4	11.4	9.2	7.3	-3.96	-4.2	-4.52
TOTAL DEMAND	68.7	70.8	74.1	78.4	0.75	0.91	1.13
% EXPORT/PRODUCTION	1.8	1.8	3.6	7.2	0.00	14.87	14.87
% IMPORT/DOMESTIC DEMAND	19.8	16.3	12.7	10.0	<-------	-4.8	------->

PART V DEVELOPMENT STRATEGY AND INVESTMENT CRITERIA

PART V DEVELOPMENT STRATEGY AND INVESTMENT CRITERIA

1.1 Introduction

This section of the report aims to outline a comprehensive development strategy with broad targets for the TE sector over the next decade. The development strategy and policy recommendations are based on the findings of the detailed industry analysis and projection provided in Section III and IV as well as the national development objectives outlined in Section II.

Like other industries, the development strategy of the TE sector is formulated within an overall national economic development framework in general and an overall manufacturing industrial development plan in particular as outlined in Section II. The approaches are therefore as follows:

(a) Review and summarize the broad direction of the existing industrial development strategies of the Malaysian Government, particularly the overall industrial development framework provided in the FMP-MTR.

(b) The overall macro-economic development framework for the next 10 years formulated by EPU is reviewed and the choice of a most likely scenario is discussed. With the overall development contexts thus established, we can then move on to discuss the specific development objectives for the TE sector, and to identify the specific component elements that will combine together to form a coherent development strategy for the TE sector over the next decade.

1.2 Review of Past Industrial Development Strategy and Future Growth Scenario

Using the comparative international experience (especially those of the NICs) as a guide, the industrial growth strategy of Malaysia can be evaluated according to the following three phases of industrial development:

Phase 1,

Growth of Import-Substitution (1960s)	non-durable consumer products (e.g. clothes, shoes) and intermediate input of non-durable consumer goods (e.g. textile fabrics, wood);

Phase 2,

Domestic Market Expansion (1970s)	consumer non-durable and durable product (e.g automobiles) as well as expansion of labour-intensive assembly-type export (e.g. electronics);

Phase 3

Increasing import-Substitution (late 1970s to early 1980s)	Intermediate goods (e.g. petrochemicals, steel, cement) and producer/ consumer durables as well
Export Promotion	higher value added resource-based goods (rubber products, wood products etc.).

Although the phases overlap to some extent, it can roughly be said that Phase 1 corresponds to the 1960s, Phase 2 to that of the 1970s and Phase 3 to late 1970s to early 1980s.

Table 5.1.1 summarizes the structural growth pattern of the manufacturing sector in Malaysia which corresponds to the Phase 1 and Phase 2 of the development strategy. During the 1960s, import-substitution accounted for slightly more than 50% of total manufacturing output growth. However, the growth of import-substitution in the 1970s declined to less than one-quarter of the total output growth. Instead, domestic market expansion increased from 40% in the 1960s to 70% in the 1970s. The proportion of export expansion declined marginally of about 1.5% over the same period.

During the period 1968 to 1979, the proportion of import substitution contribution to the output growth of intermediate and investment goods dropped practically to zero. However, in the case

TABLE 5.1.1

SOURCES OF GROWTH IN ALL MANUFACTURING SECTOR, PENINSULAR MALAYSIA 1959 - 1981

DESCRIPTION	% DISTRIBUTION OF OUTPUT GROWTH		
	DOMESTIC DEMAND EXPANSION	IMPORT SUBSTITUTION	EXPORT EXPANSION
a) ALL MANUFACTURING			
1959 - 1968	40.1	52.0	7.9
1968 - 1979	70.0	28.6	6.4
b) ALL CONSUMER GOODS INDUSTRIES			
1959 - 1968	38.1	54.6	7.3
1968 - 1979	67.4	25.1	7.5
c) ALL INTERMEDIATE GOODS INDUSTRIES			
1959 - 1968	35.0	51.8	13.2
1968 - 1979	76.1	-	23.9
d) ALL INVESTMENT GOODS INDUSTRIES			
1959 - 1968	40.3	55.5	4.2
1968 - 1979	52.7	-6.7	54.0

Source: (a) - (d) Leo (1983), Appendix Table A1 export expansion, it accounted for about 24% and 54% of the total output growth of intermediate and investment goods respectively.

The structural change of the overall growth of the TE sector (excluding shipbuilding and locomotive repairs) over the last two decades followed quite closely with the manufacturing sector. As can be seen in Table 5.1.2, import substitution for the TEI during the 1960s accounted for over 80% of the total output growth. In the case of domestic demand expansion, it only constituted about 10%.

However, the share of domestic market demand expansion had becoming more important during the 1970s. During the period 1968 to 1978, the share of domestic market demand expansion accounted for 75% to 166% of the output growth. This corresponds to phase II of the industrial development whereby durable goods were given more emphasis.

In the case of import-substitution, the share of the output growth had decreased from 86% in the 1960s to -56% in the 1970s. The share of export expansion to the output growth also declined proportionately from 4.2% in the 1960s to -10.4% in the 1970s.

During the period 1978 to 1981, there was an increasing share of import-substitution in transport equipment, with a share of 17.7% of the output growth. The domestic demand expansion, on the other hand, had decreased proportionately to 84% during the same period. Although there is greater emphasis on the export expansion in the

TABLE 5.1.2

MALAYSIA : SOURCES OF GROWTH OF THE TRANSPORT EQUIPMENT SECTOR, 1963 - 1981

SUB-DIVISION	INCREASE IN DOMESTIC DEMAND	IMPORT SUBSTITUTION	EXPORT SUBSTITUTION
MOTOR VEHICLES BODIES (MIC 38431)			
1973 - 1978	1.0105	(0.0096)	(0.0010)
1978 - 1981	0.9783	0.0226	(0.0009)
1973 - 1981	0.9946	0.0067	(0.0013)
MANUFACTURE & ASSEMBLY OF MOTOR VEHICLE (MIC 38432)			
1968 - 1973	1.5770	(0.4550)	(0.1210)
1973 - 1978	2.3280	(1.1740)	(0.1540)
1978 - 1981	1.0000	(0.0670)	(0.0670)
1968 - 1981	2.2080	(0.9780)	(0.2300)
MANUFACTURE OF MOTOR VEHICLE PART & ACCESSORIES (MIC 38432)			
1968 - 1973	(0.0817)	0.8619	0.2198
1973 - 1978	0.2066	0.9442	(0.1508)
1978 - 1981	0.4865	0.4958	0.0177
1968 - 1981	0.0308	1.0175	(0.0482)
MANUFACTURE & ASSEMBLY OF MOTOR-CYCLES & SCOOTER (MIC 38441)			
1968 - 1973	0.0000	1.0327	(0.0327)
1973 - 1978	1.1614	(0.1703)	0.0090
1978 - 1981	0.7436	(0.1466)	0.1098
1968 - 1981	0.0000	(0.9622)	0.0378
MANUFACTURE & ASSEMBLY OF BICYCLES TRICYCLES & TRISHAWS (MIC 38449)			
1968 - 1973	(13.5757)	26.7198	(12.1440)
1973 - 1978	0.4123	0.5212	0.0665
1978 - 1981	0.7967	0.3340	(0.1307)
1968 - 1981	0.7246	0.2517	0.0238
MANUFACTURE & ASSEMBLY OF TRANSPORT EQUIPMENT (1)			
1963 - 1968	0.0969	0.8609	0.0422
1968 - 1973	0.7503	0.2956	(0.0459)
1973 - 1978	1.6619	(0.5582)	(0.1038)
1978 - 1981	0.8474	0.1768	(0.0243)
1968 - 1981	1.0172	0.0818	(0.0990)

SOURCE : CALCULATED FROM TABLE 3.1.4

1980s, there is not much success. The share of the export expansion growth had, in fact, decreased to 2.4% during the same period.

Although there is a lack of information on the individual industry sub-groups of TE sector for the period 1963 to 1968, there are some interesting findings on the sources of growth for the subsequent periods. The domestic demand expansion in the 1970s was greatly felt in the three sub-groups, viz, motor vehicle bodies, motor vehicles, and motorcycles and parts. The share of domestic expansion for these sub-groups varies from 101% to 232.8%. During this period, the 13 motor vehicle assembly plants and 4 motorcycle assembly plants had been granted approvals and commenced operation. This has further boost the development of the industry.

The ancillary firms, and the bicycle and parts manufacturing industry, on the other hand, had only gradually increased their share of their domestic market demand expansion during the 1970s and the early 1980s. The share of the domestic demand expansion for the motor vehicle parts manufacturing industry increased from 21% during the period 1973 to 1978 to 49% during the period 1978 to 1980. For the bicycle and parts manufacturing industry, the increase was about 40% over the previous period.

During the period 1978 to 1981, import-substitution is gradually gaining importance in the motor vehicle parts manufacturing industry, and motorcycle and parts manufacturing industry. This is greatly due to the recent emphasis placed by the government on technology transfer, manpower skill formation and the use of more domestic resources to promote and enhance the development of backward linkages. On the export expansion side, there is relatively insignificant impact on the output growth. Thus, there is a greater need for a transition towards the third phase of industrial development in Malaysia, particularly the export expansion of transport equipment. This has been indicated in the FMP and FMP-MTR.

1.3 Product Strategy

The general development objectives for the TE sector, which are discussed in Section II, have been defined within the framework of the NEP and FMP and are aimed at meeting desirable national development needs. The key objectives amongst these can be summarized and restated as follows:

(i) Broad National Objectives

(a) To develop a National base of strategic heavy engineering and precision manufacturing industries.

(b) To upgrade the domestic management and technological skill levels and capabilities in manufacturing sophisticated, engineered and world quality products.

(c) To reduce the dependence on foreign imports of machinery, intermediate materials and other goods in order to save and earn foreign exchange.

(ii) Specific TE Industry Objectives

(a) To promote the rapid expansion and development of the TE sector and its linkages to serve as the focal point for the national industrialization policy and to spearhead the development of the vital ingredients (technology, labour skills, plant infrastructure) of this industry which are also essential for the development of many other manufacturing sectors.

(b) To expand upstream into component manufacturing and raw material processing. This serves to increase the local content of the final product (and reduce foreign contents), as well as to spurn the formation of the vital skills to produce more sophisticated components.

(c) To increase the TE sector's capabilities for high quality and precision-engineered manufacturing.

(d) To develop an effecient and productive TE sector which is then capable of meeting domestic market demand as well as capturing foreign export markets eventually.

(e) To encourage greater bumiputera participation in this strategic sector.

In order to achieve the above mentioned objectives, the following product strategies have been developed:

1.3.1 General Strategies

Since the main objectives, at least in the short to medium term, are aimed at improving skills, technology and development of a strong local base of precision and heavy engineering facilities, the major emphasis on development in the TE industry should be placed on the upstream component manufacturing and raw material processing industries rather than on the downstream final product (ie. cars, trucks, motorcycle) assembly industry where the manufacturing (assembly) capability already exists.

Therefore, it is in the development of the material processing and component manufacturing sectors in the TE industry where the intense engineering skills, technologies and traditions can be formed and consolidated. These skills and traditions are noticeably absent in Malaysia but yet are critically essential to the national industrialization drive.

Amongst these essential skills and technologies are :

(a) Advanced machine tool and metal cutting technologies;

(b) Precision manufacturing of metal and other complex shaped components;

(c) Precision sheet metal stamping and pressings;

(d) Forging, precision casting, sintering, heat treatment and related technologies;

(e) Tool and die making ;

(f) High accuracy component measuring inspection and testing technologies;

(g) Mechanical, electrical and electronic engineering design and manufacturing.

Without the widespread presence of the above mentioned capability in the manufacturing industries, the industrialization efforts of the country can be severely impeded and delayed. In addition, the continued (so far) dependence on foreign consultants, engineers, machinery, training, techniques, components and even small tools will be perpetuated.

Whilst it is recognized that the TE sector, particularly the component manufacturers, has a relatively high developmental priority and attention, it is still necessary to develop a strategy which can effectively a rapidly overcome the many constraints and obsta es which are present.

The constraints on the development of the TE sector include the following :

(a) The extremely heavy capital investments required to install even initial production capacity.

(b) The wide gap existing currently between the skills available in Malaysia and the pre-requisite skills required at all levels to foster industrial growth and, particularly, the machinery and sophisticated engineering industry.

(c) The relatively small population, with low per capita real income, and domestic market base in Malaysia.

(d) The absence of a minimum efficient size indigenous component production and sub-contracting industry.

In consideration of these constraints, the product sub-sector priorities can therefore be developed following the guidelines below :

(a) Development of multinational joint ventures for the large capital intensive products, whilst encouraging local industrialists to set up the manufacture of the simpler, lower technology components, such as exhaust pipes, rubber mats, seats, carpets, etc.

(b) Emphasis on the development of product groups which will necessitate the formation of each of the essential skill areas described above.

(c) Identification and development of selected product component groups which have the potential of supplying to regional or world markets for example, car airconditioners or spark plugs or brake linings. This may require joint venture with some of the leading multinational parts producers such as AC Delco of USA, Robert Bosch of West Germany and Lucas of the USA.

The Malaysian national car and HICOM's various projects have an important influence on the development strategy for the TE sector because the development momentum of these already start-up projects will have already set some definitive directions.

For example, it is clear that HICOM has already committed to using the Malaysian car project to :

(a) Rationalize the motorcar industry and reduce the multiplicity of makes to increase the base volumes needed to sustain the manufacture of components; and

(b) Create the demand for a component manufacturing industry supplying parts of the Proton Saga and not necessarily any other make.

Furthermore, HICOM has also decided on the list of components it will manufacture, preliminary list of local content programme for the Malaysian National Car and the time schedule for the production of automotive parts.This is provided in Appendices 32 (a), 32 (b) and 32 (c) respectively.

Separate from HICOM's list, there is also the Mandatory Deletion list which is given in Appendix 33.

There is no doubt that the above lists in Appendices 32 (a) and 33 must be coordinated into a coherent product priority list.

Broadly, the motor vehicle components parts industry can be classified into three groups according to user requirements as follows:

(a) Components dependent entirely on a sole user, e.g. a vehicle such as Proton Saga. A list of these components is given in Appendix 34.

(b) Components which are used by more than one manufacturer. Examples of this are given in Appendix 35.

(c) Standard components generally usable on most makes, including the Proton Saga. A list is given in Appendix 36.

Appendix 37 shows the preliminary list of automotive components discussed between Hicom and MACPMA last year while Appendix38 presents the local content programme for body stamping parts.

1.3.2 Product Strategies for 1985 - 1990

In the shorter term, 1985-1990, it is recommended that the TE sector's development should be aimed at the acquisition of the necessary skills and technologies as well as the backward linkages with the component, machinery and raw material processing industries.

Of a slightly lower weighting in importance during this period are the maximization of local content per sector and the market potential vis-a-vis the domestic market.

The strategy for the period, 1985-1990, should, therefore, be to focus on those products which will help in the skills formation and technology acquisition efforts. These would begin with the simpler component parts of the motor vehicle and gradually moving towards more complex and difficult components.

At the completed product level, it is recommended that the highest priority be given to the manufacture of :

(a) Passenger Cars at 1600 c.c.and below;
(b) Motor Cycles below 250 c.c.; and
(c) Small Buses

A more detailed of this is provided in Table 5.1.3.

TABLE 5.1.3

COMPLETE VEHICLE PRODUCTION - DEVELOPMENT PRIORITIES

Priority	1985-1990	1991-1995
1.	Passenger Cars around 1000 c.c. and 1200 to 1600 c.c.	-
	Motor Cycles below 250 c.c.	Medium sized Commercial Vehicles
	Small Buses	Large Buses
2.	Light Commercial Vehicles (especially dual purpose type)	Heavy Trucks
	Off-road vehicles	Agricultural Vehicles
	Passenger Cars above 1600 c.c.	
3.	Bicycles Special purpose vehicles	Special purpose vehicles (Such as garbage and oil trucks)

1.3.3 Development Strategies for 1991 - 1995

In the longer term, 1991-1995, the market viability factor becomes more important than other criteria such as skills formation and technology acquisition. This is based on the premise that the primary end objective of industrialization policy is to create a technologically efficient and economically viable manufacturing sector which can be the growth point for national economic growth.

Another characteristic of the longer term strategy is the start-up of the manufacture of the more sophisticated and complex components which will be facilitated by the formation of skills during the earlier period, 1985-1990.

At the end product level, the priority list is provided in Table 5.1.3.

1.3.4 Development Strategy For Motor Vehicle Parts Production

A time-phased programme (1985-1995) to develop the local manufacture of motor vehicle components is given in Table 5.1.4. It is based partly on the priority criteria described above and partly on the desirability of develcping the production of components which are made of :

(a) Rubber, because of the obvious natural local linkages and advantages;

Table 5.1.4

Motor Vehicle Industry Strategy for Component Parts Prop. ed Local

<table>
<tr><th>COMPONENT SUB-GROUPS</th><th>1985</th><th>1986</th><th>1987</th><th>1988</th><th>1989</th><th>1990</th></tr>
<tr><td>BODY/CHASSIS</td><td colspan="2"></td><td colspan="2">BUMPERS</td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2">EXHAUST PIPES & MUFFLERS</td><td colspan="2">FUEL TANKS & PIPES</td><td colspan="2"></td></tr>
<tr><td>TRIM</td><td colspan="2">RUBBER WEATHERSTRIPS & MATS</td><td colspan="2">CAR SEATS & CARPETS</td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2">ALL GLASS COMPONENTS</td><td colspan="2">FABRIC & PLASTIC/ INTERIOR TRIM</td><td colspan="2"></td></tr>
<tr><td>ENGINE</td><td colspan="2">RADIATOR & FAN BELTS, GASLETS</td><td colspan="2">TIMMING CHAINS, BELTS</td><td colspan="2">CYLINDER BLOCKS & CYL</td></tr>
<tr><td></td><td colspan="2">SPARK PLUGS, IGNITION COILS</td><td colspan="2">PISTONS, CONNECTING RODS, PISTONS RINGS</td><td colspan="2">ENGINES BEARINGS; MANIFOLDS</td></tr>
<tr><td>TRANSMISSION</td><td colspan="2">CLUTCHERS, COMPONENTS</td><td colspan="2">GEAR SHAFTS & RODS LEVERS</td><td colspan="2">TRANSMISSION BEARINGS</td></tr>
<tr><td></td><td colspan="2">UNIVERSAL JOINTS & DRIVE SHAFTS</td><td colspan="2"></td><td colspan="2">TRANSMISSION CASINGS</td></tr>
<tr><td>SUSPENSION, STEERING & BRAKING SYSTEMS</td><td colspan="2">BRAKE LININGS, & PIPES & PEDALS</td><td colspan="2">BRAKE VALVES, BOOSTERS, CYLINDERS</td><td colspan="2">STEERING JOINTS & ROD ENDS</td></tr>
<tr><td></td><td colspan="2">STEERING COLUMNS & WHEELS</td><td colspan="2">VEHICLE SPRINGS & SHOCK ABSORBERS</td><td colspan="2"></td></tr>
<tr><td>ELECTRICAL SYSTEM</td><td colspan="2">WIRING HARNESSES & ELECTRICAL CABLES</td><td colspan="2">ALTERNATORS, STARTERS MOTORS, WIPER MOTORS</td><td colspan="2">INSTRUMENT PANELS</td></tr>
<tr><td></td><td colspan="2">BATTERIES & REGULATORS</td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td>ACCESSORIES</td><td colspan="2">AIR CONDITIONERS</td><td colspan="2">RADIOS, STEREO SYSTEMS</td><td colspan="2"></td></tr>
<tr><td></td><td colspan="2"></td><td colspan="2">OTHER ELECTRONIC ACCESSORIES</td><td colspan="2"></td></tr>
<tr><td>GENERAL</td><td colspan="2">SCREWS, NUTS, BOLTS & WASHERS</td><td colspan="2"></td><td colspan="2"></td></tr>
</table>

SECTION 1

Table 5.1.4

y Strategy for Component Parts Proposed Local Manufacturing Programme

87	1988	1989	1990	1991	1992	1993	1994	1995
BUMPERS						SHEET METAL STAMPINGS, BODY PANELS & DOORS		
EL TANKS & PIPES								
R SEATS & CARPETS								
BRIC & PL STIC/ INTERIOR RIM								
MING CHAINS, BELTS		CYLINDER BLOCKS & CYLINDER HEADS			VALVES & VALVE SPRINGS		COMPLETE ENGINES MANUFACTURING	
STONS, CONNECTING DS, PISTONS RINGS		ENGINES BEARINGS; MANIFOLDS		CARBURETTORS, FUEL PUMPS		CAMSHAFTS & CRANKSHAFTS		
EAR SHAFTS & RODS LEVERS		TRANSMISSION BEARINGS		GEARS, CROWN WHEELS, PINIONS		COMPLETE TRANSMISSION SYSTEM MANUFACTURING		
		TRANSMISSION CASINGS						
BRAKE VALVES, OSTERS, CYLINDERS		STEERING JOINTS & ROD ENDS						
VEHICLE SPRINGS & SHOCK ABSORBERS				SUSPENSION ARMS & STRUTS			POWER STEERING SYSTEMS	
ERNATORS, STARTERS TORS, WIPER MOTORS		INSTRUMENT PANELS		VEHICLE INSTRUMENTS				
IOS, STEREO SYSTEMS								
THER ELECTRONIC ACCESSORIES								

SECTION 2

(b) Plastic, because this is a growth material in relation to other materials and much of the skills and technolgy is alreadly present locally; and

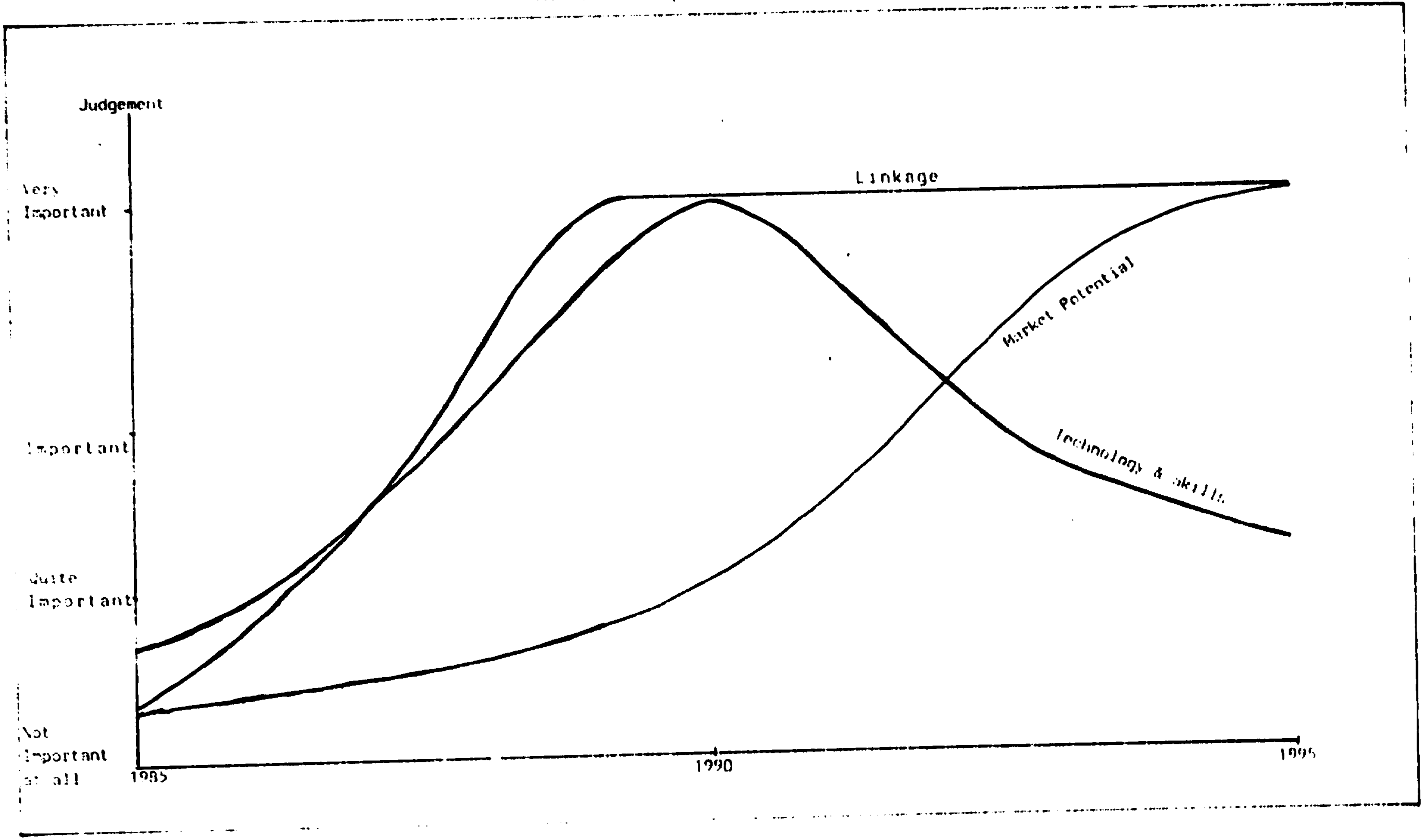
(c) Electronics, because of the fast growth of this as a component sub-group and because Malaysia already has a firm base in electronics manufacture in general.

1.3.5 Relative Development Criteria Path for the TEI

Chart 5.1.1 shows the relative development criteria path for the TEI which has been developed based on judgement from the experience of other countries. As can be seen, technology and manpower skills are very closely related to each other. At the early stages of development, it is important to stress more on high technology and manpower skill formation. This is particularly so in upgrading the present industry which is at its infancy in terms of technology and manpower development, and other related issues. Thus, during the period 1985 to 1990, it can be seen that both technology and manpower skills will be gaining importance and by 1990 they will reach their peak (very important) and subsequently taper to quite important position by 1995. Linkages, on the other hand, will increase steeply to very important position and retain its position till 1995. In other words, at all stages of development, inter-industry linkages in terms of multiplier effects to other industries within the national economy, particularly the upstream activities, should be placed at a very important

Chart 5.1.1

RELATIVE DEVELOPMENT CRITERIA PATH FOR THE TRANSPORT EQUIPMENT INDUSTRY



position. This is particularly so in reducing the leakage effects in terms of imports of intermediate TE products and related raw materials which will help to reduce the outflow foreign exchange. With higher linkages, the spinoff from the TEI will generate higher output values of other related industries.

In terms of market potential, the path will be slightly different from the others. As the industry becomes more advanced in terms of technology, manpower skills and linkages, market expansion is becoming more important. Given the limited domestic market of around 200,000 units for passenger cars, 70,000 units for commercial vehicles and 400,000 units for motorcycles, it is necessary to penetrate the export market rather than rely solely on its limited domestic market. Thus, it can be seen that market potential will increase quite gradually from a not so important position to a very important position by 1995. The gradual increase in the market potential path is mainly due to the adjustment in terms of quality and pricing of the products in order to gain international competitiveness. Good marketing network and strategies are required to expand the external market. This will be elaborated in Section VII on policies and programmes.

PART VI INVESTMENT PLANS

PART VI. Investment Plans

1.1 Introduction

According to the terms of reference, the objectives of this section of the report are as follows:

- to determine the extent of investment required to generate the planned domestic production over the next decade. This is to ensure that the total industry supply (together with envisaged import levels) is sufficient to meet the total market demand forecasted in Section IV.

- to determine the levels of new employment creation and value added generation resulting from these new investments.

It is noted that the investment plans in this section are done at the aggregated industry level only. As far as the terms of reference is concerned, this section does not include investment feasibility studies for specific product or product group. Such detailed feasibility analysis will be conducted by actual investors.

1.2 Aggregate Sectoral Investment Requirements and Employment Generation over 1985 to 1995

The estimation of the future capital investment requirement and employment generation prospects for the TE sector is based on the projected output growth and past trends of technological changes.

Table 6.1.1 shows the breakdown of projected output by TE industry sub-groups. As can be seen in the table, total gross output of the TE sector (excluding shipbuilding and locomotive repairs) is estimated to increase from $879.2 million in 1981 to $1,198.4 million in 1985 and $3,528.6 million in 1995 (at 1984 constant prices). The average annual growth rate of gross output during the period 1985 to 1995 is estimated at 11.4% (or 16.6% at current prices) as compared to 8.0% (or 16.0% at current prices) during the period 1981 to 1985.

The percentage distribution of output of the TE industry sub-groups is shown in Table 6.1.2 and Chart 6.1.1. The motor vehicle parts manufacturing industry is estimated to increase rather rapidly from 1.1% in 1968 to 23.4% by 1995. This rapid increase is mainly due to the high local content that is expected to be incorporated in the Malaysian Car and the high export potential of the motor vheicle parts and accessories. It is targeted that the ratio of output value of motor vehicle parts to total output value of motor vehicles will increase from 22% in 1981 to 30% by 1985, 45% by 1990 and 60% by 1995.

TABLE 6.1.1

ACTUAL & PROJECTED GROSS OUTPUT OF THE TRANSPORT EQUIPMENT INDUSTRY SUBGROUPS, (M$ MILLION)

		ACTUAL	GROWTH RATE (%) P.A.				PROJECTION		
		1981	1968-1981	1981-1985	1985-1990	1990-1995	1985	1990	1995
MOTOR VEHICLE BODIES (1)	CURRENT PRICES	74.9	24.4	12.9	16.8	15.1	121.7	264.5	534.3
	1984 PRICES	84.7	17.7	7.5	11.4	9.7	113.0	193.8	307.5
MOTOR VEHICLE (2)	CURRENT PRICES	454.9	15.9	12.0	15.2	13.4	820.8	1,665.3	3,122.9
	1984 PRICES	514.2	9.6	6.6	9.8	9.0	649.2	1,036.1	[illegible],522.4
MOTOR VEHICLE PARTS	CURRENT PRICES	98.9	42.2	20.3	24.5	19.8	207.1	619.5	1,528.7
	1984 PRICES	111.8	34.4	14.9	19.1	14.4	194.8	466.2	913.4
MOTORCYCLES & PARTS	CURRENT PRICES	100.1	16.6	18.0	20.2	19.9	194.1	487.0	[illegible],206.8
	1984 PRICES	113.2	9.1	12.6	14.8	14.5	182.0	362.9	714.2
BICYCLES, ETC & PARTS	CURRENT PRICES	48.9	7.7	<--------	7.2	------->	64.6	91.5	129.6
	1984 PRICES	55.3	1.8	<--------	1.8	------->	59.4	65.0	71.1
TOTAL TRANSPORT EQUIPMENT INDUSTRY	CURRENT PRICES	777.7	18.0	16.0	17.3	15.8	1,408.3	3,127.8	6,522.3
	1984 PRICES	879.2	11.6	8.0	12.1	10.7	1,198.4	2,124.0	3,528.6

ASSUMPTIONS : (1) USING THE PAST RATIO OF OUTPUT VALUE OF MOTOR VEHICLES, THE RATIO IS ESTIMATED TO INCREASE AT A SLOWER RATE OF 1.5% P.A. THUS, THE RATIO (AT 1984 PRICES) FOR 1985, 1990 AND 1995 IS 17.4%, 18.7% AND 20.2%, RESPECTIVELY.

(2) THE MOST LIKELY PROJECTED OUTPUT GROWTH RATES FOR PASSENGER CARS (LOCAL ASSEMBLERS & PROTON) AND COMMERCIAL VEHICLES ARE :

	P.C.	C.V.	AVERAGE
1981-1985	5.52	7.59	6.55
1985-1990	10.19	9.34	9.76
1990-1995	6.74	9.17	7.96

(3) USING THE PAST TREND OF CPI, THE AVERAGE CPI FOR 1985-1995 IS ESTIMATED AT 5.4% FIGURES AT CURRENT PRICES FOR 1985 ARE INFLATED AT A RATE OF 5.4% P.A.

(4) RATIO OF OUTPUT VALUE OF MOTOR VEHICLES PARTS TO O/P VALUE OF MOTOR VEHICLES AT 1984 PRICES IS TARGETTED TO ACHIEVE 30% IN 1985, 45% IN 1990 AND 60% IN 1995 DUE TO THE HIGHER LEVEL OF LOCAL CONTENT THAT WILL BE INCORPORATED IN THE MOTOR VEHICLES.

(5) THE MOST LIKELY PROJECTED OUTPUT GROWTH RATES FOR MOTORCYCLES AND PARTS ARE :

	M.C.	M.V. PARTS	AVERAGE
1981-1985	3.37	21.9	12.6
1985-1990	7.73	21.9	14.8
1990-1995	7.17	21.9	14.5

SOURCES : (1) TABLE 4.3.1
(2) APPENDIX 52

TABLE 6.1.2

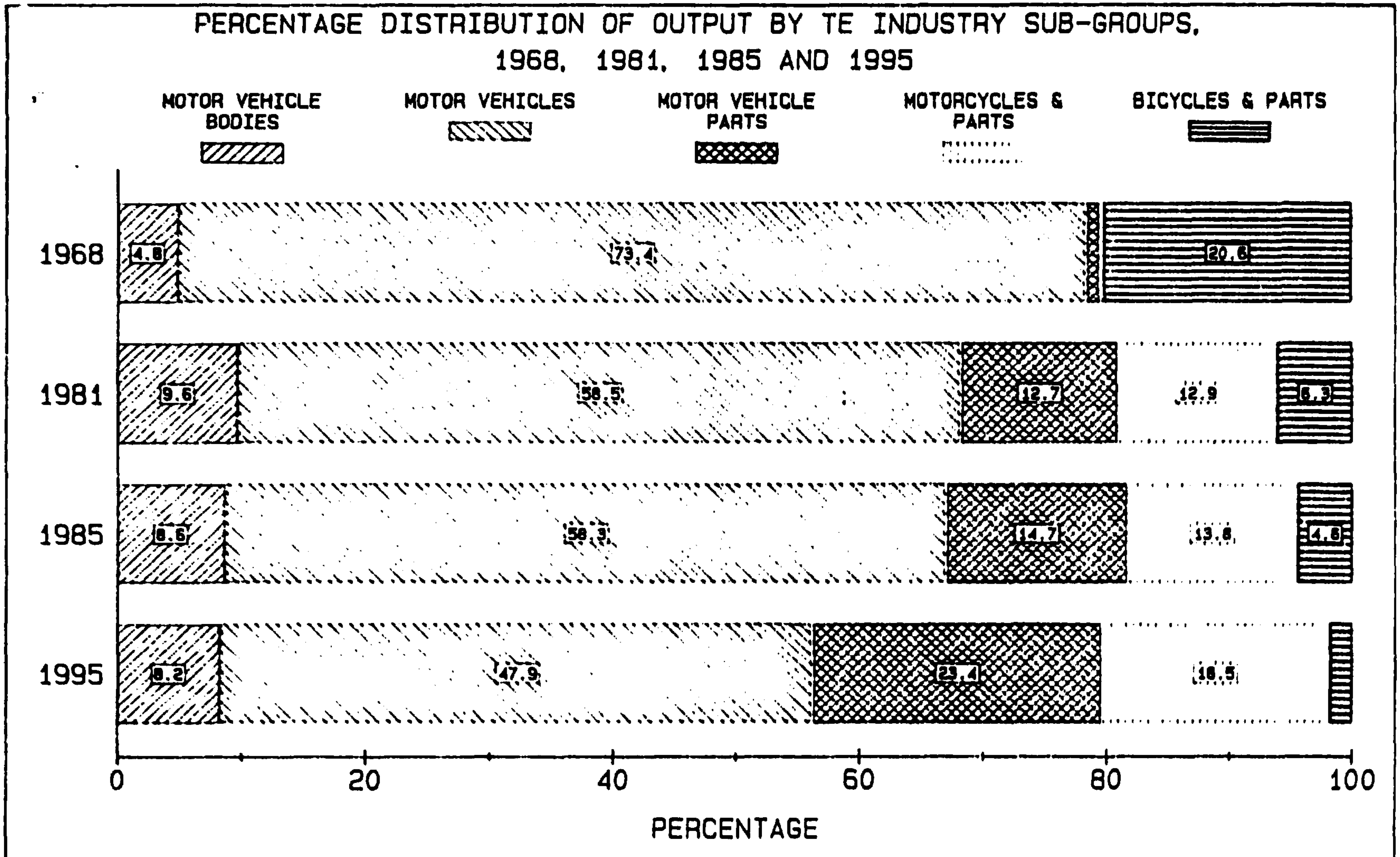
PERCENTAGE DISTRIBUTION OF OUTPUT, BY THE TEI SUBGROUPS, 1968, 1973, 1978, 1981 & 1995

	OUTPUT					
	1968	1973	1978	1981	1985	1995
MOTOR VEHICLE BODIES	4.8	6.5	9.4	9.6	8.6	8.2
MOTOR VEHICLES	73.4	70.1	64.7	58.5	58.3	47.9
MOTOR VEHICLE PARTS	1.1	1.7	9.0	12.7	14.7	23.4
MOTORCYCLES	-	13.2	10.4	12.9	13.8	18.5
BICYCLES, TRICYCLES, & PARTS	20.6	8.4	6.4	6.3	4.6	2.0
TEI	100.0	100.0	100.0	100.0	100.0	100.0

NOTE : CALCULATED FROM VALUES IN CURRENT PRICES

SOURCE : TABLES 3.1.3 AND 6.1.1

CHART 6.1.1


PERCENTAGE DISTRIBUTION OF OUTPUT BY TE INDUSTRY SUB-GROUPS, 1968, 1981, 1985 AND 1995
MOTOR VEHICLE BODIES
MOTOR VEHICLES
MOTOR VEHICLE PARTS
MOTORCYCLES & PARTS
BICYCLES & PARTS
1968
4.8
73.4
20.6
1981
9.6
58.5
12.7
12.9
6.3
1985
8.6
58.3
14.7
13.8
4.6
1995
8.2
47.9
23.4
18.5
0
20
40
60
80
100
PERCENTAGE

The motor vehicle assembly industry, on the other hand, will decrease from 73.4% in 1968 to 50.1% by 1995. The proportion of gross output value of other sub-groups to total TEI in 1995 is 10.1% for motor vehicle body building industry, 8% for motorcycles and 1% for bicycles

Table 6.1.3 summarizes the technological trends of the TEI. The key ratios for our analysis purpose are the output-capital ratio (Y/K), capital-labour ratio (Y/L) and capital-labour ratio (K/L). It is noted that the values have been adjusted to constant 1984 prices (using the deflators as seen in Appendix 51) and in current prices.

It is observed that output growth during the period 1968 to 1981 is slightly faster than capital (fixed assets) growth but more than three times higher than labour growth. Consequently, the Y/K ratio was increasing at a small average annual growth rate of 1.23%, while the K/L ratio has a higher growth rate of 4.8% at current prices (-0.93% at 1984 constant prices).

If we assume that the Y/K ratio increases at a constant rate of 1.23% during the period 1981 to 1985 (same average annual growth rate as the past trend) and it doubles to 2.46% during the period 1985 to 1995, then the ratio will increase to 4.03 by 1995. The higher increase in the Y/K ratio during the period 1985 to 1995 is mainly attributed to the higher emphasis placed on TEI, particularly with the start-up National Car Project.

TABLE 6.1.3

MALAYSIA : PAST GROWTH TREND OF OUTPUT, CAPITAL AND EMPLOYMENT RATIOS IN THE TE SECTOR, 1973 - 1981

		(1984 PRICES)		GROWTH % (P.A.)			RATIO	
		1968	1981	1968-1981	1981-1985	1985-1995	1985	1995
OUTPUT (Y)	CURRENT PRICES	90.7	777.7	18.0	16.0	11.4	1,408.3	6,522.3
($ MILLION)	1984 PRICES	211.7	879.2	11.6	8.0	16.6	1,198.4	3,528.6
CAPITAL (K)	CURRENT PRICES	31.2	229.1	16.56	14.6	15.2	394.5	1,618.4
($ MILLION)	1984 PRICES	72.9	251.0	10.24	7.5	10.1	335.7	875.6
LABOUR (L)		3,629	14,528	5.24	7.6	7.4	19,517	39,800
Y/K		2.9	3.4	1.23	1.23	2.46	3.57	4.03
Y/L	CURRENT PRICES	25.0	53.5	6.00	7.8	8.5	72.16	163.9
($ '000)	1984 PRICES	58.3	60.5	0.28	0.37	3.7	61.4	88.66
K/L	CURRENT PRICES	8.6	15.8	4.80	4.0	6.6	18.5	25.0
($ '000)	1984 PRICES	20.1	17.8	-0.93	-0.93	2.5	17.2	22.0

NOTES : (1) PROJECTED OUTPUT IS COMPILED FROM TABLE 6.1.1
(2) OUTPUT-CAPITAL RATIO IS ASSUMED TO GROW AT 1.23 % CONSTANT RATE FROM 1981 TO 1985 AND IT DOUBLED TO 2.46 % DURING THE PERIOD 1985 - 1995
(3) CAPITAL-LABOUR RATIO IS ASSUMED TO DECREASE BY 0.93 % DURING 1981 -1985 & PICK UP AGAIN TO 2.5 % DURING 1985 - 1995

On the other hand, the K/L ratio is expected to decrease at 0.93% per annum until 1985. The negative growth rate during this period is due to the prolonged recession that has been affecting the industry. There is not much reinvestment and new investment for expansion purpose by the existing TE manufacturing and assembly firms. Moreover, the National Car Project has also created a pessimistic economic environment or uncertainties for the existing assemblers to reinvest in the industry. Subsequently, the ratio increases to $22,000 per worker by 1995 or an addition of $4,200 over that of the 1981 figure. This shows an average annual growth rate of 2.5% (at 1984 constant prices). This is mainly caused by the Proton's high investment on the TEI.

The calculation of the implied capital investment and employment over the period 1985 to 1995 is based on the above projected values of the Y/K ratio and K/L ratio as well as the projected total output value (Y). As can be seen in Table 6.1.3, the most likely total capital investment in fixed assets is estimated to increase to $875.6 million (at 1984 prices) or $1,618.4 million (at current prices) by 1995. The implied growth rate of total investment during the period 1985 to 1995 is projected at 10.1% (at constant 1984 prices) which is slightly lower than the 1981 figure (10.24%).

Total employment created in the TE sector is estimated to increase proportionately from 14,528 in 1981 to 19,517 by 1985 and 39,800 by 1995, showing an implied employment growth rate of about

7.4% over the period 1985-1995. In absolute terms, about 20,283 new jobs are expected to be created over a period of 15 years.

Assuming that the past pattern of distribution of fixed assets (land and buildings, transport equipment, machinery and equipment, and other capital expenditure) of the TE sector remains unchanged over the next decade, the breakdown of fixed assets is shown in Table 6.1.4. On an average, land and building comprise about 55% of the total fixed assets, followed by machinery and equipment (39%), transport equipment (3.4%) and other capital expenditure (2.5%). These breakdown figures can be used as a rough guide for future investment planning analysis.

1.3 Investment Requirements And Employment Generation By Industry Subgroups Over The Period 1985 to 1995

At the industrial subgroup levels, the same method is used to estimate the investment and employment requirement over the next decade. However, it is noted that at the disaggregated levels, the projected figures could be less reliable due to factors such as change in technology, policies and other structural factors that could affect the industry. As far as the projections are concerned, the Proton project is also taken into consideration. However,owing to the unavailability of certain vital data, the accuracy of the projections could not be ascertained.

TABLE 6.1.4

PENINSULAR MALAYSIA : PERCENTAGE DISTRIBUTION OF FIXED ASSETS BY TYPE IN THE TE SUBGROUPS, 1978

INDUSTRY	LAND & BUILDING	TRANSPORT EQUIPMENT	MACHINERY & EQUIPMENT	OTHER CAPITAL EXPENDITURE	TOTAL FIXED ASSETS
MANUFACTURING OF MOTOR VEHICLE BODIES	35.5	20.5	39.0	5.0	100.0
MANUFACTURING & ASSEMBLY OF MOTOR VEHICLES	59.8	1.9	36.9	1.3	100.0
MANUFACTURING OF MOTOR VEHICLE PARTS	47.2	4.5	44.3	3.9	100.0
MANUFACTURING & ASSEMBLY OF MOTORCYCLES & PARTS	54.0	2.9	38.9	4.2	100.0
MANUFACTURING & ASSEMBLY OF BICYCLES, TRICYCLES, TRISHAWS & PARTS	52.6	3.8	39.0	4.6	100.0
TEI (1)	55.1	3.4	39.0	2.5	100.0

NOTES : (1) EXCLUDES SHIPBUILDING & LOCOMOTIVE REPAIRS

SOURCES : CALCULATED FROM TABLE 3.1.16

Table 6.1.5 shows the Y/K ratio, K/L ratio and the growth rates for the major industry groups for 1968 and 1981. It is observed that the growth rates of Y/K and K/L vary widely amongst the TEI subgroups from -9.86% to 14.2%. The decline in (Y/K) for motor vehicle bodies, motor vehicle parts, motorcycles and parts, and bicycles and parts could be due to the underutilisation of the production capacity or the high capital utilisation. However, in the case of motor vehicles, the positive growth rate of 6.7% p.a. is attributed to the high plant utilisation level as well as the low reinvestment and new investment during the same period.

The decline in K/L ratio for motor vehicles over the period 1968-1981 is likely to continue till 1985 but subsequently pick up again in view of the high investment of the National Car Project. Chart 6.1.2 shows the growth path of K/L ratio by TEI sub-groups.

The percentage distribution of output, capital and employment by TE industry subgroups for 1981 is shown in Table 6.1.6. As can be seen, the highest output value generated, and capital and labour utilisation is registered in the motor vehicle assembly industry. However, with the existence of the National Car Project, this scenario will be changed, emphasizing more on component parts manufacturing then mere assembly services. Given the high multiplier effect of the TE sector (more than 2 times the original effect), the other downstream activities will be further upgraded in terms of technology. Thus, investment on these upstream industries, particularly the component parts manufacturing industry will be increased.

VI.12

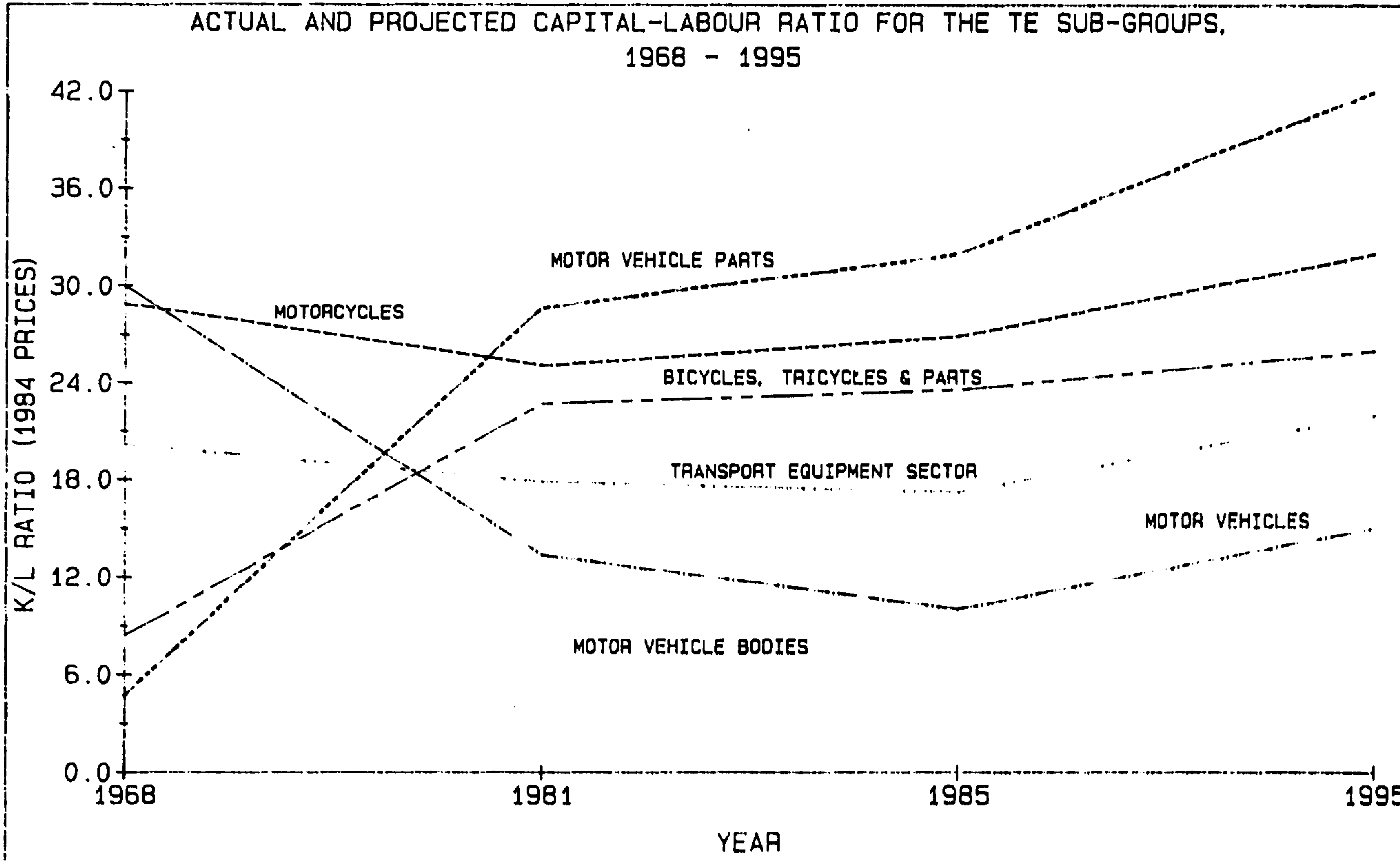
TABLE 6.1.5

ESTIMATED (Y/K) AND (K/L) RATIOS BY MAJOR TE INDUSTRY SUBGROUPS, 1968 - 1981

INDUSTRY	Y/K			K/L ($'000)		
	1968	1981	% P.A.	1968	1981	% P.A.
(a) CURRENT PRICES						
MOTOR VEHICLE BODIES	8.77	8.31	-0.41	0.96	5.17	13.83
MOTOR VEHICLES	2.42	5.65	6.74	12.84	11.77	-0.67
MOTOR VEHICLE PARTS	3.31	1.17	-7.7	2.01	25.40	21.50
MOTORCYCLES & PARTS	4.1 (1)	3.90	-6.23	14.97 *	22.20	5.00
BICYCLES & PARTS	6.48	1.68	-9.86	3.58	20.10	14.20
AVERAGE TEI						
(b) 1984 PRICES (2)						
MOTOR VEHICLE BODIES	8.77	8.31	-0.41	2.25	5.85	7.63
MOTOR VEHICLES	2.42	5.65	6.74	29.96	13.31	-6.05
MOTOR VEHICLE PARTS	3.31	1.17	-7.7	4.70	28.70	14.90
MOTORCYCLES & PARTS	4.1 *	3.90	-6.23	28.9 *	25.07	-1.8
BICYCLES & PARTS	6.48	1.68	-9.86	8.37	22.72	8.00
AVERAGE TEI						

NOTES : (1) AT 1973
(2) VALUES ADJUSTED TO 1984 PRICES

CHART 6.1.2



VI.13

TABLE 6.1.6

PERCENTAGE DISTRIBUTION BY OUTPUT, CAPITAL AND EMPLOYMENT BY TE INDUSTRY SUBGROUPS, 1981

	OUTPUT	CAPITAL	LABOUR
MOTOR VEHICLE BODIES	9.6	3.9	12.0
MOTOR VEHICLES	58.5	35.2	47.1
MOTOR VEHICLE PARTS	12.7	37.0	23.0
MOTORCYCLES	12.9	11.2	7.9
BICYCLES, TRICYCLES, ETC & PARTS	6.3	12.6	9.9
TEI	100.0	100.0	100.0

SOURCE : TABLE 3.1.3

PART VII POLICIES AND PROGRAMMES

PART VII POLICIES AND PROGRAMMES

1.1 Introduction

This section highlights the use of various policy instruments and programmes which are aimed at solving the problems and realising the set of development objectives, strategic plans and targets outlined in Parts II, III, V and VI.

Although the policy and programme recommendations are categorised under separate headings, they should be viewed as complementary sets of policy instruments. As such, their separate individual and multiplier effects on the TE sector and the rest of the manufacturing economy should be noted.

Because the National Car Project has created new implications for the automotive industry, the range of policy recommendations depends on the model permutations that the government has in mind but has yet to disclose at this stage. We therefore first review the implications of two different development directions for the automotive industry using the National Car Project as the focal point and provide specific policy recommendations within such a framework accordingly.

This is then followed by other policy recommendations which are generally required regardless of what final market structure the government desires for the automotive industry.

Because of the need to summarise and highlight some major recommendations in the policy section, there will be some overlapping and repetition.

1.2 Specific Policy and Programme Recommendations

1.2.1 Policy Recommendations Under Different Scenarios for the Automotive Industry

Although the history of the motor vehicle industry in Malaysia began as early as 1926 it has yet to develop into a significant national industry with the necessary international competitive edge.

What has been lacking during the previous decades of development is the formulation of long-term directions and strategies in the development of the automotive sector.

Whilst the original main objectives in establishing the local motor vehicle assembly industry were to promote import-substitution, save foreign exchange, and to create employment, the future development of the industry must stress on export potential and the technology multiplier effects on the rest of the economy. This means rationalising the supportive component and maintenance industry. In this context, the national car project must be considered to be the focal point for the automotive industry.

However, this new start-up project has caused grave concern among local assemblers, traders and component manufacturers, particularly with regard to their future role and participation in the motor vehicle industry.

1.2.2 Implications to Industry

The national car project is expected to aggravate the following problems by increasing the total output of the industry:

(a) High Production Costs

Both local motor vehicle assemblers and component manufacturers alike have been unable to achieve economies of scale in production because of the small domestic market.

A major reason for the high cost of local assembly is the high overhead costs resulting from the low volume of production of local assembly plants. For four wheelers, the average plant output of 10,700 units (1983 figure) is not only low by world standards but there is also a wide gap in the output of the largest plant (35,800 units) and that of the smallest plant (149 units only).

The high cost of local assembly can also be attributed to the high costs of locally manufactured components which make up approximately 20% of production costs in the case of passenger cars. Again, high production costs (due to low production volumes) of component parts manufacturers is one of the main reasons behind the high costs of locally manufactured components.

(b) Excess Plant Capacity

Local automobile assemblers and component parts manufacturers are currently operating at less than the installed capacity adding further to the increasing costs of production.

(c) Displacement of Exisitng Assemblers

If various discriminatory and protective measures are used to promote and subsidise the National Car Project, quite a number of existing assemblers will be displaced.

(d) Adverse Impact on Investment

The unilateral initiative and activities of Proton in the automotive industry has implications not only for the the motor vehicle industry but also for other sectors of the Malaysian economy. Already, the uncertainties created by the National Car Project have considerably held back reinvestment and new investment in the automotive industry. What must be avoided is adverse spinoff effect on investment in other sectors of the economy.

1.3 Policy Recommendations Under Conflict and Co-existence Scenarios

Although the national car project is already onstream, HICOM has yet a clear blueprint for the future development path of the whole industry.

Thus, the question as to what future role the existing local assembly industry is supposed to have is not clear.

In retrospect, this penetration of the domestic automotive industry by HICOM is strategically unsound for the national economy although it may benefit some sections of the industry. But what matters utlimately is whether the whole economy gains as the national car project involves a high social cost.

1.3.1 Two Projected Scenarios

We project two scenarios and review the policy implications:

Scenario I: Non Co-existence between Proton and existing assemblers

Scenario II: Co-existence between Proton and existing assemblers

The demand supply projections used in the different scenarios are based on revised estimates of the AFM submission to MIDA.

Scenario I

As shown in Chart 7.1.1, assuming that there is no co-existence between Proton and local assemblers, Scenario I is based on the premise that Proton intends to sell all its planned production in the limited small domestic market by imposing various government regulatory policies and protectionism. Because of differential protection given, Proton will enjoy monopoly rent and this would definitely create price differential between the categories of cars. An artificial monopoly market for the 1200cc-1600cc range is created by reducing the number of makes and models of other assemblers. Instruments like government directives, artificial market forces and protectionism (such as escalating the tariff rates on existing assemblers' CKDs and imposing none on Proton Saga are expected to be adopted to restrict the number of makes and models) (Chan 1984).

Based on the 3 sets of domestic demand projections (pessimistic, most likely and optimistic) for passenger cars between 1200cc-1600cc, the forseeable effects and implications of Scenario I are summarised as follows:

(a) Under the pessimistic demand situation, all the existing 6 local assemblers of the 1200cc-1600cc range of passenger cars, namely, Asia Automobile Ind. Sdn. Bhd. (AAI), Associated Motor Industries Sdn. Bhd. (AMIM), Kelang Pembena Kereta-Kereta Sdn. Bhd. (KPKK), Oriental Assemblers Sdn. Bhd/ General Motor Malaysia Sdn. Bhd. (OA/GMM), Assembly Services Sdn. Bhd. (ASSB) and Tan Chong Motor

Chart 7.1.1

Scenario 1

NO CO-EXISTENCE BETWEEN PROTON AND LOCAL ASSEMBLERS

PROTON SAGA
1200 - 1600c.c.

OBJECTIVE

To Sell all its planned production

LIKELY DRASTIC STRATEGIES TO BE IMPLEMENTED BY THE GOVERNMENT

Assumptions:
(a) 80% of production of p.c. in the 1200cc-1600cc range. On an avg. 80% of the present capacity (82.9%) or 66.3 % level of production utilisation is used to produce this cc range.
(b) maintain existing level of production as at 1983
(c) no exports

Step 1
Increase tariff & duties on CKD packs

Step 2
Impose import quotas on CKD packs

Step 3
Complete ban or sharp increase in import duty on CBU cars in the 1200-1600 c.c. range

Step 4
Restructuring indirect taxes such as excise duty & road tax in favour of engine capacity range of Proton Saga

Step 5
Exempt Proton Saga from any or part of duties/taxes

Step 6
Provide all government incentives

Step 7
Moral persuasion e.g. civil servants with govt. car loans should buy Proton Saga

PRICE ADVANTAGE FOR PROTON SAGA

IMPLICATIONS TO LOCAL ASSEMBLERS, TRADERS & CONSUMERS

Case A

Pessimistic Dd Projection (refer Table 4.3.2)

1. Remaining demand for locally assembled cars

   1985 - 75,856
   1989 - 11,635
   1994 - 28,285

2. The avg. production capacity to be used to produce passenger cars (1200-1600cc) is as follows:

   1983 - 59.9
   1985 - 62.5
   1989 - 9.6
   1994 - 22.5

3. The overall avg. plant utilisation for both c.v and p.c is as follows:

Case B

Most Likely Dd Projection (refer Table 4.3.2)

Remaining demand for locally assembled cars

1985 - 77,697
1989 - 18,738
1994 - 46,129

The avg. production capacity to be used to produce p.c. (1200-1600cc) is as follows:

1983 - 59.9
1985 - 64.0
1989 - 15.4
1994 - 38.0

The overall avg. plant utilisation for both c.v. and p.c. is as follows:

Case C

Optimistic Dd Projection (refer Table

Remaining demand for locally assembled cars

1985 - 79,554
1989 - 26,180
1994 - 65,722

The avg. production capacity to be used to produce p.c. (1200-1600cc) is as follows:

1983 - 59.9
1985 - 65.5
1989 - 21.6
1994 - 54.1

The overall avg. plant utilisation for both c.v. and p.c. is as follows:

2. The avg. production capacity to be used to produce passenger cars (1200-1600cc) is as follows:

1983 - 55.9
1985 - 62.5
1989 - 9.6
1994 - 22.5

3. The overall avg. plant utilisation for both c.v and p.c is as follows:

1983 - 69.1
1985 - 80.9
1989 - 49.5
1994 - 66.4

4. The Market share of other makes decreases from 100% in 1984 to,11% by 1989.

The avg. production capacity to be used to produce p.c. (1200-1600cc) is as follows:

1983 - 59.9
1985 - 64.0
1989 - 15.4
1994 - 38.0

The overall avg. plant utilisation for both c.v. and p.c. is as follows:

1983 - 69.1
1985 - 83.3
1989 - 52.3
1994 - 85.4

The market share of other makes in the range 1200-1600 c.c. range decreases sharply from 100% in 1984 to 16% by 1989.

The avg. production capacity to be used to produce p.c. (1200-1600cc) is as follows:

1983 - 59.9
1985 - 65.5
1989 - 21.6
1994 - 54.1

The overall avg. plant utilisation for both c.v. and p.c. is as follows:

1983 - 69.1
1985 - 85.6
1989 - 64.4
1994 - 106.3

The market share of other makes decreases from 100% in 1984 to 22% by 1989.

Under pessimistic demand situation, the 6 existing plant producing p.c 1200cc-1600cc range will have to stop producing this cc range after 1988.

Under mostly likely or optimistic view, one or two of the top sellers (i.e. Tan Chong Motors and Assembly Services) can operate at a reasonable economical level.

The following are the costs/losses to the local assemblers, traders and consumers:

(a) Loss of Total Investment worth $169,853,000

AAI	-	$ 11,566,000
AMI	-	$ 28,778,000
ASSB	-	$ 49,385,000
KPK	-	$ 14,876,000
OA/SB	-	$ 9,848,000
TCM	-	$ 55,500,000

(b) Total Unemployment of 19,001

In assembly 6,801 employees
In marketing & trading 12,200

(c) Loss of established marketing network

There are four main channels, namely Franchise dealers, Franchise contract assembly, dealers and Dealer contract. Each channel has many marketing companies and branches throughout Malaysia.

(d) Loss of goodwill and technology transfer

Most of the assemblers have more than 10 years of experience in this industry.

(e) Loss of consumers' sovereignity

No freedom of choice

SECTION 2

Assemblies Sdn. Bhd. (TCMA) will have to stop producing or reduce production of this cc range. Assembly plants that produce mainly passenger cars of 1200cc-1600cc range (e.g. KPKK and OA/GMM) will have to shut down or have to start assembling commercial vehicles or passenger cars below 1200cc and above 1600cc range. For assembly plants with dual purposes (assembling both commercial vehicles and passenger cars), the overall level of plant utilisation in 1989 will still remain too low (i.e. 50%) to operate at an economical level.

(b) Under the most likely and optimistic demand projections, only the top producers (i.e.,Tan Chong Motor Assemblies Sdn. Bhd. and Assembly Services Sdn. Bhd.) will be able to operate at a reasonable economical level. The overall average level of plant utilisation (both passenger cars and commercial vehicles) in 1989 is between 52.3% to 64.4% depending on the demand projections.

Basically, if the other makes are not allowed to survive, there will definitely be high costs and losses incurred by the assembly industry, in particular the 6 assemblers producing passenger cars within 1200 - 1600 cc range.

The 6 assemblers have invested more than 10 years in the industry with total capital investment to date amounting to about $170 million (excluding investments on showrooms and after sales establishments which is more than 3 times the investment mentioned). These assemblers have also taken the initiative and risks in building the present marketing network, status, technological level and credibility in the industry. A total of 19,000 people are employed directly and indirectly in the industry (comprising 6,800 employees in assembly and 12,200 employees in marketing and trading). All the industry's investments and efforts will be wiped out should the existing local assemblers be forced to shut down.

The consequences to the component parts' manufacturers and traders are (a) component parts' manufacturers will lose all their present OEM buyers (b) traders will lose their business and employment.

Consumers, on the other hand, will also suffer loss of psychic income due to the restricted model range of passenger cars available within the 1200cc-1600cc range. Because of the limited substitution possibility (due to limitation of purchasing power), it is highly unlikely that consumers will be able to switch to other higher priced cars of higher cc. range as the demand for such cars is not very price elastic. The restricted commodity choice and substitution also affect consumers' preferences.

Proton (Perusahaan Otomobil Nasional) is a Malaysian joint-venture company with two private Japanese companies, Mitsubishi Motors Corporation (MMC) and Mitsubishi Corporation (MC). The Heavy Industries Corporation of Malaysia (HICOM) has 70% equity share and the other two Japanese companies have 15% each. The Japanese companies will enjoy monopoly rent from the protected market at the expense of the other existing assemblers which are not included in the Malaysian car programme. The country is likely to experience an outflow of foreign exchange due to profit repatriation and expenditure on import of technology and components. Although this may seem to contradict the country's overall industrialisation strategy to save foreign exchange, this approach is supposed to benefit the country with technology transfer.

The existing component makers will be displaced if they are excluded from the list of approved manufacturers of components, particularly original equipment, for the Malaysian car .

If it is decided that existing assemblers, at least for the 1200 to 1600 c.c range, are to be displaced we recommend that the government should provide an explicit time schedule, say a 5 year period, for phasing them out. This explicit programme would give them time to adjust and to diversify. Such a clear-cut policy is prefered to the present situation in which there are no definite guidelines forthcoming.

Scenario 2

The co-existence model could be a viable and feasible programme in the context of the Malaysian Incoporated concept propounded by the government itself.

Scenario 2 is based on the assumption that Proton plans to achieve 66% of its planned production and local assemblers intend to maintain their present average level of plant utilization

Chart 7.1.2

Scenario 2

CO-EXISTENCE BETWEEN PROTON AND LOCAL ASSEMBLERS

OBJECTIVE
To have a Fair Free Market System

Minimum government regulatory policies and protectionism

1. No extra protection for Proton Saga
2. No price advantage for Proton Saga
3. No further increase in tariff and duties on CKD packs
4. No imposition of import quotas on CKD packs
5. No government directives/moral persuasion

PROTON's VIEW

To achieve 66% sales of its planned production* (refer Table 4.3.3)

IMPLICATIONS TO LOCAL ASSEMBLERS

(a) Remaining demand for locally assembled cars

Year	Pessi-mistic	Most Likely	Optimis-tic
1985	75,856	77,697	79,554
1989	44,003	51,106	58,548
1994	69,085	86,929	106,552

(b) Market share of locally assembled cars

Year	Pessi-mistic	Most Likely	Optimis-tic
1984	100%	100%	100%
1985	93%	93%	94%

LOCAL ASSEMBLERS's VIEW

To maintain the present level of plant utilization of passenger car (1200-1600c.c) of 66.3% or 80,160 units per annum. (refer Table 4.3.4)

IMPLICATIONS TO PROTON

(a) Remaining demand for Proton Saga

Year	Pessi-mistic	Most Likely	Optimis-tic
1985	8,978	10,819	12,676
1989	34,457	41,560	49,002
1994	75,907	93,751	113,344

(b) Market share of Proton Saga

Year	Pessi-mistic	Most Likely	Optimis-tic
1985	11%	13%	15%
1989	32%	36%	40%

1989	44,003	51,106	58,548
1994	69,085	86,929	106,552

(b) Market share of locally assembled cars

Year	Pessi-mistic	Most Likely	Optimis-tic
1984	100%	100%	100%
1985	93%	93%	94%
1989	41%	45%	48%
1994	47%	52%	57%

(c) Avg.production capacity used to produce passenger cars (1200-1600cc)

Year	Pessi-mistic	Most Likely	Optimis-tic
1984	59.6	59.6	59.6
1985	62.5	64.0	65.5
1989	36.2	42.1	48.2
1994	56.9	71.6	87.7

1989	34,457	41,560	49,002
1994	75,907	93,751	113,344

(b) Market share of Proton Saga

Year	Pessi-mistic	Most Likely	Optimis-tic
1985	11%	13%	15%
1989	32%	36%	40%
1994	51%	56%	61%

(c) Excess supply of Proton Saga

Year	Pessi-mistic	Most Likely	Optimis-tic
1985	(3,478)	(5,319)	(7,176)
1989	160,743	53,640	46,198
1994	44,093	26,249	6,656

(d) Percentage of sales to planned production of Proton Saga

Year	Pessi-mistic	Most Likely	Optimis-tic
1985	163.2%	196.7%	230.5%
1989	36.2%	43.6%	51.5%
1994	63.2%	78.1%	94.4%

Under most likely and optimistic views, the majority of the local assemblers can survive. But the question posed is "is it economical to produce at such level of utilisation especially at pessimistic view?" Eventually some uneconomical plants will have to shut down.

It will take about 10 years for Proton to achieve its target if it base only on its domestic market. However, if the government can stimulate demand up to 185,722 units of passenger in that cc range by 1994 (as in our optimistic demand projection) then Proton and local assemblers will both have sufficient share of the domestic market

How Proton and local assemblers can co-exist with minimum adverse effects?

See RECOMMENDATIONS

Note: * Estimated percentage sales Proton need to achieve in order to be viable.
Source: Revised from AIM Submission

SECTION 2

for 1200cc-1600cc cars at 66.3% or 80,160 units per annum (local assemblers are willing to compromise by not further expanding its capacity from 1984 to 1994). The 66% sales of the planned production of Proton is only a working assumption for discussion purpose (Chart 7.1.2).

The effects and implications of Scenario 2 on local assemblers are summarised below:

(a) There will be only 75,856 units to 79,554 units and 44,003 units to 58,548 units of the remaining market of passenger cars in the 1200cc-1600cc range left for local assemblers to penetrate in 1985 and 1989 respectively, depending on the projections;

(b) The local assemblers will only achieve about 62.5% to 65.5% production capacity utilisation (passenger cars within 1200cc-1600cc range) at all level of projections in 1985. By 1989, under the pessimistic demand situation, the level of plant utilisation will drop to less than 36.2%; and

(c) The market share of locally assembled cars of passenger cars 1200cc-1600cc range will decrease sharply from 100% to 41% by 1989 and slowly increase again to 47% by 1994 under the pessimistic demand situation.

1.2.5 Implications of Scenario 2

If demand under the pessimistic situation occurs, some uneconomical plants will have to stop producing this cc range. On the other hand, under the most likely and optimistic views, the majority of assemblers will be able to survive.

If local assemblers intend to maintain the present level of production of 72,378 units for the 1985-1994 period, the effects on Proton are as follows:

(a) Proton can sell all its planned production in 1985, 36.2% to 51.5% in 1989 and 63.2% to 94.4% in 1994 depending on the projections.

(b) There will be excess demand of Proton Saga which ranges from 3,478 to 7,176 units of Proton Saga in the first year of operation. However, with the increase in the production of Proton Saga to 95,200 units in 1989, the excess supply will be around 46,198 units to 60,743 units depending on the projections. The situation will improve after 1989 if Proton does not increase its planned production of 120,000 units.

Given such situations, Proton will take about 10 years to achieve its target if it base only on its domestic demand (under optimistic situation).

The question posed is " at what level of production should both parties operate to minimise the adverse effects and to promote efficiency and viability for the whole industry together?"

1.2.6 Production Planning Strategies

It is not wise to displace the role of the private sector in the automtive assembly industry because of the adverse implications to the overall investment climate in the country.

Secondly, this is contrary to the policy of privatisation and Malaysian Incorporated which the Government has just implemented.

In order for both the existing assemblers and Proton to co-exist as shown in Scenario 2, the following recommendations are suggested:

i) If the most likely demand situation occurs, the recommendations are:

(a) During the most critical years (1985-1988), in order for both the assemblers and Proton to be viable, it is recommended that Proton sells less of its planned production to our small limited domestic market which is already saturated. It should consider exporting its production to foreign markets, particularly Asean and other developing countries.

At the same time, the Government should use its influence to negotiate for export quotas into heavily protected markets of developed countries. Even barter trading could be considered in promoting the penetration of foreign markets for the Proton Saga.

The role of HICOM should be in the export market in line with the government's policy to encourage export-oriented industrialization.

(b) We also recommend that Proton delays its expansion plan during 1988-1994 unless and until the export market is established. For instance, Proton should consider maintaining its 1988 full capacity, i.e., production level of 85,000 units per annum for 1988-1994;

(c) Proton should not create any artificial market forces such as reducing the number of makes and models through new regulations. For instance, some of these could include discriminatory use of loans and hire purchase facilities in order to promote markets for Proton Saga. Such measures, essentially hidden subsidies of some sort, introduce further distortions into the market system and increases the opportunity cost of the National Car Project further.

ii) On the other hand, if the pessimistic demand situation is more likely to occur, the following recommendations:

(a) as some smaller plants would not be producing passenger cars or would be shutting down due to diseconomies of scale, the government should at least allow these plants to convert and diversify into component parts manufacturing (especially components that are not presently manufactured by the existing manufacturers) using the same premises as well as utilising the idle capacity and input factors;

(b) allow these smaller plants to participate actively by giving them a role in supplying components to the Malaysian Car.

iii) If the ultimate objective is to displace the existing local assemblers, their contribution over the past 15 years could be "compensated" by some positive participative role in the industry. Thus:

(a) giving the assemblers the opportunity to participate in the Malaysian car project by allowing them to supply Original Equipment to Proton;

(b) changing its policy to allow the existing local assemblers to participate actively in the manufacturing of Proton Saga by giving them equity share of the Project. This is in line with the concept of Malaysian Incorporated.

(c) removing restrictions on assembly licences and bonded areas. This would allow existing assemblers to manufacture component parts using the same plant and premises thereby enabling the utilisation of the existing labour force, idle capacity and input factors.

The existing component parts manufacturers who have taken the initiative to develop the industry should also be allowed to supply components to Proton.

Component suppliers should be given full government support to work out viable joint-venture within the ASEAN region. This is in line with the government policy to promote manufacturing exports.

The traders and dealers who have been actively promoting the industry should be given priority in the distribution network of Proton.

1.3 Manpower Development Policies and Programmes

One of the most serious constraints on the rapid development and expansion of the motor vehicle and its related industries is the scarcity of the required skills and particularly the engineering traditions.

At the same time, the development of adequate good quality engineers, technicians, mechanics, machinists and other skilled and semi-skilled workers within a short space of time remains one of the more complex and difficult issues to be dealt with in establishing a comprehensive local motor vehicle industry. [illegible] should be noted that, in comparison, the industrialized Western countries have taken over a century [illegible] this important national asset [illegible] of [illegible]neering and manufacturing skills and [illegible]ditions.

The strategies to develop the manpower for the TE sector, should really form part of the overall national manpower plan. Broadly, the specific strategies required for the TE sector can be classified as follows:

(a) Basic Skills Formation

Production of adequate, good quality personnel from the institutions of learning. This includes the vocational schools, universities, polytechnics, technical colleges and other educational institutes. This will ensure a steady stream of personnel supply to the industry.

(b) Skills Reinforcement and Improvement

Provision of good quality, comprehensive training on-the-job and off-the-job for TE sector personnel at all levels. This will ensure the on-going development and improvement of these people.

(c) Skills Enhancement and Extension

This takes the skills reinforcement training objective further to import new skills which are necessary for the personnel's development, in line with the further development and expansion of the industry. This may include some element of retraining.

1.3.1 Basic Skills Formation

Traditionally, within the local educational system a great deal of emphasis has been placed on education of a theoretical and general nature. It is recommended that new emphasis now needs to be placed on developing the more industrially-oriented institutions such as polytechnics, technical colleges and vocational schools.

Amongst the strategies which have been adopted in advanced countries and which are also applicable to Malaysia are:

i) Development of closer cooperation between the universities and other educational institutions and industry through:

   (a) joint research and development programmes which may be funded by industry or government;

   (b) secondment of practicing industrial managers and engineers for brief teaching engagements in universities and colleges and vice versa for teaching staff;

   (c) creation of "sandwich courses" which require students to spend several months or up to a year in between studies out in "foster" industrial companies;

(d) creation of "teaching company" arrangements which are similar to the teaching hospital concept and allow good practical training of students even before they graduate;

ii) Setting up of more relevant degree, diploma and certificate courses in universities and colleges. These include courses in:

(a) mechanical and production engineering;
(b) workshop technology;
(c) machine tool technology;
(d) metal working trades;
(e) plant maintenance.

The proportion of engineering students to arts students should be raised to cater for the future needs. For instance, there is only one engineering student to every ten arts students in Malaysia which is more than three times lower than Japan (one engineering students to every three arts students).

iii) Setting up of educational funds and scholarships to attract good quality students into the essential courses at university, college and vocational school.

1.3.2 Skills Reinforcement and Improvement

The universities, colleges, polytechnics and vocational schools can also play an important part in the continual skills reinforcement and improvement effort by providing relevant short courses which could take the form of:

(a) evening courses;

(b) part time day-release courses;

(c) weekend courses;

(d) "summer school" or vacation-type courses.

In addition, however, it will be desirable to start an Automotive Production Research or TE Industry Research Training Institute.

This Institute will be able to take the lead in planning, encouraging and promoting the skills reinforcement and improvement, or even skill formation efforts. If funded by the TE industry itself, these will be even more motivation amongst the manufacturers to utilize this Institute for the training needs of the industry.

Such an Institute will also need to be fully equipped with relevant machine tools and other equipment and real-life systems to allow the training to be truly practically-oriented. Moreover, the Institute, with these facilities, can then also carry out applied research and development to solve practical manufacturing problems for the TE manufacturers. It will then be a centre for innovation as well as training.

1.3.3 Skills Enhancement and Extension

This area of manpower development will include advanced training and specialized courses for key personnel in the TE Industry. Such training can be encouraged both at the local level at the various institutions, initially staffed by foreign experts, and also at the international level by sending these engineers, technicians and skilled operatives to short special skill courses abroad.

A good source of this area of special skills development is the capital equipment vendors themselves. Purchase contracts for foreign equipment should specify extensive training provisions for Malaysian technicians, mechanics and operatives.

The proposed TE Industry Research & Training Institute will also be able to play a major role in identifying, planning, developing and executing the advanced skills enhancements and extension programmes for the TE Industry.

These advanced skills include some of the following:

(a) machine tool programming (for computerized machines);

(b) machine and tool setting (for high accuracy standards and tolerances);

(c) production systems design (including efficient plant layout, facilities planning and methods engineering);

(d) efficient production planning and control techniques;

(e) value analysis and engineering techniques;

(f) jig and tool design;

(g) tool and die making;

(h) mechanical engineering design related to the TE industry;

(i) advanced production inspection and testing;

(j) advanced quality engineering and control techniques.

1.3.4 Emphasis on Mechanical & Production Engineering

In the past, Malaysia has been quite well endowed with engineers from the disciplines of civil, structural, electrical and mechanical engineering. Most of these have been oriented towards the public sector and infrastructural works and construction industries.

As the construction industry declines and manufacturing industry develops and accelerates its need for engineers and technicians, thus there will need to be a shift of emphasis from the civil and construction related engineering skills to the mechanical, production and industrial engineering skills. The TE sector is one such sector which requires a very large pool of these skills.

Therefore, the proposed manpower development strategies for the TE sector discussed thus far has been aimed primarily at developing this relatively new skills area of manufacturing-oriented mechanical, production and industrial engineers, technicians and operatives.

1.4 Policies for Rationalising Tax Structure

We recommend that the government re-evaluate and rationalise the following areas:

1.4.1 The multiple taxation

The assemblers and the components parts manufacturers both face multiple taxation. For instance, in the case of tyres and batteries, the manufacturers and the assemblers have to pay excise duty on the same product. This contradicts the government localisation policy as it penalises assemblers for using higher local content. It is recommended that such anomalies be corrected. It is therefore appropriate that excise duty be eliminated to stimulate both demand for motor vehicles and to accelerate the development of the component parts manufacturing industry.

1.4.2 High Tax Structure

The government should not increase further the present tariff level on CKD packs. At present, taxes already make up 83% of the landed cost of the CKD packs for passenger cars within 1300cc range (98% for post budget price) which is among the highest in the world. The government should consider removing or reducing the present high tax structure on imported raw materials used to manufacture components for the local content programme. In fact, the tariff level should be reduced for all component imports. The government should not impose any import quotas on CKD packs in order to further promote the industry.

The development of the automotive industry, if carefully implemented, has tremendous economic effects on the economy. We advise that the government use various measures to stimulate growth in the industry and at the same time ensure that viability of the Poton Saga project would not joepardise other makes.

In general, the rise in per capita real income in Malaysia is slow, and the expenditure of an average income earner on a car constitutes a large proportion of his total household budget.

The relative change in real income and cost of car purchases is supported by our finding that since 1983 real disposal income per working person has been growing only marginally but sales price of a popular Japanese-origin 1300cc car has been increasing from around M$17,174 to M$19,282 or 13%. The increase in car price is due mainly to the increase in import duty from 15% to 25%.

Moreover, taxes account for about 83% of the landed cost of CKD packs. As our demand models have confirmed, income and pricing factors are the main variables that affect the demand for passenger cars. We therefore recommend a reduction in all taxes affecting the industry so that aggregate domestic demand would be stimulated.

Some of the following specific tax rates need to be reconsidered:

(a) lower the rates of road tax for petrol and diesel passenger cars, both private and company owned;

(b) grant more equitable capital allowance on company owned passenger cars, exclusively used by company's executives;

(c) eliminate the multiplicity of Duty and Sales tax on local content items; and

(d) lower the rates on petrol and diesel.

1.4.3 Policies on CBU Imports

We recommend that the government should ban or impose a high tariff system on CBU cars in the 1200-1600cc range to help boost demand for locally assembled motor vehicles.

1.5 Recommendations on Role of MVAC and HICOM

Officially, the principal regulatory unit is the Motor Vehicle Assembly Committee (MVAC) which is entirely comprised of top government officials.

The offical functions of MVAC, inter alia, include: formulating general guidelines for the industry; advising on specific issues, viz the number of assemblers permissible, number of makes and models of vehicles, import regulations, the local content scheme, motor vehicle and component prices administration; monitoring and reviewing the industry and recommending changes, if necessary.

But with the intiative taken by HICOM in the automotive industry, there is uncertainty regarding which institution has the final authoritative word. We strongly stress the significance of having one authority to plan for the automotive industry.

Unilateral actions and projects undertaken by HICOM without prior consultations with the private sector and other relevant decision making bodies can only create adverse effects in the automotive industry

We recommend that the role of HICOM in the automotive industry should not be independent of other institutions and the interests of the private sector.

We also recommend that the role of private interests be strongly represented. Presently, the representation of the private sector in MVAC is non significiant. During interviews conducted in the course of this study, the private sector has expressed strong reservations concerning the unilateral initiatives of HICOM in the automotive industry. There is not even a dialogue happening.

We recommend closer consultation between the Automotive Federation of Malaysia (the representative body of the automotive industry) and the

Ministry of Trade and Industry, MVAC and HICOM in policy-making and decisions affecting the industry.

We recommend that all regulatory policy measures centrally administered by the MVAC to be streamlined and made consistent.

Because of their inconsistencies there are unintended effects. Thus:

(a) The auto component localisation promotion is still based on a two- page "Revised Guidelines for Mandatory CKD Deletion" put together in June 1978, to reflect the industry make-up at that time. These guidelines are very rigid and not flexible enough to accomodate contingencies arising at the present time. Improvement in the guidelines is required to encourage the proper developments of the industry.

(b) Absence of a policy guideline on target phases that determines the percentage or proportion of components to be localised in the case of four-wheelers.

(c) Absence of a definite weighting system to determine the level of local content used for four-wheelers.

(d) Long processing time for deleted items. This discourages investors from setting up large establishments.

1.5.1 Privatization of HICOM

The expanding role of HICOM is contrary to the privatization policy. We recommend that the government should privatise the Proton Saga project at some stages

The role of HICOM should be restricted only to high technology components which are currently beyond the technical capability of the existing local component manufacturers. This means that where private enterprises are able to manufacture certain types of components, HICOM should not become involved in it. Instead, HICOM should incorporate more local content into Proton Saga. Transfer of technology from HICOM's technically advanced foreign joint-venture partners to local component manufacturers should be encouraged to provide local manufacturers the opportunity to upgrade their existing level of technology.

1.5.2 Policy for Localisation

It is recommended that appropriate implementation of the local content policy based on targeted percentages over a reasonable period of time is therefore necessary. A definite weighting system is also necessary to determine the level of local content used for four-wheelers. Such policy would enable both assemblers and manufacturers to plan long-term.

The present system, to date, tends to penalise assemblers who use more local content. Measures should be introduced whereby users of more local content be rewarded.

1.6 Policies for Commercial Vehicles and Other C.C Ranges

We recommend that existing assemblers be allowed to retain their position in the commercial vehicle market and passenger cars of around 1000 cc and above 1600 cc range. If Proton intends to participate in this area, it should enter into joint venture participation with existing assemblers.

It is important to ensure that a favourable investment climate for Malaysian, besides foreign, investors is promoted. The prolonged recession has already retarded the pace of industrial development in the country, especially the motor vehicle and its supporting industry. It is therefore critical that the existing capital and enterprise in the assembly industry which was invested in good faith and confidence in the government leadership should not be jeopardised. This is especially so in view of the fact that these investors could be pioneers for the second phase of the industrial development of Malaysia.

1.7 Export Promotion Programme

The final success of the Malaysian automotive industry, particularly completed vehicles, lies in the export market since the domestic market is not sufficiently large for the industry to benefit from economies of scale. This study has shown from the import pattern of some of the major industrial economies that there is a significant amount of components imported.

Based on the various demand-supply gap models for passenger cars in this study, we recommend that at least 50 percent of the surplus production in 1990 be geared towards export markets. The percentage will be increased by 10% per annum until there is no excess capacity in the country. However, for component exports the target should be aimed at capturing a share of the global market by 1995. A target of 1 percent is feasible. South Korea has succeeded in capturing 1 percent of the world market after a 14 year startup.

Todate, the Malaysian assemblers, and indeed even the National Car Project, are principally domestic market oriented.

In order to promote the export competitiveness of Malaysian made vehicles and components we recommend that various incentives be incorporated into the export promotion programme. The following incentive export scheme could be considered:

(a) For completely assembled automotive vehicles which have a minimum 50% local content achievement tax rebates up to 50% of the value of exports could be granted. Secondly, a subsidy of 40% of the f.o.b value of passenger cars and commercial vehicles is suggested. Thirdly, all vehicles for the export market are to be granted a minimum of

50% tax exemption from taxes. Fourthly, all components used in vehicles for the export market are to be tax exempted.

(b) For component exports we recommend that all inputs used in their manufacturing be tax exempted. Secondly, tax rebates up to 50% of the value of exports be granted to exporters.

Whatever is the final spepcification of the export incentive scheme, the overall effective subsidy must be at least 40% to 50% of the f.o.b value of the export. The level must be competitive with those which are used by other developing economies like Brazil and Mexico

The above export incentive scheme is scheduled for a 10 year programme in order to promote export aggressively.

But we do not recommend that the automotive industry be given further protection in the domestic market. In fact, this should be discouraged in light of the very high effective protection rates they are now enjoying.

It is noteworthy that the motorcycle, bicycle and motor vehicle component subsectors are quite competitive with low rates of effective protection. We recommend that these products to be incoporated into the incentive export scheme since they are sufficiently competitive to penetrate foreign markets.

Because protectionism involves the use of non tariff barriers, it is important to negotiate at government to government level for market shares in some of the major markets, viz, US, West Asia, and EEC. However, the potential is in other developing economies where the degree of competition and protectionism is less restrictive.

As the automotive industry in competitive market is based on quality and precision engineering, it is vital that such high international standards must first be acquired. The history of Japan's success in the automotive industry confirms that the adoption of a quality-first priority, rather than cost economy, has been critical for all its achievements. Presently, the Malaysian component industry has neither the management efficiency, the cost consciousness, nor the quality control standards desired. In this respect, the role of SIRIM is inadequate. A National Automotive Institute must therefore be set up for such a purpose.

One of the weakest point in the whole production structure of the Malaysian economy is international marketing. Except for the marketing of primary commodities, Malaysia has not developed an international marketing network for manufactured goods. In view of increasing protectionism and competitiveness in the markets of the industrialized economies, it would be impossible to promote the export of assembled cars nor components parts which Malaysia aims to manufacture later. The establishment of an institutional structure for an international marketing mechansim is therefore a precondition for export marketing.

We also recommend that the Asean Car Complementation Scheme be reviewed in terms of its potential for Malaysia. If the Malaysian car project is successfully implemented this will provide a competitive edge for Malaysia over its Asean neighbours in terms of negotiation for market penetration within the framework of the Asean Car Complementation Scheme.

Because of inadequate knowledge about the international market, we recommend a separate study on potential markets for Malaysian made vehicles and components.

1.8 Rationalising the Structure of the Component Industry

The present status of the component industry indicates that it is technologically backward when compared to the Japanese or even the South Korean industry. If the present system is perpetuated without any structural rationalisation there is little scope for the component industry to be developed into a dynamic supporting role for the automotive sector. Because the primary assemblers themselves do not possess the technology capabilities, there is thus no transfer of technology from them to the ancillary firms. The relationship between the assemblers and the component manufacturers is essentialy a trading relationship rather than one based on subcontracting for specific component production.

Under the present Mandatory Deletion Policy assemblers are required to source components from local manufacturers. Unfortunately, neither the quality nor the prices are competitive. Secondly, most component manufacturers prefer to produce for the REM market, which is about 7 times larger than the OEM market.

We therefore recommend that the National Car Project be made the focal point for the development of the component industry. In this context, the Japanese model is worth considering. This is based on a close collaborative subcontracting relationship. The ancillary component firms form the supporting base for the primary firm at the top of the system. A similar relationship could be developed for Proton and the component firms. The advantage of the primary firm-led relationship is that the ancillary firms could produce according to the required standards for specific products and also contribute to the linkage effects of the industry.

Although Proton has identified a list of components to be manufactured by itself, the question of whether to make or buy must be carefuly considered. Many major automotive companies have found it economic to subcontract most component production to ancillary firms. In-house production is only practised when very high quality standards are required. In view of the experience of other countries, we recommend that it is sensible to promote the development of a technologically efficient component industry, using joint ventures with internationally established companies, with the National Car Project at the top of the system.

1.9 <u>Policies on Transfer of Technology</u>

The experiences of most developing countries have shown the practical difficulties of technology transfer. Except for Japan, and to a smaller extent Taiwan and South Korea, most developing countries do not have a coherent programme to effect technology transfer.

The section on technology utilization in the TE industry in Malaysia confirms the relatively backward status of the assemblers and component manufacturers. Indeed, the overall perspective is one of low technology and low productivity.

In light of the various models of technology transfer as experienced in Japan and South Korea we recommend that a separate technical cum economic study on technology transfer be done for each sub sector of the automotive industry.

Besides the above, we recommend that all joint venture agreements, for instance between Mitsubishi and Proton, should have a built-in agreement regarding manpower training and technology transfer. Secondly, favourable licensing agreements for technology transfer in the component industry must be formulated with large international companies. Thirdly, the government should encourage the acquisition of foreign companies with the necessary type of technology base. Fourthly, the manpower training programme for Malaysian, especially in technical subjects, in countries like Japan must be intensified and enlarged. Fifthly, we recommend that the immigration regulations be relaxed so that foreign skilled manpower could be used on a contractual basis in order to remedy the immediate shortage of skilled manpower. Sixthly, we recommend that a high wage policy be adopted in the TE industry in order to encourage the use of more capital intensive technologies. Lastly, we recommend that automotive firms which are using more automation and high technology production techniques be given generous tax incentives or subsidies.

1.10 Recommendations on Future Studies

Because of their immediate usefulness we recommend the following supplementary technical studies to be undertaken as part of the implementation programme for the TE industry:

(a) a global indepth study of potential foreign markets for the component industry;

(b) a study of the organizational structure and international marketing network of the multinational companies which control the a global market in TE products and services;

(c) a manpower study in the TE sector; and

(d) a study on the specific areas for transfer of technology at the sectoral and project level.

LIST OF APPENDICES

Appendix 1

TRANSPORT EQUIPMENT SECTOR MIC AND SITC CLASSIFICATION

DESCRIPTION	MIC CODE	SITC CODE PRE 1978	SITC CODE POST 1978
(A) <u>Manufacture Of Motor Vehicle Bodies</u>	<u>38431</u>		
Motor Vehicle Bodies For Passenger Cars		73281100	78422000
Motor Vehicle Bodies For Buses		73281200	78423000
Motor Vehicle Bodies For Ambulances and Good Vehicles		73281300	78424000
(B) <u>Manufacturing And Assembly Of Motor Vehicles</u>	<u>38432</u>		
Passenger Cars - All C.C. Ranges	38432-01/03		
- Dual Purpose Vehicles CKD			78103100
- Dual Purpose Vehicles CBU			78103200
- Passenger Cars CKD		73210100	78101000
- Passenger Cars CBU New		73210300	78102100
- Passenger Cars CBU Old		73210500	78102900
Buses And Coach	38432-06		
- Buses CKD		73220100	78311000
- Buses CBU New		73220300	78312100
- Buses CBU Old		73220200	78312900
- Other Buses			78319000
Motor Vehicles For The Transport Of Goods & Materials			
- Goods Motor Vehicles CKD		73230100	78212000
- Goods Motor Vehicles CBU New		73230300	78213100
- Goods Motor Vehicles CBU Old		73230200	78213200
- Other	38432-11		78219000
- Lorry	38432-04		
- Van	38432-05		

Appendix 1 (cont).

TRANSPORT EQUIPMENT SECTOR MIC AND SITC CLASSIFICATION

DESCRIPTION	MIC CODE	SITC CODE PRE 1978	SITC CODE POST 1978
(B) <u>Manufacturing And Assembly Of Motor Vehicles (Con't)</u>			
- Pick-ups	38432-10		
- Trailers	38432-07		
- Trailers & Semi-Trailers Of The Caravan Type For Housing and Camping		73330200	78611000
- Trailers & Semi-Trailers For Transport Of Goods			78612000
- Other Vehicles			78681000
- Trucks	38432-09	71932100 & 71932900	74411100 74411900
- Special Purpose Commercial Vehicle (Ambulance, Fire Engine etc.)	38432-08	73240000	78220000
- Ambulance		73210400 & 73210200	78211000 & 78210400
- Chassis Fitted With Engines		73260000 To 73279000	78412000 To 78415000
(C) <u>Manufacturing Of Motor Vehicle Parts & Accessories</u>	<u>39439</u>		
Brake, Motor Vehicle	38439-01		
Wheel, Motor Vehicle	38439-02		
Clutch, Motor Vehicle	38439-04		
Engine, Motor Vehicle	38439-05		
Carburettor, Motor vehicle	38439-06		
Exhaust Pipes & Silencer System	38439-07	73289400	78499300
Spark Plug	38439-08		
Horn, Motor Vehicle	38439-09		
Oil Filter, Motor Vehicle	38439-10		
Radiator & Radiator Parts, Motor Vehicle	38439-11	73289200 & 73289300	78499100 & 78499200
Axles, Motor Vehicle	38439-12		
Gear, Motor Vehicle	38439-13		
Steering, Motor Vehicle	38439-14		
Shock Absorber, Motor Vehicle	38439-15		
Wiper Blades, Windscreen, Motor Vehicle	38439-16		

TRANSPORT EQUIPMENT SECTOR MIC AND SITC CLASSIFICATION

DESCRIPTION	MIC CODE	SITC CODE PRE 1978	SITC CODE POST 1978
(C) Manufacturing Of Motor Vehicle Parts And Accessories (Con't)			
Crankshaft, Motor Vehicle	38439-17		
Power Transmission, Motor Vehicle	38439-18		
Fuel System And Parts, Motor Vehicle	38439-19		
Motor Vehicle Parts, Accessories, nec.	38439-20		
Reconditioned Clutch Plates	38439-21		
Brushes	38439-22		
Brake Lining & Clutch Facing	38439-23		
Door Visors	38439-24		
Brushes & Washers	38439-25		
Bolts	38439-26		
Piston (Car Auto)	38439-27		
Automobile Gasket	38439-28		
Safety Belt (Cars)	38439-29	73289970	78499600
Air Filter	38439-30		
Cylinder Liner	38439-31		
Fan Belt	38439-32		
Spokes And Nipples, Motor Vehicle		73289500	78689100
Spokes And Nipples, Trailers			78689100 & 78689200
Disc And Bonded Brake Shoes		73289970	78499600
Other Parts & Accesories			
- Motor		73289900	78499900
- Trailers			78689900
- Trucks			74419100
(D) Manufacturing And Assembly Of Motor Cycles And Scooters			
Motor Scooters	38441-01		
Motor Cycles	38441-02		
- Motor Cycles CKD		73291200	78519100
- Motor Cycles CBU New		73291300	78519210
- Motor Cycles CBU Old		73291400	78519290
Bumper	38441-03		

APPENDIX I (Cont.)

TRANSPORT EQUIPMENT SECTOR MIC AND SITC CLASSIFICATION

DESCRIPTION	MIC CODE	SITC CODE PRE 1978	SITC CODE POST 1978
(D) Manufacturing And Assembly Of Motor Cycles & Scooters (Con't)			
Carriers	38441-04		
Baskets	38441-05		
Handle Bars	38441-06		
Exhaust Pipes	38441-07		
Spokes		73292001	78539111
Nipples		73292009	78539112
Other Parts And Accessories	38441-08		78539119
(E) Manufacturing And Assembly Of Bicycles, Tricycles And Trishaws	38449		
Tricycle, Fully Assembled	38449-02	73311200	78522000
Bicycle, Fully Assembled	38449-03	73311100	78521000
Frame, Bicycle	38449-04	73312100 & 73312200	78539121 & 78539122
Front Fork, Bicycle	38449-05	73313000	78539130
Chain Wheel, Bicycle	38449-06	73312900	78539129
Handle Bar, Bicycle	38449-07	73312400	78539124
Brakes	38449-08		
Mud Guards, Front And Rear, Bicycle	38449-09	73312800	78539128
Rims	38449-11	73312500	78539125
Hubs, Front And Rear, Bicycle	38449-12		
Seat Pillar, Bicycle	38449-13	73312600	78539126
Full Gear Case, Bicycle	38449-14		
Saddle, Bicycle	38449-15	73312300	78539123
Head Part For Steering Column	38449-16		
Lamp Bracket, Bicycle	38449-17	73312700	78539127
Bracket Axles, Bicycle	38449-18		
Bracket Parts, Bottom, Bicycle	38449-19		
Pedal Bicycle	38449-20		
Handle Grip, Bicycle	38449-21		
Trishaw, Fully Assembled	38449-22	73311300	78523000

TRANSPORT EQUIPMENT SECTOR MIC AND SITC CLASSIFICATION

DESCRIPTION	MIC CODE	SITC CODE PRE 1978	SITC CODE POST 1978
(E) Manufacturing And Assembly Of Bicycles, Tricycles, And Trishaws (Con't)			
Chains, Bicycle	38449-24		
Chain Adjuster, Bicycle	38449-25		
Carriers, Bicycle	38449-26	73313300	78539133
Stands And Side Stands, Bicycle	38449-27		
Foot Plate, Bicycle	38449-28		
Back Stay, Bicycle	38449-29		
Bell, Bicycle	38449-30		
Bicycle, Tricycle and Trishaw Partc n.e.c	38449-31	73319800 & 73319900	78539138 & 78539139
Bicycle Rims	38449-32		
Electro Plating Components, Bicycle	38449-33		
Spokes	38449-34	73313400	78539134
Chain Cover	38449-35		
Children Tricycle	38449-36		
Perambulator	38449-37		
Bracket Lugs		73313100	78539131
Reflectors		73313200	78539132
Nipples			78539135
(F) Manufacturing Of Aircraft	38450		
Aeroplanes	38450-01		
Aircraft, Not Fitted With Means Of Mechanical Propulsion; Rotochutes		73410100	79281000
Other Aircraft Of An Unladen Weight Not Exceeding 2,000 KG.			79220000
Other Aircra** Of An Unladen Weight Fxceeding 2,000 KG. But Not Exceeding 15,000 KG.			79230000
Other Aircraft of An Unladen Weight Exceeding 15,000 KG.		73410200	79240000
Helicopters	38450-03		79210000

APPENDIX I (Cont.)

TRANSPORT EQUIPMENT SECTOR MIC AND SITC CLASSIFICATION

DESCRIPTION	MIC CODE	SITC CODE PRE 1978	SITC CODE POST 1978
(F) Manufacturing Of Aircraft (Con't)			
Parts - Aircraft Engine And Motor	38450-04		
- Aircraft Pantoons	38450-05		
- Aircraft Propellers	38450-06	73920000	79290000
- Aircraft Under Carriage	38450-07		
- Specialised Parts n.e.c	38450-09		

APPENDIX 2

ASSEMBLY PLANTS BY NUMBER OF MAKE, MODEL AND VARIANT OF COMMERCIAL VEHICLE AND PASSENGER CARS, 1980 to 1983

	MAKE: TOTAL NUMBER OF COMMERCIAL AND PASSENGER MAKES				MODEL: TOTAL NUMBER OF COMMERCIAL AND PASSENGER MODELS				VARIANT: TOTAL NUMBER OF COMMERCIAL AND PASSENGER VARIANTS			
	1980	1981	1982	1983	1980	1981	1982	1983	1980	1981	1982	1983
ASIA AUTO IND. (AAI)	2	2	2	2	7	5	6	4	12	9	10	13
ASSO MOTOR IND (AMI)	6	5	4	4	24	22	14	15	34	32	22	26
ASSEMBLY SERVICES (ASSB)	8	8	7	7	33	32	30	26	60	58	56	53
C & C BINTANG (CCB)	1	1	1	1	6	9	7	7	15	16	10	11
ORIENTAL ASSEMBLY (OA)	2	2	2	2	8	7	7	7	18	18	15	13
SWEDISH MOTOR ASSEMBLIES (SMA)	2	2	3	4	6	6	6	7	9	10	9	10
TAN CHONG MOTOR ASSEMBLIES (TCMA)	1	1	1	1	16	15	17	17	24	22	24	[illegible]
TATAB INDUSTRIES (TI)	1	1	2	2	2	2	3	3	6	6	6	5
KINABALU MOTOR ASSEMBLY (KMA)	-	-		1	-	-	-	5				6
SARAWAK MOTOR IND (SMI)	4	4	4	4	12	13	11	7	20	22	15	13
K. PEMBENA KERETA (KPKK)	2	2	2	2	9	9	8	7	16	13	15	12
TOTAL*	25	24	22	22	122	119	104	105	212	204	176	183

Source : Malaysian Motor Vehicle Assemblies Association

* Excludes identical makes assembled by the same or more than one plant

APPENDIX 3

MALAYSIA : PRODUCTION OF AUTOMOBILES BY ENGINE, 1980 - 1983 ('000 UNITS)

	1980		1981		1982		1983	
	'000	%	'000	%	'000	%	'000	%
PASSENGER CARS								
BELOW 1000 CC	1.1	1.3	3.1	3.5	3.7	4.3	4.2	4.2
1000 - 1200	16.5	20.5	17.9	20.4	8.1	9.5	0.2	0.2
1201 - 1400	26.9	33.5	27.2	31.0	38.7	45.5	52.7	81.6
1401 - 1600	19.8	24.6	23.9	27.3	22.2	26.1	27.0	81.6
1601 - 1800	7.7	9.6	7.1	8.1	3.9	4.6	6.7	6.7
1801 - 2100	3.0	3.7	3.4	3.9	4.2	4.9	4.4	4.4
2101 - 2400	3.6	4.5	3.6	4.1	3.3	3.9	3.8	3.8
ABOVE 2400	1.8	2.3	1.5	1.7	1.0	1.2	1.1	1.1
TOTAL PASSENGER CARS	80.4	100.0	87.7	100.0	85.1	100.0	100.1	100.0
COMMERCIAL VEHICLES								
JEEPS	2.8	11.9	4.3	18.2	1.6	10.3	1.3	7.2
VANS/BUS	3.1	13.2	3.3	13.9	3.1	20.0	5.2	28.9
BUS	0.6	2.6	1.3	5.5	0.8	5.2	0.9	5.0
TRUCKS								
0 - 3.0*	8.0	34.0	8.3	35.1	6.1	39.4	7.8	43.4
3.1 - 5.0	0.2	0.9	0.6	2.5	0.5	3.2	0.5	2.8
5.1 - 8.0	0.5	2.1	0.2	0.8	0.1	0.6	0.6	3.3
8.1 - 10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10.1 - 12.0	2.9	12.3	1.8	7.6	0.7	4.5	0.4	2.2
12.1 - 15.0	2.8	11.9	2.5	10.5	1.6	10.3	0.4	2.2
ABOVE 15.0	2.6	11.1	1.4	5.9	1.0	6.5	0.9	5.0
TOTAL COMMERCIAL VEHICLES	23.5	100.0	23.7	100.0	15.5	100.0	18.0	100.0
TOTAL MOTOR VEHICLES	103.9		111.4		100.6		118.1	

Note : * This commonly refers to 2.5 tons (BDM) which is absolute limit for all decontrolled commercial vehicles.

SOURCE : MALAYSIAN MOTOR VEHICLE ASSEMBLERS ASSOCIATION

AUTOMOBILE PRODUCTION CAPACITY AND UTILIZATION BY PLANT, 1983

PLANTS	PASSENGER CARS					COMMERCIAL VEHICLES				
	CAPACITY PER DAY			TOTAL PRODUCTION	LEVEL OF UTILIZATION (%)	CAPACITY PER DAY			TOTAL PRODUCTION	LEVEL OF UTILIZATION (%)
	INSTALLED	NO. OF SHIFTS	TOTAL CAPACITY			INSTALLED	NO. OF SHIFTS	TOTAL CAPACITY		
AAI	42.5	1.0	42.5	7,188.0	69.6	2.5	1.0	2.5	66.4	100.0
AMI	65.0	1.0	65.0	10,170.0	64.4	15.0	1.0	15.0	2,862.0	78.5
ASSB	75.0	2.0	150.0	28,798.0	79.0	23.0	1.0	23.0	3,926.0	70.2
CCB	-	-	-	-	-	10.0	1.0	10.0	1,389.0	57.2
KPK	40.0	1.0	40.0	9,220.0	94.9	-	-	-	-	-
OASB	50.0	1.0	50.0	9,635.0	79.3	5.0	1.0	5.0	646.0	53.2
TCMA	125.0	1.0	125.0	29,478.0	97.0	50.0	1.0	50.0	6,355.0	52.3
TATA	-	-	-	-	-	6.0	1.0	6.0	149.0	10.2
SMA	21.0	1.0	21.0	5,026.0	98.5	8.0	1.0	8.0	94.0	4.8
KMA	-	-	-	-	-	8.0	1.0	8.0	315.0	16.2
SNI	4.0	1.0	4.0	711.0	73.1	8.5	1.0	8.5	1,838.0	88.9
TOTAL	422.5	9.0	497.5	100,226.0	82.9	136.0	10.0	136.0	18,238.0	55.2

NO. OF WORKDAYS IN 1983 = 243 DAYS

* WORKDAYS EXCEED 243 DAYS IN 1983

SOURCE : MALAYSIAN MOTOR VEHICLE ASSEMBLERS ASSOCIATION

APPENDIX 5

PENINSULAR MALAYSIA : REGIONAL DISTRIBUTION OF MOTOR VEHICLE PARTS AND ACCESSORIES
(MIC 38439) 1981

STATES	NO. OF ESTABLISHMENT		TOTAL REVENUE		TOTAL EMPLOYMENT		SALARIES & WAGES	
	NO.	%	NO.	%	NO.	%	NO.	%
JOHORE	11	13.75%	5,927,646	5.79%	301	9.01%	991,827	6.47%
PAHANG/KEDAH/PERLIS	5	6.25%	995,822	0.97%	111	3.32%	206,968	1.35%
MELAKA	4	5.00%	2,964,726	2.90%	82	2.46%	391,758	2.55%
NEGRI SEMBILAN	7	8.75%	10,834,947	10.59%	391	11.71%	1,774,033	11.57%
PENANG	4	5.00%	12,602,418	12.31%	290	8.68%	1,225,980	7.99%
PERAK	11	13.75%	5,251,638	5.13%	351	10.51%	802,883	5.23%
SELANGOR	18	22.50%	55,451,317	54.17%	1,481	44.34%	8,972,322	58.50%
WILAYAH	20	25.00%	8,330,788	8.14%	333	9.97%	971,099	6.33%
TOTAL FOR DIVISION	80	100.00%	102,359,302	100.00%	3,340	100.00%	15,336,870	100.00%

SOURCE : DEPARTMENT OF STATISTICS, CENSUS OF MANUFACTURING INDUSTRIES,
PENINSULAR MALAYSIA, 1981

APPPROVED AUTOMOTIVE COMPONENT MANUFACTURERS WITH ONE PRODUCT LINE

NAMES OF COMPANIES IN OPERATION AND <u>WITH ONLY ONE PRODUCT LINE</u>

A. ENGINE PARTS

1. AUTOFILTER IND. SDN BHD
2. BALDWIN IND. (M) SDN BHD
3. FILTON IND. SDN BHD
4. MALAYSIA PISTONS SDN BHD
5. MS AUTO PARTS IND. SDN BHD
6. SYARIKAT GENERAL RADIATORS (M) SDN BHD
7. UMW AUTO PARTS SDN BHD
8. UNITED FILTERS SDN BHD
9. USAHA IND. SDN BHD

B. ELECTRICAL PARTS

1. AMALGAMATED PARTS MANUFACTURERS SDN BHD
2. GREATER EASTERN CARBON (M) SDN BHD
3. JEMCO ELECTRIC PRODUCTS SDN BHD
4. J.K. WIRE HARNESS SDN BHD
5. KLANG ALATGANTI LETRIK KERETA SDN BHD
6. NGK SPARK PLUGS (M) BHD
7. SONGWILL IND. SDN BHD
8. SOUTH EAST CARBON & TRADING (M) SDN BHD

C. DRIVE, TRANSMISSION AND STEERING PARTS

1. ALLOY AUTOMOTIVE SDN BHD
2. AUTO ANCILLARY MANUFACTURER SDN BHD
3. CHEVIOT IND. (M) SDN BHD
4. SAJRA GEARS N.S. SDN BHD
5. SOUTH-EAST ASIA CLUTCH IND. SDN BHD

D. SUSPENSION AND BRAKE PARTS

1. KAYABA

E. BODY PARTS

1. AUTO DEVELOPMENT & IND. SDN BHD
2. AUTOMOTIVE IND. SDN BHD
3. CARPETS INTERNATIONAL (M) SDN BHD
4. COCO IND. SDN BHD
5. HOLLYWOOD MANUFACTURERS (M) SDN BHD
6. KILANG ALATGANTI BANGI SDN BHD
7. LIFELONG STAINLESS EXHAUSTS (M)
8. AUTO COMPONENT IND. (M) SDN BHD
9. MALAYSIA SHEET GLASS BHD
10. MCIS SAFETY GLASS SDN BHD
11. POWER STEEL & ELECTRO PLATING WORKS SDN BHD
12. TECK SEE PLASTIC SDN BHD
13. UNITED BOLT AND NUT SDN BHD

F. ACCESSORIES

1. KAR-KOOL AUTO SDN BHD
2. NIPPONDENSO CAPITAL SDN BHD
3. PATCO (M) SDN BHD
4. PROGRESS ENGINEERING SDN BHD
5. SIGMA (AIR-CONDITIONING) SDN BHD
6. TAMRECO SDN BHD
7. WEPCO (M) SDN BHD
8. UNIVERSAL CAR COOLER CO.
9. AMALGAMATED BATTERIES MFG (M) SDN BHD
10. CENTURY BATTERIES (M) SDN BHD
11. CHLORIDE (M) SDN BHD
12. DOMAR BATTERY MFR SDN BHD
13. FEDERAL BATTERIES MFG SDN BHD
14. KOTA IND. (M) SDN BHD
15. SWEE THYE BATTERY MFG SDN BHD
16. TANITE BATTERY CO SDN BHD
17. TAMAN BATU BATTERY & PLATES MFG CO SDN BHD
18. T.U. IND. (M) SDN BHD
19. WATTA BATTERY IND. (M) SDN BHD
20. YUASA BATTERY (M) SDN BHD

NAMES OF COMPANIES NOT IN OPERATION <u>AND WITH ONLY ONE PRODUCT LINE</u>

A. ENGINE PARTS

AE CYLINDER LINER MANUFACTURING (M) SDN BH
INDUSTRIAL MOTOR COMPONENTS SDN BHD
IZUMI (M) SDN BHD
JEMCO IND. SDN BHD
N.P. PACKING CO SDN BHD
UNITED AUTOFILTERS IND. SDN BHD

B. ELECTRICAL PARTS

AUTOBULBS (M) SDN BHD
ASIA AUTOMOBILE IND. SDN BHD
HONG LEONG YAMAHA MOTOR SDN BHD
KIAN HIN IND. (M) SDN BHD
LIGHT IND. SDN BHD
PLUGS AND POINTS IND. SDN BHD
SOUTH EAST ASIAN MOTOR IND. SDN BHD
STANLEY BULBS (M) SDN BHD
STATE ENTERPRISE SDN BHD

C. DRIVE, TRANSMISSION AND STEERING PARTS

AISIN-TIMURAN SDN BHD
AUTOMOTIVE PRODUCTS CC SDN BHD
BRILLIANT WHEEL MANUFACTURER SDN BHD
ORIENTAL METAL IND. (M) SDN BHD
PERINDUSTRIAN RODA KENDERAAN SDN BHD
TAN KIM HOE

D. SUSPENSION AND BRAKE PARTS

AUTO COIL SPRINGS SDN BHD
MAIDI SDN BHD
ORIENTAL SHOWA SDN BHD
ZETA IND. SDN BHD

E. BODY PARTS

AUTO-SEATS (M) SDN BHD
CAR SEATS (M) SDN BHD
ELECTRO CHEMICAL CO (M) SDN BHD
KLANG PEMASANGAN BADAN KENDERAAN SDN BHD
KOPERASI PENGANAN (M) BHD
LEE HUAT PLASTIC IND. SDN BHD
MAH SING PLASTIC IND. SDN BHD
MULTIPLE CORPORATION SDN BHD
UMW (M) HOLDINGS BHD
UNITED VEHICLE IND. SDN BHD
VENEX CORPORATION SDN BHD

F. ACCESSORIES

ASIA MOTOR (K.L.) SDN BHD
AUTO COOLER IND. (M) SDN BHD
CITY CAR COOLER SDN BHD
MARK IV (M) SDN BHD
PERINDUSTRIAL KOMPONEN PENDAMARAN SDN BHD
ROXY ELECTRIC IND. (M) SDN BHD
SANDILANDS ENGINEERING SDN BHD
SANKYO INTERNATIONAL (M) SDN BHD
SMI SDN BHD
MARA BATTERY MFG SDN BHD
SEDCO BATTERY PROJECT
LIEW KIM LIN
AUTOMOTIVE PARTS ENGINEERING SDN BHD

APPENDIX 7

APPROVED COMPANIES MANUFACTURING AUTOMOTIVE ENGINE PARTS (SN 100 - 200), 1983

	COMPANIES IN OPERATION				COMPANIES NOT IN OPERATION		TOTAL APPROVED COMPANIES	
	APPROVED		PRODUCTS MANUFACTURED					
	NO.	%	NO.	%	NO.	%	NO.	%
CO. BY BREADTH OF ENGINE PARTS APPROVED	19	100.0			8	100.0	27	100.0
ONE	5	26.3			5	62.5	10	37.0
TWO	3	15.8					3	11.1
THREE	7	36.8			2	25.0	9	33.3
MORE THAN THREE	4	21.1			1	12.5	5	18.5
CO. BY TYPES OF ENGINE PARTS APPROVED/MANUF'D.	49	100.0	39	100.0	15	100.0	64	100.0
PISTONS	1	2.0	1	2.6	1	6.7	2	3.1
PISTON PINS	1	2.0			1	6.7	2	3.1
PISTON RINGS	1	2.0			1	6.7	2	3.1
CYLINDER LINERS	2	4.1	2	5.0	2	13.3	4	6.2
PISTON ASSEMBLY	1	2.0	1	2.6			1	1.6
ENGINE GASKET	4	8.2	4	10.2	2	13.3	6	9.4
VALVE SPRINGS	1	2.0					1	1.6
BEARINGS	1	2.0					1	1.6
FUEL FILTERS	9	18.4	9	23.1	2	13.3	11	17.2
AIR FILTERS	11	22.4	9	23.1	2	13.3	13	20.3
OIL FILTERS	10	20.4	9	23.1	3	20.0	13	20.3
RADIATORS	3	6.1	2	5.1			3	4.7
V-BELTS					1	6.7	1	1.6
RUBBER HOSES	1	2.0	1	2.6			1	1.6
OTHER ENGINE PARTS	3	6.1	1	2.6			3	4.6

SOURCE : COMPILED FROM MIDA, DIRECTORY OF MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURERS 1984

APPENDIX 8

APPROVED COMPANIES MANUFACTURING AUTOMOTIVE ELECTRICAL PARTS
(SN 200 - 400), 1983

	COMPANIES IN OPERATION				COMPANIES NOT IN OPERATION		TOTAL APPROVED COMPANIES	
	ITEMS APPROVED		ACTUAL ITEMS MANUFACTURED					
	NO.	%	NO.	%	NO.	%	NO.	%
CO. BY BREADTH OF ELECTRICAL PARTS APPROVED	14	100.0			14	100	28	100.0
ONE	10	71.4			9	64.3	19	67.9
TWO	1	7.1			1	7.1	2	7.1
THREE	1	7.1			2	14.3	3	10.7
MORE THAN THREE	2	14.3			2	14.3	4	14.3
CO. BY TYPES OF ELECTRICAL PARTS APPROVED/MANUF'D.	27	100.0	14	100.0	38	100.0	65	100.0
STARTING MOTORS	1	3.7	1	7				
GENERATORS	1	3.7	1	7			1	1.5
VOLTAGE REGULATORS	2	7.4	1	7			2	3.1
DISTRIBUTORS	1	3.7					1	1.5
DISTRIBUTOR POINTS & ARMS	1	3.7	1	7.1	2	5.3	3	4.6
IGNITION	1	3.7			2	5.3	3	4.6
SPARK PLUGS	2	7.4	1	7.1	2	5.3	4	6.2
CONDENSORS					1	2.6	1	1.5
ENGINE CONTROL ELECTRIC DEV.	1	3.7					1	1.5
ELECTRONIC IGNITION DEV.					1	2.6	1	1.5
DRIVE & TRANSMISSION RELATED ELECTRONIC DEVISES	1	3.7					1	1.5
VEHICLE DIAGNOSTIC DEVICES	1	3.7	1	7.1			1	1.5
OTHER ELECTRICAL PARTS	2	7.4	2	14.3			2	3.1
HEAD LAMPS					2	5.3	2	3.1
SIGNAL & INDICATOR LAMPS	1	3.7	1	7.1	2	5.3	3	4.6
OTHER LAMPS	1	3.7	1	7.1	3	7.9	4	6.2
LAMP BULBS					3	7.9	3	4.6
SPEEDOMETERS	1	3.7			2	5.3	3	4.6
SPEEDOMETER CABLES	1	3.7			2	5.3	3	4.6
FUEL LEVEL GAUGES					1	2.6	1	1.5
TACHNOGRAPHS					2	5.3	2	3.1
OTHER INSTRUMENTS					2	5.3	2	3.1
WIPER MOTOR & LINKAGE PARTS	1	3.7			1	2.6	2	3.1
WIPER ARMS & BLADES	1	3.7			1	2.6	2	3.1
WINDSHIELD WASHERS	2	7.4					2	3.1
HORNS AND BUZZERS	1	3.7	1	7.1	1	2.6	2	3.1
HANDLE COCKS					1	2.6	1	1.5
SWITCHES					2	5.3	2	3.1
FLASHERS	1	3.7	1	7.1	1	2.6	2	3.1
RELAYS & RELAY BOXES					1	2.6	1	1.5
LOW TENSION ELECTRIC CABLES					1	2.6	1	1.5
WIRING HARNESSES	2	7.4	2	14.3			2	3.1
OTHER ELECTRICAL PARTS	1	3.7			2	5.3	3	4.6

SOURCE : COMPILED FROM MIDA, DIRECTORY OF MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURERS 1984

APPENDIX 9

APPROVED COMPANIES MANUFACTURING AUTOMOTIVE DRIVE, TRANSMISION AND STEERING PARTS (SN 600 - 700), 1983

	COMPANIES IN OPERATION				COMPANIES NOT IN OPERATION		TOTAL APPROVED COMPANIES	
	ITEMS APPROVED		ACTUAL ITEMS MANUFACTURED					
	NO.	%	NO.	%	NO.	%	NO.	%
CO. BY BREADTH OF DRIVE, TRANSMISSION & STEERING PARTS APPROVED	14	100.0			12	100.0	26	100.0
ONE	9	64.3			8	66.7	17	65.4
TWO	3	21.4			3	25.0	6	23.1
THREE	2	14.3			1	8.3	3	11.5
CO. BY TYPES OF DRIVE, TRANSMISSION & STEERING PARTS APPROVED/MANUF'D.	21	100.0	14	100.0	17	100.0	38	100.0
CLUTCH COVER	1	4.8			2	11.8	3	7.9
CLUTCH DISCS	3	14.2	1	7.1	3	17.6	6	15.8
CLUTCH FACINGS	5	23.8	5	35.7	2	11.8	7	18.4
CLUTCH TUBINGS	1	4.8					1	2.6
STEERING WHEELERS					1	5.9	1	2.6
PROPELLER SHAFTS					1	5.9	1	2.6
DIFFERENTIAL GEARS	1	4.8	1	7.1			1	2.6
WHEELS-STEEL					1	5.9	1	2.6
WHEELS-LIGHT ALLOY	2	9.5	2	14.3	2	11.8	4	10.5
HUB BOLTS & NUTS	2	9.5	1	7.1			2	5.3
KING PINS & SHACKLE PINS	2	9.5	2	14.3	2	11.8	4	10.5
BUSHINGS	1	4.8	1	7.1			1	2.6
OIL SEALS					1	5.9	1	2.6
TYRE VALVES & VALVE INSIDES	1	4.8	1	7.1			1	2.6
CONTROL CABLES	2	9.5			2	11.8	4	10.5

SOURCE : COMPILED FROM MIDA, DIRECTORY OF MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURERS 1984

APPENDIX 10

APPROVED COMPANIES MANUFACTURING AUTOMOTIVE SUSPENSION AND BRAKE PARTS (SN 100 - 200), 1983

	COMPANIES IN OPERATION				COMPANIES NOT IN OPERATION		TOTAL APPROVED COMPANIES	
	ITEMS APPROVED		ACTUAL ITEMS MANUFACTURED					
	NO.	%	NO.	%	NO.	%	NO.	%
CO. BY BREADTH OF SUSPENSION & BRAKE PARTS APPROVED	9				10		19	
ONE	3				5		8	
TWO	2				5		7	
THREE	4						4	
CO. BY TYPES OF SUSPENSION & BRAKE PARTS APPROVED/MANUF'D.	19	100.0	15	100.0	15	100.0	34	100.0
LEAF SPRINGS	1	5.3	1	6.7	2	13.3	3	8.8
COIL SPRINGS					3	20.0	3	8.8
SHOCK ABSORBERS	2	10.5	2	13.3	1	6.7	3	8.8
TORSION BARS & STABILIZERS					1	6.7	1	2.9
OTHER SUSPENSION PARTS	3	15.8	2	13.3	1	6.7	4	11.8
BRAKE LININGS	4	21.0	4	26.7	2	13.3	6	17.6
BRAKE SHOES	4	21.0	2	13.3	1	6.7	5	14.7
DISC PADS	4	21.0	4	26.7			4	11.8
BRAKE HOSES					1	6.7	1	2.9
BRAKE PIPES	1	5.3			1	6.7	2	5.9
BRAKE DRUMS & DISCS					1	6.7	1	2.9
OTHER SUSPENSION & BRAKE PARTS					1	6.7	1	2.9

SOURCE : COMPILED FROM MIDA, DIRECTORY OF MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURERS 1984

APPENDIX 11

APPROVED COMPANIES MANUFACTURING AUTOMOTIVE BODY PARTS (SN 600 - 700), 1983

	COMPANIES IN OPERATION				COMPANIES NOT IN OPERATION		TOTAL APPROVED COMPANIES	
	ITEMS APPROVED		ACTUAL ITEMS MANUFACTURED					
	NO.	%	NO.	%	NO.	%	NO.	%
CO. BY BREADTH OF BODY PARTS APPROVED	25	100.0			17	100.0	42	100.0
ONE	15	60.0			12	70.6	27	64.3
TWO	6	24.0			3	17.6	9	21.4
THREE	2	8.0			1	5.9	3	7.1
MORE THAN THREE	2	8.0			1	5.9	3	7.1
CO. BY TYPES OF BODY PARTS APPROVED/MANUF'D.	43	100.0	26	100.0	27	100.0	70	100.0
PANELS FOR TRUCKS & BUS CHASSIS	1	2.3			2	7.4	3	4.3
PANELS FOR MOTORCYCLES BODIES					1	3.7	1	1.4
CHASSIS FRAMES					1	3.7	1	1.4
FUEL TANKS	1	2.3			1	3.7	2	2.8
EXHAUST PIPES & MUFFLERS	7	16.3	5	19.2	2	7.4	9	12.8
UPHOLSTERY & MOLDINGS	2	4.6	1	3.8	2	7.4	4	5.7
BRACKETS	1	2.3					1	1.4
WEATHERSTRIPS	1	2.3	1	3.8			1	1.4
SEATS & SEAT SPRINGS	1	2.3			4	14.8	5	7.1
SEAT ADJUSTERS	1	2.3			2	7.4	3	4.3
SEAT BELTS	3	7.0	2	7.7			3	4.3
SUN VISORS	2	4.6					2	2.8
INTERIOR PARTS	3	7	1	3.8	1	3.7	4	5.7
MIRRORS	3	7.0	2	7.7	1	3.7	4	5.7
RUBBER DAMPERS	1	2.3	1	3.8			1	1.4
DUST COVERS & HOOTS	1	2.3					1	1.4
GREASE NIPPLES	1	2.3	1	3.8			1	1.4
OTHER BODY PARTS	14	32.6	13	50.0	10	37.0	24	34.3

SOURCE : COMPILED FROM MIDA, DIRECTORY OF MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURERS 1984

APPROVED COMPANIES MANUFACTURING AUTOMOTIVE ACCESSORIES
(SN 700 - 800), 1983

	COMPANIES IN OPERATION				COMPANIES NOT IN OPERATION		TOTAL APPROVED COMPANIES	
	ITEMS APPROVED		ACTUAL ITEMS MANUFACTURED					
	NO.	%	NO.	%	NO.	%	NO.	%
CO. BY BREADTH OF ACCESSORIES APPROVED	25	100.0			14	100.0	39	100.0
ONE	24	96.0			14	100.0	38	97.4
TWO	1	4.0					1	2.6
THREE								
CO. BY TYPES OF ACCESSORIES APPROVED/MANUF'D.	26	100.0	23	100.0	14	100.0	40	100.0
CAR CLOCKS	1	3.8					1	2.5
COOLER/AIR COND.	8	30.8	8	34.8	9	64.3	17	42.5
BABY CAR SEATS	1	3.8	1	4.3			1	2.5
HELMETS	2	7.7	2	8.7			2	5.0
SERVICE TOOLS					2	14.3	2	5.0
OTHER ACCESSORIES	2	7.7	1	4.3	1	7.1	3	7.5
BATTERIES & BATTERY PARTS	12	46.2	12	52.2	2	14.3	14	35.0

SOURCE : COMPILED FROM MIDA, DIRECTORY OF MALAYSIAN AUTOMOTIVE COMPONENT MANUFACTURERS 1984

APPENDIX 13

MALAYSIA : EXPORTS AND IMPORTS OF MOTOR VEHICLE BODIES, 1969 - 1983

DESCRIPTION MANUFACTURE OF MOTOR VEHICLE BODIES	SITC CODE	EXPORT/ IMPORT	UNIT	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
MOTOR VEHICLE BODIES FOR PASSENGER CAR	78422000	EXPORT	UNIT (NO)	1	9	2	49	70	20	28	30	4	10	-	10	-	-
			VALUE ($fob)	200	7,933	360	13,200	12,635	4,520	6,286	5,150	8,781	800	-	2,500	-	-
	73281100	IMPORT	UNIT (NO)	55	518	114	32	105	48	80	343	31	268	31	104	3	38
			VALUE ($fob)	18,640	65,888	46,021	11,823	44,893	50,422	54,944	141,637	45,871	154,938	192,282	73,513	16,012	75,958
MOTOR VEHICLE BODIES FOR BUSES	78423000	EXPORT	UNIT (NO)	-	-	-	3	2	-	-	24	-	-	-	-	-	-
			VALUE ($fob)	-	-	-	650	1,080	-	-	9,751	-	-	-	-	-	-
	73281200	IMPORT	UNIT (NO)	1	19	12	123	95	1	40	3	13	10	-	24	24	46
			VALUE ($fob)	8,700	7,431	18	119,350	119,185	1,022	14,590	22,912	110,082	54,388	-	61,304	90035	217,960
MOTOR VEHICLE BODIES FOR AMBULANCES & GOODS VEHICLE	78424000	EXPORT	UNIT (NO)	9	5	-	7	3	3	1	3	-	2	-	3	-	-
			VALUE ($fob)	75,422	41,662	-	6,000	1,200	2,500	3,383	600	-	16,148	-	7,930	-	-
	73281300	IMPORT	UNIT (NO)	38	71	177	381	590	291	143	121	197	337	191	169	290	375
			VALUE ($fob)	91,610	193,023	55,109	17,703	132,744	264,915	539,831	233,177	126,234	792,397	690,415	2,490,560	1,027,213	696,517
TOTAL MOTOR VEHICLE BODIES		EXPORT	UNIT (NO)	10	14	2	59	75	23	29	57	4	12	-	13	-	-
			VALUE ($fob)	75,622	49,595	360	19,850	14,915	7,020	9,669	15,501	8,781	16,948	-	10,430	-	-
		IMPORT	UNIT (NO)	94	608	305	536	790	340	263	467	241	615	222	297	317	459
			VALUE ($fob)	118,950	266,342	101,146	148,876	296,822	316,359	609,365	397,726	282,187	1,001,723	-	2,625,377	1,133,260	990,435

SOURCE : Department of Statistics, Annual Statistics of External Trade, Malaysia, Various Years

APPENDIX 14

EXPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE
WORLD	18,015,115	2,936,860	1,676,325	5,924,400	55,907
DEVELOPED EC	14,351,537	2,493,634	1,177,467	5,767,219	1,995
DEVELOPING EC	3,642,721	442,822	497,611	157,157	53,871
CENTRALLY PLANNED EC	20,857	203	1,247	-	-
AFRICA	47,559	11,924	244,839	932	-

SOUTH AFRICA	150,549	1,499	108,934	-	-
DEVELOPING EC	327,010	10,425	135,905	912	-
NORTH AFRICA	62,792	4,466	41,418	764	-

ALGERIA	34,209	1,651	21,633	-	-
LIBYA ARAB JM.	1,104	-	8,178	-	-
MOROCCO	119	398	679	521	-
SUDAN	7,089	282	4,443	-	-
TUNISIA	240	2,083	3,424	-	-
EGYPT	20,019	2,083	3,060	183	-
CEUCA	36,143	303	945	-	-
UNITED RP. CAMR.	16,679	-	132	-	-
CENT. AFRICA REP.	660	-	-	-	-
CONGO	6,896	-	258	-	-
GABON	11,904	244	555	-	-
OTHER AFRICA	228,075	5,656	93,542	114	-

ANGOLA	459	-	395	-	-
BURUNDI	1,085	-	159	-	-
ZAIRE	4,752	213	3,065	-	-
BENIN	3,145	-	263	-	-
ETHIOPIA	5,034	-	563	-	-
DJIBOUTI	4,658	-	522	-	-
GAMBIA	1,238	-	713	-	-
GHANA	889	177	2,919	-	-
GUINEA	232	120	390	-	-
IVORY COAST	15,882	345	150	-	-
KENYA	7,312	112	13,050	-	-
LIBERIA	4,884	616	-	-	-
MADAGASCAR	183	-	305	-	-
MALAWI	183	-	1,190	-	-
MALI	706	-	556	-	-
MAURITANIA	535	-	114	-	-

APPENDIX 14 (CONT.)

EXPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE
MAURITIUS	949	-	247	-	-
MOZAMBIQUE	1967	-	1388	-	-
NIGER	1,964	-	-	-	-
NIGERIA	127,596	3,179	46,636	-	-
REUNION	3,991	-	-	-	-
RWANDA	2,143	-	257	-	-
SAO TOME PRN.	131	-	-	-	-
SENEGAL	1,977	121	-	-	-
SEYCHELLES	618	-	-	-	-
SIERRA LEONE	2,354	-	760	-	-
ZIMBABWE	12,906	-	4,201	-	-
TOGO	7,293	-	216	-	-
UGANDA	1,185	-	1,393	-	-
UNITED RP. TANZANIA	2,300	-	7,733	-	-
UPPER VOLTA	672	-	-	-	-
ZAMBIA	6,792	-	4,636	-	-
GUINEABISSAU	-	302	201	-	-
ST. HELENA	-	-	160	-	-
SOMALIA	-	-	858	-	-
NORTH AMERICA	10,468,960	2,349,537	350,451	5,755,070	-

DEVELOPED EC	10,462,449	2,349,393	350,296	5,754,867	-
CANADA	657,885	234,993	10,684	-	-
USA-PUERTO RICO	9,804,613	-	339,612	5,754,867	-
DEVELOPING EC	6,461	145	156	203	-
BERMUDA	6,461	145	154	-	-
OTHER AMERICA	492,709	160,868	27,197	3,657	-

DEVELOPING EC	492,709	160,868	27,197	3,657	-
LAFTA	250,742	108,233	5,287	2,422	-
ARGENTINA	1,236	704	-	-	-
BOLIVIA	1,877	900	-	-	-
BRAZIL	-	-	136	-	-
CHILE	44,465	4,145	705	106	-
COLOMBIA	59,240	16,113	717	-	-
ECUADOR	15,848	11,368	-	-	-
MEXICO	-	16,365	191	925	-
PARAQUAY	3,309	640	451	198	-
PERU	69,037	14,513	233	155	-
URUGUAY	706	220	2,610	-	-
VENEZUELA	54,968	43,022	-	919	-

APPENDIX 14 (CONT.)

EXPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE
CACM	10,736	3,940	138	-	-

COSTA RICA	615	732	-	-	-
EL SALVADOR	291	582	-	-	-
GUATEMALA	5,543	1,218	-	-	-
HONDURAS	3,950	1,207	-	-	-
NICARAGUA	337	201	-	-	-
CARRIBEAN	171,216	40,924	20,220	720	-

ANTIGUA	3,151	-	-	-	-
BAHAMAS	14,120	12,340	172	-	-
BARBADOS	6,084	348	698	-	-
CAYMAN ISLAND	1,886	3,389	-	-	-
CUBA	115	-	-	-	-
DOMINICA	383	-	432	-	-
DOMINICAN REPUBLIC	10,032	3,278	-	-	-
GRENADA	977	-	-	-	-
GUADELOUPE	8,678	-	497	-	-
HAITI	5,983	1,364	705	-	-
JAMAICA	18,391	7,890	4,746	140	-
MONTSERRAT	382	-	181	-	-
NETH. ANTILES	29,500	8,872	-	389	-
ST. KITTS NEV.	627	2,204	-	-	-
ST. LUCIA	1,641	-	155	-	-
ST. VINCENT	1,094	-	-	-	-
TRINIDAD TBG.	67,730	870	12,133	-	-
US VIRGIN ISLANDS	358	-	-	-	-
TURKS CA. ISLD.	-	290	-	-	-
REST OF AMERICA	60,015	7,771	1,552	496	-

FR GUIANA	559	-	204	-	-
GUYANA	258	381	801	-	-
PANAMA	49,860	6,272	324	425	-
SURINAM	9,338	773	-	-	-
BELIZE	-	346	-	-	-
FALKLAND ISLAND	-	-	152	-	-

APPENDIX 14 (CONT.)

EXPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE
ASIA	2,814,533	321,265	341,779	1,537,915	53,545

DEVELOPED EC	49,873	50,160	8,407	1,455	-
ISRAEL	49,873	4,613	2,704	1,252	-
JAPAN	-	45,546	5,704	203	-
DEVELOPING EC	255,078	271,006	333,236	152,338	53,461
MIDDLE EAST	1,979,650	262,677	255,228	151,621	231
BAHRAIN	46,508	3,229	4,773	346	-
CYPRUS	25,958	-	4,002	-	212
IRAN I.R.	9,192	-	91,659	-	-
IRAQ	265,921	131	38,893	-	-
JORDAN	22,180	852	3,358	-	-
KUWAIT	216;621	66,210	19,387	31,148	-
LEBANON	14,128	3,166	1,761	596	-
OMAN	127,491	6,606	11,244	1,546	-
QATAR	57,477	9,823	10,518	4,731	-
SAUDI ARABIA	1,008,300	153,362	33,249	104,699	-
DEM. YEMEN	3,125	-	150	-	-
SYRN. ARAB REPUBLIC	45,778	428	472	-	-
UNITED ARAB EM.	120,755	18,659	33,052	8,488	-
YEMEN	16,193	-	844	-	-
TURKEY	-	220	1,867	-	-
OTHER ASIA	775,429	8,329	78,008	717	53,230

AFGHANISTAN	115	-	-	-	-
BANGLADESH	3,168	-	316	-	-
BHUTAN	450	-	-	-	-
BRUNEI	27,660	-	1,400	-	2,189
BURMA	872	-	151	-	-
DM KAMPUCHEA	153	-	-	-	-
SRI LANKA	25,054	244	1,364	-	-
HONG KONG	65,226	605	6,663	-	220
INDIA	2,420	320	1,623	-	166
INDONESIA	130,129	-	10,586	-	-
KOREA REPUBLIC	1,383	144	12,990	-	-
LAOS P.D. REPUBLIC	323	-	-	-	-
MACAU	5,215	-	-	-	-
MALAYSIA	236,920	148	13,089	-	49,962
NEPAL	2,076	-	126	-	-
PAKISTAN	58,322	-	2,777	-	-
PHILIPPINES	73,400	1,625	1,079	-	170
SINGAPORE	94,819	726	2,663	-	-
THAILAND	42,013	245	975	-	-
OTHER ASIA NES.	5,662	4,107	22,170	629	-

APPENDIX 14 (CONT.)

EXPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE
CENTRALLY PLANNED EC	9,582	100	136	-	-
CHINA	7,051	100	129	-	-
KOREA DP. RP.	2,117	-	-	-	-
VIETNAM	414	-	-	-	-
EUROPE	2,871,159	90,636	632,221	10,893	177

DEVELOPED EC	2,859,984	90,562	631,572	10,871	177
EEC	2,025,725	61,919	549,689	5,064	177
BELGIUM-LUX	247,400	6,387	72,505	491	-
DENMARK	62,788	259	4,848	-	-
FRANCE	203,426	6,181	176,842	392	-
GERMANY FR	595,164	30,381	55,531	1,602	-
GREECE	108,713	1,277	2,268	143	-
IRELAND	49,068	122	31,321	-	-
ITALY	6,694	3,465	177,495	-	-
NETHERLANDS	198,712	5,828	28,878	1,845	-
UNITED KINGDOM	553,761	8,019	-	491	155
E.F.T.A.	793,167	27,628	67,508	5,460	-
AUSTRIA	151,568	1,132	7,630	281	-
FINLAND	131,462	1,399	1,563	615	-
ICELAND	13,643	655	353	-	-
NORWAY	119,824	5,598	1,692	566	-
PORTUGAL	27,540	628	27,306	-	-
SWEDEN	96,064	9,291	1,991	949	196
SWITZERLAND	253,066	8,925	26,970	2,942	1,068
OTHER EUROPE	41,093	1,015	14,375	347	-

ANDORA	106	-	122	-	-
GIBRALTAR	2,013	-	526	-	-
MALTA	8,318	-	2,098	-	-
SPAIN	30,611	960	10,562	338	-
YUGOSLAVIA	-	-	1,067	-	-
CENTRALLY PLANNED EC	11,174	-	649	-	-
GERMAN DM RP	9,664	-	-	-	-
HUNGARY	453	-	-	-	-
POLAND	1,012	-	244	-	-
BULGARIA	-	-	230	-	-
U.S.S.R.	100	-	462	-	-

APPENDIX 14 (CONT.)

EXPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE
OCEANIA	890,095	2,600	79,376	-	2,035

DEVELOPED EC	828,632	2,221	78,258	-	1,709
AUSTRALIA	655,852	1,822	42,087	-	303
NEW ZEALAND	172,780	399	36,171	-	1,406
DEVELOPING EC	61,463	379	1,118	-	326
AMER. SAMOA	968	-	-	-	-
SOLOMON ISLAND	236	-	-	-	-
CHRISTMAS ISLAND	-	-	-	-	174
COCOS ISLANDS	217	-	-	-	-
COOK ISLANDS	212	-	-	-	-
FIJI	4,441	-	159	-	-
FR. POLYNESIA	1,984	-	489	-	-
GUAM	34,994	-	-	-	-
NAURU	559	-	-	-	-
NEW CALEDONIA	2,785	105	364	-	109
VANUATU	729	-	-	-	-
PACIFIC ISLAND	4,344	166	-	-	-
PAPUA NEW GUINEA	9,419	-	-	-	-
TONGA	266	-	-	-	-
SAMOA	261	-	-	-	-

SOURCE : COMMODITY TRADE STATISTICS, 1982, UNITED NATIONS

APPENDIX 15

IMPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE	THAILAND
WORLD	347,691	21,465,152	5,056,380	3,302,366	200,761	64,471
DEVELOPED EC	347,623	21,459,169	4,974,753	3,283,115	199,062	64,173
DEVELOPING EC	-	3,836	17,534	-	1,689	249
CENTRALLY PLANNED EC	-	2,146	64,093	159	-	-
MISC.	-	-	-	19,068	-	-
AFRICA	-	-	575	-	-	-

SOUTH AFRICA	-	-	141	-	-	-
DEVELOPING EC	-	-	434	-	-	-
OTHER AFRICA	-	-	374	-	-	-
NIGERIA	-	-	323	-	-	-
NORTH AMERICA	44,796	5,833,624	7,322	2,342,572	1,129	109

DEVELOPED EC	44,796	5,833,624	7,264	2,342,572	1,129	109
CANADA	1,150	5,833,624	604	-	-	-
USA-PUERTO RICO	43,648	-	6,660	2,342,572	1,129	109
OTHER AMERICA	-	214	-	-	-	-

DEVELOPING EC	-	214	-	-	-	-
LAFTA	-	186	-	-	-	-
MEXICO	-	141	-	-	-	-
ASIA	-	10,604,114	720,224	686,461	158,998	46,267

DEVELOPED EC	-	10,600,492	703,271	686,461	157,344	45,018
JAPAN	-	10,600,476	703,247	686,461	157,344	45,018
DEVELOPED EC	-	3,622	16,946	-	1,654	-
MIDDLE EAST	-	-	1,160	-	-	249
IRAQ	-	-	349	-	-	-
KUWAIT	-	-	127	-	-	-
QATAR	-	-	132	-	-	-
SAUDI ARABIA	-	-	284	-	-	-
OTHER ASIA	-	3,575	15,786	-	1,654	248

HONG KONG	-	-	268	-	-	-
KOREA REPUBLIC	-	637	15,325	-	712	-
PHILIPPINES	-	-	-	-	-	-
OTHER ASIA NES.	-	2,884	-	-	-	241
MALAYSIA	-	-	-	-	870	-

APPENDIX 15 (CONT.)

IMPORTS OF PASSENGER MOTOR VEHICLES EXCLUDING BUSES (SITC 781) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE	THAILAND
EUROPE	302,591	5,027,035	4,286,332	254,200	40,147	19,034

DEVELOPED EC	302,586	5,024,976	4,252,837	254,041	40,147	19,034
EEC	294,533	4,160,582	3,877,869	244,687	36,260	16,933
BELGIUM-LUX	-	8,316	750,742	-	-	-
DENMARK	-	-	2,512	-	-	-
FRANCE	2,094	-	624,715	67,109	1,963	7,431
GERMANY FR	275,600	3,336,681	2,011,297	164,499	29,853	8,342
GREECE	-	-	105	-	-	-
IRELAND	-	17,404	115,195	-	-	-
ITALY	6,429	112,209	201,302	4,187	2,378	876
NETHERLANDS	-	731	172,001	-	-	-
UNITED KINGDOM	10,398	343,881	-	8,786	1,998	282
E.F.T.A.	8,023	864,387	172,019	9,353	3,887	2,101
AUSTRIA	293	-	7,303	-	-	-
FINLAND	-	-	492	-	-	-
PORTUGAL	-	-	2,052	-	-	-
SWEDEN	7,686	864,216	161,157	8,394	3,882	2,101
SWITZERLAND	-	150	952	949	-	-
OTHER EUROPE	-	-	212,949	-	-	-
GIBRALTAR	-	-	134	-	-	-
SPAIN	-	-	208,734	-	-	-
YUGOSLAVIA	-	-	4,046	-	-	-
CENTRALLY PLANNED EC	-	2,059	23,495	159	-	-
CZECHOSLOVAKIA	-	-	13,082	-	-	-
POLAND	-	2,059	10,364	-	-	-
ROMANIA	-	-	-	147	-	-
USSR	-	-	40,592	-	442	-

OCEANIA	188	-	1,239	-	442	-

DEVELOPED EC	188	-	1,239	-	442	-
AUSTRALIA	182	-	1,232	-	-	-
MISC	-	-	-	19,068	-	-
NOT SPECIFIED	-	-	-	19,068	-	-

SOURCE: UN, COMMODITY TRADE STATISTICS, 1982

APPENDIX 16

DESTINATION OF MOTOR VEHICLE PARTS EXPORTS (SITC 784.9) BY SELECTED REFERENCE COUNTRIES, 1982 (U.S. $'000)

COUNTRY	Japan	U.S.A.	U.K.	Canada
World	2,546,275	7,774,123	2,486,768	3,563,802
Developed Ec	1,495,770	5,608,652	1,904,563	3,173,073
Developing Ec	947,875	2,096,500	572,805	386,031
Cent. Plnd. Ec	102,630	68,966	9,396	4,698
Africa	286,030	189,956	240,121	26,099
S. Afr. Cus. Un.	198,296	73,031	95,692	18,078
Developng Ec	87,734	116,926	14,430	8,021
North Africa	37,652	77,065	52,388	4,094
Algeria	14,451	41,096	14,714	3,277
Libya Arab JM	12,522	6,176	8,181	-
Morocco	772	5,782	6,741	-
Sudan	2,662	5,991	13,374	-
Tunisia	906	1,081	2,948	-
Egypt	6,339	16,939	6,431	609
Ceuca	4,872	1,959	379	-
United RP. Camb.	2,328	692	140	-
Cent. Af. Rep.	130	-	-	-
Congo	530	1,118	-	-
Gabon	1,885	140	-	-
Other Africa	45,210	37,902	91,663	3,915
Angola	1,025	879	1,299	-
Burundi	341	-	-	-
Zaire	448	5,667	2,923	2,983
Benin	246	-	204	-
Ethiopia	1,407	530	1,600	-
Djibouti	752	-	-	-
Gambia	103	-	405	-
Ghana	271	462	5,829	-
Ivory Coast	3,400	1,489	371	-
Kenya	2,466	1,066	8,439	181
Liberia	598	10,000	299	-
Madagascar	161	911	215	-
Malawi	450	-	2,514	-
Mali	114	-	146	-
Mauritania	170	411	232	-
Cape Verde	-	-	110	-
Guinea	-	-	822	-
Mauritius	223	130	1,259	-
Mozambique	340	1,828	3,364	-
Niger	676	-	692	-
Nigeria	24,330	6,243	35,373	142
Reunion	447	-	-	-
Rwanda	645	-	-	-
Senegal	102	1,356	-	-
Seychelles	191	-	229	-
Sierra Leone	374	-	515	-
Zimbabwe	1,812	594	5,511	-
Togo	613	156	128	-
United Rp. Tanzania	2,111	1,310	11,303	144

DESTINATION OF MOTOR VEHICLE PARTS EXPORTS (SITC 784.9)
BY SELECTED REFERENCE COUNTRIES, 1982 (U.S. $'000)

CONT.				
Upper Zolta	138	-	-	-
Zambia	[illegible],127	3,491	4,613	-
Guineabissau	-	355	-	-
Somalia	-	553	1,232	-
St. Helena	-	-	166	-
Uganda	-	-	1,455	-
Comoros	-	-	-	165
Other Africa NES	-	-	-	-
North America	671,129	4,327,711	170,577	3,040,777
Dev. Ec	670,710	4,327,025	169,664	3,040,139
Canada	87,418	4,327,025	35,530	-
U.S.A. Puerto R.	583,292	-	134,134	3,040,139
Developing Ec	419	686	914	638
Bermuda	419	651	867	-
Greenland	-	-	-	212
St. Pier. Miqu	-	-	-	350
Other America	185,305	1,509,798	89,243	356,525
Developng Ec	185,305	1,509,798	89,243	356,525
LAFTA	143,898	1,426,865	60,710	352,734
Argentina	1,588	15,393	3,713	15,541
Brazil	11,889	55,702	15,055	2,981
Chile	5,685	18,600	888	1,374
Bolivia	1,304	3,025	-	-
Colombia	13,327	50,144	1,562	41,133
Ecuador	9,423	25,061	1,232	5,325
Mexico	83,494	867,486	31,732	23,383
Paraguay	841	897	236	-
Peru	6,607	24,015	1,199	736
Uruguay	606	1,210	2,037	-
Venezuela	9,134	365,277	3,037	262,215
CACM	7,908	22,473	1,820	774
Costa Rico	1,521	2,417	313	-
El Salvador	1,613	3,148	285	226
Guatemala	1,835	8,094	801	319
Honduras	2,088	4,757	167	115
Nigaragua	850	4,058	254	-
Carribean	26,513	37,505	22,866	2,470
Antigua	153	-	-	-
Bahamas	517	4,655	331	187
Barbados	732	714	2,430	183
Cuba	6,263	-	748	162
Dominican Rep.	4,185	7,998	-	-
Guadeloupe	859	770	-	-
Haiti	785	1,482	-	127
Jamaica	2,024	5,957	-	301
Neth. Antiles	1,784	5,428	-	101
Saint Lucia	136	-	-	-
Trinidad TBG	8,706	7,822	-	1,096
			-	-
Rest of America	6,985	222,955	-	-
FR. Guiana	180	593	-	-
Guyana	100	5,446	-	-
Panama	5,337	13,657	-	-

DESTINATION OF MOTOR VEHICLE PARTS EXPORTS (SITC 784.9)
BY SELECTED REFERRENCE COUNTRIES, 1982 (U.S. $'000)

CONT.				
Suriname	1,367	2,527	-	-
Belize	-	722	-	-
Cayman Islands	-	971	130	-
St. Kitts Nev	-	1,437	-	289
Turks Ca. Island	-	271	-	-
Br. Virgin Island	-	-	173	-
Asia	687,001	563,174	349,263	31,688
Dev. Ec	1,596	95,018	13,422	9,696
Israel	1,596	18,016	5,529	1,692
Japan	-	77,002	7,893	8,004
Developing Ec	666,689	464,514	335,722	20,764
Middle East	234,850	286,561	218,170	4,141
Bahrain	3,431	1,822	1,569	-
Cyprus	862	170	4,616	-
Iran	12,089	4,022	18,154	-
Iraq	74,133	19,799	37,740	2,057
Jordan	5,033	5,981	2,435	-
Kuwait	15,236	35,925	4,484	647
Lebanon	2,035	4,574	1,675	-
Omar	8,772	3,427	5,307	-
Qatar	4,471	6,292	2,417	-
Saudi Arabia	81,468	154,270	33,784	1,055
Dem. Yemen	1,967	-	915	-
Syrn. Arab Rep.	2,242	3,299	3,073	-
United Arab Em.	13,892	15,592	13,034	153
Turkey	2,596	31,025	87,799	-
Yemen	6,622	321	1,167	-
Other Asia	431,840	177,953	117,552	16,623
Afghanistan	377	127	1,557	-
Bangladesh	694	145	1,083	-
Brunei	516	-	512	-
Burma	9,463	574	176	-
Sri Lanka	1,876	678	2,189	904
H. Kong	18,150	1,731	17,853	122
India	17,211	33,870	27,524	433
Indonesia	35,555	3,453	1,882	-
Korea Rep.	69,770	40,620	10,518	997
Malaysia	21,323	7,427	5,926	362
Nepal	254	-	-	-
Pakistan	7,181	4,427	15,760	538
Philippines	44,219	13,694	8,320	1,167
Singapore	64,722	54,526	17,589	727
Thailand	35,545	4,993	4,046	104
Other Asia NES	104,828	11,434	2,439	11,219
Cent. Plnd. Ec	18,716	3,642	119	1,228
China	16,451	3,642	105	1,228
Korea D.P. Rep.	807	-	-	-
Vietnam	1,456	-	-	-

APPENDIX 16 (CONT)

DESTINATION OF MOTOR VEHICLE PARTS EXPORTS (SITC 784.9)
BY SELECTED REFERENCE COUNTRIES, 1982 (U.S. $'000)

CONT.				
Europe	398,060	916,261	1,570,917	44,796
Developed Ec	397,623	899,875	1,564,884	44,567
EEC	325,626	769,784	1,164,274	30,075
Belgium-Lux	108,747	211,534	358,646	3,895
Demark	5,563	5,812	27,306	1,265
France	10,013	135,422	182,834	2,737
Germany FR.	31,334	202,338	380,832	12,617
Greece	11,282	5,033	8,899	161
Ireland	2,318	2,094	72,170	219
Italy	2,982	23,173	76,847	758
Netherlands	11,849	20,548	56,741	679
United Kingdom	141,538	163,830	-	7,744
EFTA	69,200	109,412	292,774	12,067
Austria	5,565	5,152	14,527	127
Finland	7,004	6,313	25,938	579
Iceland	351	2,071	1,861	137
Norway	6,912	5,420	13,482	726
Portugal	9,042	6,706	35,083	-
Sweden	29,523	69,307	184,021	8,815
Switzerland	10,803	14,442	17,859	1,026
Other Europe	2,797	20,679	107,835	2,426
Malta	190	-	3,340	-
Spain	2,590	14,437	97,494	333
Yugoslavia	-	6,026	6,742	2,092
Gibraltar	-	129	211	-
Cent. Plnd. Ec	437	16,386	6,034	228
Hungary	-	6,866	795	-
Poland	-	7,185	2,210	-
Romania	-	2,288	162	152
Bulgaria	152	-	403	-
Czechoslavakia	-	-	2,276	-
German Dm.Rep.	211	-	152	-
USSR	83,477	48,937	3,243	3,241
Ocenia	235,273	218,286	63,398	60,675
Developed Ec	227,546	213,704	60,901	60,593
Australia	211,976	199,912	40,371	58,639
New Zealand	15,570	13,792	20,531	1,954
Developed Ec	7,728	4,582	2,497	-
Solomon Island	104	235	191	-
Fiji	1,466	347	823	-
FR. Polynesia	181	-	210	-
Guam	529	-	-	-
New Caledonia	249	898	219	-
Pacific Island	417	384	-	-
Papua New Cuinea	4,541	2,659	396	-
Nauru	-	-	627	-

SOURCE: UN,COMMODITY TRADE STATISTICS,1982

APPENDIX 17

IMPORTS OF MOTOR VEHICLE PARTS (SITC 784.9) BY SELECTED
REFERENCE COUNTRIES, 1982 (U.S. $'000)

COUNTRY	Japan	U.S.A.	U.K.	Canada	Singapore	Thailand
World	112,702	4,027,427	167,377	5507411	149,387	62,950
Developed Ec	104,727	3,676,420	1,654,037	5475199	137,425	61,350
Developing Ec	7,805	327,520	11,405	27694	11,874	1,213
Cent. Plnd. Ec	170	23,487	5,934	4518	-	388
North America	50,057	2,203,109	109,773	5284293	42,318	6,337
Developed Ec	50,035	2,203,105	109,772	5284293	42,318	6,337
Canada	1,230	2,203,105	4,485	-	371	-
U.S.A. Puerto R	48,805	-	105,287	5284293	41,947	6,337
Other America	604	275,406	2,346	23147	723	149
Developing Ec	604	275,406	2,346	23147	723	149
LAFTA	604	275,316	2,184	22604	723	149
Brazil	508	50,322	2,035	3474	684	149
Mexico	-	212,972	-	18996	-	-
Peru	-	372	-	109	-	-
Caribbean	-	-	-	531	-	-
Haiti	-	-	-	434	-	-
Rest of America	-	-	117	-	-	-
Panama	-	-	112	-	-	-
Argentina	-	3,263	-	-	-	
Colombia	-	1,745	-	-	-	-
Venezuela	-	6,641	-	-	-	-
					-	-
Africa	-	205	2,287	1131	-	-
S. Afr. Cus. Un	-	196	1,462	1131	-	-
Developng Ec	-	-	825	-	-	-
North Africa	-	-	374	-	-	-
Morocco	-	-	109	-	-	-
Sudan	-	-	219	-	-	-
Other Africa	-	-	449	-	-	-
Nigeria	-	-	167	-	-	-
Asia	7,293	653,007	104,038	94312	66,566	43,125
Developed Ec	-	600,129	95,470	89765	55,399	41,757
Japan	-	591,283	94,705	897645	55,398	41,757
Israel	-	8,846	766	-	-	-
Developng Ec	7,177	52,101	8,215	4547	11,135	1,064
Other Asia	7,169	51,953	6,432	4378	11,130	1,064
Hong Kong	-	783	285	985	259	-
India	-	1,859	1,118	321	1,050	-
Korea Rep.	1,955	7,232	761	261	778	-
Malaysia	-	152	-	-	2,923	164
Thailand	-	-	-	-	2,575	-
Philippines	3,897	358	2,294	-	-	-
Singapore	110	3,234	324	-	-	-
Other Asia nes	1,138	38,326	1,475	2725	-	711

APPENDIX 17 (CONT.)

IMPORTS OF MOTOR VEHICLE PARTS (SITC 784.9) BY SELECTED REFERENCE COUNTRIES, 1982 (U.S. $'000)

COUNTRY	Japan	U.S.A.	U.K.	Canada	Singapore	Thailand
Middle East	-	147	1,783	169	-	-
Oman	-	-	207	-	-	-
S. Arabia	-	-	414	-	-	-
U.A. Em.	-	-	359	-	-	-
Turkey	-	-	677	-	-	-
Kuwait	-	-	-	169	-	-
Europe	53,571	890,368	1,450,205	100626	38,082	12,809
Developed Ec	53,519	867,743	1,445,845	99470	38,052	12,788
EEC	50,354	778,274	1,319,356	53138	36,117	12,046
Belgium-Lux	583	30,224	183,020	1121	596	230
France	743	189,229	256,676	6876	2,035	1,759
Germany, FR	32,175	326,356	723,958	23404	15,645	4,153
Italy	9,472	108,219	93,206	10150	5,831	3,617
Netherlands	2,343	5,910	38,088	522	569	102
United Kingdom	4,968	115,674	-	10977	11,397	2,174
Denmark	-	2,632	15,657	-	-	-
Ireland	-	-	8,713	-	-	-
EFTA	3,162	36,237	84,071	41,894	1478	562
Norway	113	1,449	2,128	-	-	-
Sweden	958	31,589	69,298	37,608	1223	497
Switzerland	1,991	1,402	7,808	3,329	113	-
Austria	-	1,089	1,067	647	133	-
Finland	-	213	1,309	239	-	-
Portugal	-	462	2,453	-	-	-
Other Europe	-	57,647	42,418	4,438	457	179
Spain	-	57,585	41,432	4,438	455	179
Yugoslavia	-	-	928	-	-	-
Oceania	1,106	5,247	1,507	541	1665	469
Developed Ec	1,106	5,247	1,488	541	1657	469
Australia	1,098	4,978	1,283	489	1630	464
New Zealand	-	269	205	-	-	-
CENT. PLND. Ec	-	22,624	4,360	1156	-	-
Czechoslavakia	-	294	1,338	336	-	-
Romania	-	842	450	740	-	-
USSR	-	-	1,222	3,362	-	-
Hungary	-	20,930	1,615	-	-	-
Poland	-	553	866	-	-	-

SOURCE: UN, COMMODITY TRADE STATISTICS, 1982

EXPORTS OF MOTOR VEHICLE BODIES (SITC 784.2) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	SINGAPORE	THAILAND
WORLD	17,886	61,080	14,673	200	228
DEVELOPED EC	7,461	32,931	9,409	-	-
DEVELOPING EC	9,234	28,149	5,354	193	228
CENTRALLY PLANNED EC	1,190	-	-	-	-
AFRICA	6,944	1,853	354	-	-

SOUTH AFRICA CUS. UN.	6,240	739	240	-	-
DEVELOPING EC	704	1,114	-	-	-
NORTH AFRICA	400	273	-	-	-
ALGERIA	177	-	-	-	-
LIBYA ARAB JM.	203	116	-	-	-
EGYPT	-	131	-	-	-
OTHER AFRICA	280	841	165	-	-
ZAIRE	-	137	-	-	-
ZIMBABWE	224	-	-	-	-
NIGERIA	-	653	-	-	-
NORTH AMERICA	158	27,555	1,707	-	-

DEVELOPED EC	158	27,548	1,707	-	-
USA-PUERTO RICO	-	-	1,642	-	-
CANADA	-	27,548	-	-	-
OTHER AMERICA	153	-	131	-	-

DEVELOPING EC	153	-	131	-	-
LAFTA	-	12,909	-	-	-
ARGENTINA	-	119	-	-	-
CHILE	-	108	-	-	-
COLOMBIA	-	1,322	-	-	-
ECUADOR	-	1,281	-	-	-
MEXICO	-	2,435	-	-	-
PERU	-	341	-	-	-
VENEZEULA	-	7,264	-	-	-
CACM	-	490	-	-	-
GUATEMALA	-	150	-	-	-
HONDURAS	-	157	-	-	-
NICARAGUA	-	122	-	-	-
ASIA	69,247	11,896	4,985	139	228

DEVELOPED EC	-	368	-	-	-
JAPAN	-	361	-	-	-
DEVELOPING EC	8,341	11,527	4,982	139	228
MIDDLE EAST	1,035	8,346	613	-	-

APPENDIX 1B (CONT.)

EXPORTS OF MOTOR VEHICLE BODIES (SITC 784.2) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	SINGAPORE	THAILAND
IRAQ	812	350	177	-	-
KUWAIT	-	4,153	-	-	-
QATAR	-	111	-	-	-
SAUDI ARABIA	-	3,387	221	-	-
UNITED ARAB EMIRATES	-	249	-	-	-
OTHER ASIA	7,306	3,181	4,369	139	228
KOREA REP.	6,012	2,475	-	-	-
PHILIPPINES	438	123	-	-	-
SINGAPORE	253	123	1,341	-	228
THAILAND	-	198	-	-	-
HONG KONG	-	-	651	-	-
INDONESIA	138	-	2,298	-	-
MALAYSIA	257	-	-	-	-
OTHER ASIA NES	-	-	-	-	-
CENTRALLY PLANNED EC	907	-	-	-	-
CHINA	904	-	-	-	-
EUROPE	580	3,633	7,161	-	-

DEVELOPED EC	580	3,633	7,161	-	-
EEC	427	2,615	6,394	-	-
FRANCE	-	573	2,750	-	-
GERMANY	-	500	559	-	-
ITALY	-	697	114	-	-
UNITED KINGDOM	-	663	-	-	-
BELGIUM-LUX	191	-	2,314	-	-
IRELAND	-	-	349	-	-
NETHERLANDS	-	-	267	-	-
EFTA	139	838	742	-	-
AUSTRIA	-	135	140	-	-
FINLAND	-	139	-	-	-
NORWAY	-	121	-	-	-
PORTUGAL	129	126	-	-	-
SWEDEN	-	261	308	-	-
SWITZERLAND	-	-	111	-	-
OTHER EUROPE	-	180	-	-	-
YUGOSLAVIA	-	157	-	-	-
USSR	284	-	-	-	-

OCEANIA	519	851	424	-	-
DEVELOPED EC	483	642	424	-	-
AUSTRALIA	459	605	400	-	-
DEVELOPING EC	-	208	-	-	-
PAPUA NEW GUINEA	-	145	-	-	-

SOURCE : COMMODITY TRADE STATISTICS 1982, UN PUBLICATIONS

APPENDIX 19

IMPORTS OF MOTOR VEHICLES BODIES (SITC 784.2) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE	THAILAND
WORLD	179	111,064	31,338	788,361	5,130	286
DEVELOPED EC	171	110,235	31,311	787,691	4,957	286
DEVELOPING EC	-	829	-	463	173	-
CENTRALLY PLANNED EC	-	-	-	208	-	-
NORTH AMERICA	-	86,445	1,094	778,235	102	-

DEVELOPED EC	-	86,445	1,094	778,235	102	-
CANADA	-	86,445	-	-	-	-
USA-PUERTO RICO	-	-	1,094	778,235	-	-
					-	-
OTHER AMERICA	-	660	-	133	-	-
DEVELOPING EC	-	660	-	133	-	-
LAFTA	-	660	-	133	-	-
BRAZIL	-	186	-	-	-	-
MEXICO	-	460	-	124	-	-
ASIA	-	20,872	-	2,698	595	276

DEVELOPED EC	-	20,703	-	2,369	423	276
JAPAN	-	20,703	-	2,369	423	276
DEVELOPING EC	-	169	-	329	172	-
OTHER ASIA	-	169	-	329	172	-
PHILIPPINES	-	147	-	-	-	-
OTHER ASIA NES.	-	-	-	329	-	-
THAILAND	-	-	-	-	145	-
EUROPE	145	3,086	30,194	7,086	2,636	-
DEVELOPED EC	145	3,086	30,187	7,086	2,636	-
EEC	143	2,452	23,823	1,416	2,462	-
GERMANY FR	138	355	1,007	962	-	-
UNITED KINGDOM	-	2,019	-	239	2,401	-
FRANCE	-	-	5,611	136	-	-
BELGIUM-LUX	-	-	2,092	-	-	-
DENMARK	-	-	8,812	-	-	-
IRELAND	-	-	113	-	-	-
ITALY	-	-	5,228	-	-	-
NETHERLANDS	-	-	960	-	-	-
EFTA	-	634	6,302	5,671	174	-
SWEDEN	-	634	6,286	5,664	174	-
					-	-
USSR	-	-	-	208	-	-
				-	-	-
OCEANIA	-	-	-	-	1,795	-
DEVELOPED EC	-	-	-	-	1,795	-
NEW ZEALAND	-	-	-	-	1,788	-

SOURCE: UN,COMMODITY TRADE STATISTICS,1982

APPENDIX 20

EXPORTS OF MOTORCYCLES (SITC 785.1) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.
WORLD	2,588,248	66,668	22,750
DEVELOPED EC	2,116,818	59,260	20,576
DEVELOPING EC	470,451	7,335	2,091
CENTRALLY PLANNED EC	979	-	-
AFRICA	170,646	2,608	1,657

SOUTH AFRICA	30,446	910	262
DEVELOPING EC	140,200	1,699	1,395
NORTH AFRICA	4,136	-	-

MOROCCO	346	-	-
SUDAN	578	-	-
EGYPT	3,193	-	-
CEUCA	2,027	-	-
UNITED REP. CAMR.	1,704	-	-
GABON	249	-	-
OTHER AFRICA	134,037	1,681	1,345

ANGOLA	908	-	-
BURUNDI	261	-	-
ZAIRE	420	-	-
ETHIOPIA	301	-	-
DJIBOITI	394	-	-
GAMBIA	186	-	-
GHANA	203	-	531
IVORY COAST	705	-	-
KENYA	499	-	497
LIBERIA	217	-	-
MALAWI	515	-	-
MOZAMBIQUE	213	-	-
NIGER	298	-	-
NIGERIA	119,844	1,416	-
REUNION	2,005	-	-
RWANDA	617	-	-
SIERRA LEONE	295	-	-
ZIMBABWE	1,075	-	-
TOGO	287	-	-
TANZANIA REPUBLIC	7[illegible]7	-	-
UPPER VOLTA	3,191	-	-
ZAMBIA	507	-	-
SOMALIA	-	117	-
UGANDA	-	-	100

APPENDIX 2D (CONT.)

EXPORTS OF MOTORCYCLES (SITC 785.1) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.
NORTH AMERICA	1,365,930	36,554	1,440
DEVELOPED EC	1,364,961	2,375	1,439
CANADA	139,144	2,375	216
USA-PUERTO RICO	1,225,817	351	1,223
DEVELOPING EC	970	-	-
BERMUDA	970	-	-
OTHER AMERICA	69,877	4,827	304
DEVELOPING EC	69,877	4,827	304
LAFTA	54,172	4,218	-
BRAZIL	9,489	-	-
CHILE	635	-	-
COLOMBIA	10,995	772	-
ECUADOR	3,251	-	-
MEXICO	189	1,896	-
PARAGUAY	951	-	-
PERU	7,817	699	-
URUGUAY	302	-	-
VENEZUELA	20,468	309	-
ARGENTINA	-	323	-
CACM	1,687	131	-
EL SALVADOR	468	-	-
GUATEMALA	729	-	-
HONDURAS	440	-	-
			-
CARRIBEAN	11,790	375	-
JAMAICA	425	-	248
BAHAMAS	180	107	-
BARBADOS	241	-	-
DOMINICAN REPUBLIC	7,883	-	-
GUADELOUPE	1,265	-	-
HAITI	247	-	-
NETHERLANDS ANTILES	159	-	-
TRINIDAD TBG.	1,150	-	-
REST OF AMERICA	2,228	103	-

APPENDIX 20 (CONT.)

EXPORTS OF MOTORCYCLES (SITC 785.1) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.
ASIA	256575	6473	1636

DEVELOPED EC	-	5,622	1,239
JAPAN	-	5,603	1,133
ISRAEL	-	-	106
DEVELOPED EC	255,633	777	391
MIDDLE EAST	25,042	297	144
BAHRAIN	115	-	-
CYPRUS	1,632	-	-
IRAN	1,253	-	-
IRAQ	2,125	-	-
JORDAN	572	-	-
KUWAIT	2,225	-	-
LEBANON	2,065	148	-
OMAN	1,097	-	-
QATAR	673	-	-
SAUDI ARABIA	10,983	-	-
DEM. YEMEN	269	-	-
SYRN. ARAB REPUBLIC	396	-	-
UNITED ARAB EMIRATES	1,389	-	-
YEMEN	246	-	-
OTHER ASIA	230591	480	247
BANGLADESH	1,551	-	-
BURMA	542	-	-
SRI LANKA	2,545	-	-
HONG KONG	4,162	-	-
INDONESIA	105,905	-	-
INDIA	-	144	-
BRUNEI	-	-	-
KOREA REPUBLIC	1,225	-	-
MACAU	464	-	-
MALAYSIA	54,532	-	-
NEPAL	1,117	-	-
PAKISTAN	22,292	-	-
PHILIPPINES	6,842	-	-
SINGAPORE	14,418	-	-
THAILAND	9,739	-	-
OTHER ASIA NES.	5,020	188	-
CENTRALLY PLANNED EC	943	-	-
CHINA	221	-	-
KOREA REPUBLIC	125	-	-
VIETNAM	597	-	-

APPENDIX 20 (CONT.)

EXPORTS OF MOTORCYCLES (SITC 785.1) BY SELECTED REFERENCE COUNTRIES, 1982 (US $'000)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.
EUROPE	629,024	10,960	16,915

DEVELOPED EC	628,991	10,960	16,840
EEC	522,084	8,648	15,355
BELGIUM-LUX	22,199	193	163
DENMARK	6,360	-	-
FRANCE	82,531	722	769
GERMANY REPUBLIC	184,442	4,609	3,449
GREECE	18,945	-	8,207
IRELAND	937	-	1,272
ITALY	59,638	1,453	1,097
NETHERLANDS	25,795	760	310
UNITED STATES	121,237	831	-
EFTA	101,649	2,291	1,450
AUSTRIA	7,845	-	-
FINLAND	5,334	156	-
ICELAND	218	-	-
NORWAY	9,538	197	-
PORTUGAL	528	-	-
SWEDEN	29,129	1,315	196
SWITZERLAND	49,056	532	1,068
OTHER EUROPE	5,259	-	-
GIBRALTAR	203	-	-
MALTA	643	-	-
SPAIN	4,396	-	-
OCEANIA	96,191	5,247	796

DEVELOPED EC	92,420	5,232	796
AUSTRALIA	75,485	5,084	754
NEW ZEALAND	16,935	148	-
DEVELOPING EC	3,771	-	-
COOK ISLANDS	166	-	-
FR. POLYNESIA	674	-	-
GUAM	1,424	-	-
NEW CALEDONIA	395	-	-
PACIFIC ISLAND	111	-	-
PAPUA NEW GUINEA	512	-	-

SOURCE: UN, COMMODITY TRADE STATISTICS, 1982

APPENDIX 21

EXPORTS OF CYCLES ETC. NON-MOTOR (SITC 785.2)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE	THAILAND
WORLD	65,347	815	22,997	1,680	1,423	205

DEVELOPED EC	52,758	279	16,276	1,395	-	-
DEVELOPING EC	12,199	537	6,631	197	1,351	167
CENTRALLY PLANNED EC	390	-	-	-	-	-
AFRICA	2,269	-	5,077	-	-	-

SOUTH AFRICA	269	-	-	-	-	-
DEVELOPING EC	2,000	-	504	-	-	-
OTHER AFRICA	1,945	-	4,748	-	-	-
BURUNDI	181	-	-	-	-	-
NIGERIA	799	-	3,528	-	-	-
RWANDA	902	-	-	-	-	-
GHANA	-	-	534	-	-	-
KENYA	-	-	107	-	-	-
MAURITIUS	-	-	122	-	-	-
UGANDA	-	-	103	-	-	-
NORTH AFRICA	902	-	153	-	-	-
SUDAN	-	-	153	-	-	-
CEUCA	-	-	163	-	-	-
CONGO	-	-	163	-	-	-
NORTH AMERICA	42,995	137	453	1,129	-	-
-------------					-	
DEVELOPED EC	42,995	-	448	1,127	-	-
USA PUERTO RICO	38,362	-	267	1,127	-	-
CANADA	4,633	-	181	-	-	-
OTHER AMERICA	1,163	463	683	-	-	-

DEVELOPING EC	1,163	463	683	-	-	-
LAFTA	700	220	100	-	-	-
MEXICO	-	110	-	-	-	-
CARIBBEAN	-	209	421	-	-	-
TRINIDAD TBG.	-	-	258	-	-	-
CACM	242	-	-	-	-	-
REST OF AMERICA	-	-	125	-	-	-
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APPENDIX 21(CONT.)

EXPORTS OF CYCLES ETC. NON-MOTOR (SITC 785.2)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE	THAILAND
ASIA	9,399	-	1,376	134	1,401	167

DEVELOPED EC	-	-	493	-	1,336	167
ISRAEL	-	-	490	-	-	-
DEVELOPING EC	8,923	-	796	-	-	-
MIDDLE EAST	2,475	-	534	-	-	-
CYPRUS	-	-	165	-	-	-
IRAQ	828	-	-	-	-	-
KUWAIT	358	-	-	-	-	-
SAUDI ARABIA	900	-	-	-	-	-
UNITED ARAB EM.	123	-	-	-	-	-
YEMEN	146	-	-	-	-	-
OTHER ASIA	6,448	-	262	-	1,318	167
BRUNEI	-	-	-	-	162	-
HONG KONG	206	-	-	-	-	-
INDONESIA	4,673	-	-	-	-	-
KOREA REPUBLIC	120	-	-	-	-	-
MALAYSIA	-	-	-	-	-	844
PHILIPPINES	108	-	-	-	-	-
SINGAPORE	1,053	-	111	-	-	-
OTHER ASIA NES	-	-	-	-	-	-
					-	-
EUROPE	6,373	167	15,279	259	-	-

DEVELOPED EC	6,373	167	15,276	171	-	-
EEC	3,656	158	14,464	169	-	-
FRANCE	-	133	3,206	105	-	-
BELGIUM-LUX	-	-	1,490	-	-	-
DENMARK	1,830	-	198	-	-	-
GERMANY FR	369	-	550	-	-	-
IRELAND	-	-	7,906	-	-	-
ITALY	-	-	872	-	-	-
NETHERLANDS	709	-	242	-	-	-
UNITED KINGDOM	477	-	-	-	-	-
E.F.T.A.	2,675	-	677	-	-	-
SWEDEN	1,597	-	370	-	-	-
SWITZERLAND	152	-	259	-	-	-
OTHER EUROPE	152	-	134	-	-	-
						-
				-	-	-
OCEANIA	3,143	-	129	-	-	-

DEVELOPED EC	3,031	-	-	-	-	-
AUSTRALIA	2,921	-	-	-	-	-
NEW ZEALAND	110	-	-	-	-	-
DEVELOPING EC	112	-	-	-	-	-

SOURCE: UN,COMMODITY TRADE STATISTICS,1982

APPENDIX 22

IMPORTS OF CYCLES ETC. NON. MOTOR (SITC 785.2)

COUNTRY OF ORIGIN	JAPAN	U.S.A.	U.K.	CANADA	SINGAPORE	THAILAND
WORLD	1,667	128,844	35,427	7,530	6,815	721
DEVELOPED EC	1,453	55,027	29,649	4,976	1,256	134
DEVELOPING EC	232	70,637	5,431	741	2,482	561
CENTRALLY PLANNED EC	-	3,180	346	1,993	3,077	-
NORTH AMERICA	-	138	545	196	-	-

DEVELOPED EC	-	138	545	196	-	-
USA-PUERTO RICO	-	-	543	196	-	-
CANADA	-	138	-	-	-	-
ASIA	234	113,718	6,013	4,943	6,588	718

DEVELOPED EC	-	41,011	573	4,202	1,054	131
ISRAEL	-	177	-	-	-	-
JAPAN	-	40,835	573	4,202	1,054	131
DEVELOPING EC	232	70,549	5,431	741	2,482	561
OTHER ASIA	232	70,549	5,431	741	2,482	561
KOREA REPUBLIC	-	5,981	457	-	-	-
MALAYSIA	232	64,525	4,961	739	2,329	527
CENTRALLY PLANNED EC	-	2,157	-	-	3,052	-
CHINA	-	2,157	-	-	3,052	-
EUROPE	1,419	14,901	28,868	2,390	223	-

DEVELOPED EC	1,419	13,878	28,530	398	197	-
EEC	1,380	13,000	23,065	397	192	-
FRANCE	1,179	10,222	5,041	146	-	-
GERMANY FR	-	222	8,578	-	-	-
IRELAND	-	-	2,046	-	-	-
ITALY	189	2,182	6,881	113	-	-
NETHERLANDS	-	-	414	-	-	-
UNITED KINGDOM	-	300	-	131	-	-
E.F.T.A.	-	844	3,932	-	-	-
AUSTRIA	-	832	3,178	-	-	-
SWEDEN	-	-	182	-	-	-
SWITZERLAND	-	-	572	-	-	-
OTHER EUROPE	-	-	1,534	-	-	-
------------						-
SPAIN	-	-	1,071	-	-	-
YUGOSLAVIA	-	-	462	-	-	-
CENTRALLY PLANNED EC	-	1,023	338	1,992	-	-
POLAND	-	940	185	809	-	-
CZECHOSLOVAKIA	-	-	-	1,183	-	-

SOURCE: UN,COMMODITY TRADE STATISTICS,1982

APPENDIX 23

MALAYSIA : AUTOMOTIVE ANCILLARY SUPPORTING INDUSTRIES - A GENERAL TECHNOLOGY TREE OF IRON AND STEEL RELATED ACTIVITIES

TYPE OF ESTABLISHMENT	MAJOR PRODUCTION PROCESSES		GENERAL TYPE OF PRODUCTS *	EXAMPLES COMPANY	SPECIFIC PRODUCTS
	TECHNIQUE	TYPICAL OPERATIONS			
1. Foundry/Casting Factory	Casting	Moulding, Casting & Die - Casting	Engine Blocks, Crank Shafts, Gear Box, Certain Brackets & Joints, Parts Of Exhaust System Of Automobiles, etc.	Perusahaan Besi Sdn. Bhd.	Cast Iron Manholes, Covers & Frames Cast Iron Pipes & Fittings
2. Forging Plant	Solid Metal Forming	Rolling, Extrusion, Forging, Drawing	Bicycle Pedals, Connecting Rod, Internal Combustion Engine Connecting Rod, Certain Screw & bolts	United Bolt & Nut Sdn. Bhd.	Bolts & Nuts
3. Cold Roll/Drawing Mill	(a) Sheet Metal Forming	Blanking, Shearing, Bending, Drawing, Coining, Cold Hobbing, Impact Extrusion, Roll Forming, Components Rolling, Spin Forming	Cold Worked Sheets, Plates, Strips, Tubes/Pipes, Wires, Rod Bars (Especially Thin/Or Having Small Cross Sectional Area)	Far East Metal Works Sdn. Bhd.	Frames, Seat Pillar, Rims, Lamp Brackets etc.
				Ambadi Engineering Bhd.	Motorcycle, Industrial & Bicycle Chains, Clutch Plate etc.
				Sin Heng Bicycle Manufacturing Sdn. Bhd.	Joint Clip, Fork End & Crown, Chrome Plate Handle, Lamp Brackets etc.
				United Industries Sdn. Bhd.	Exhaust Muffler & Exhaust Pipes etc.
4. Electroplating Shop	(b) Surface Treatment	Electroplating	Electroplated Plastic & Metal Parts Of Automobiles & Equipment	Hup Lee Coach Builders Sdn. Bhd.	Bodies For Bus, Coach, Truck, Van etc.
5. Presswork Shop		Pressing, Joining/Welding	Pressed Brackets, Frames & Bodies Of Automobiles & Equipment		
6. Machine Shop, Machining Factory	Metal Cutting	Boring, Turning Shaping, Planing, Milling, Grinding, Drilling	Various Types Of Gears, Tools Gauges, Dies, Moulds etc.	German - Malaysian Precision Engineering Sdn. Bhd.	Autolathe Produced Components
				Gajra Gears MS Sdn. Bhd.	Crown Wheels & Pinions

* Covers "The Iron & Steel" Products To Be Produced In Malaysia Upon Completion And Operation Of HICOM's Iron & Steel Projects

SOURCE : COMPILED FROM MIDA, DIRECTORY OF ANCILLARY AND SUPPORTING INDUSTRIES IN MALAYSIA

Appendix 24

MALAYSIA : MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS, TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

Name Of Company	No. Of Employee	Ownership	Building	Products: Item	Products: Quantity (Per Annum)	Products: Application	Material: Item	Material: Source	Countries Exported To	Main Production Process: Technique	Main Production Process: Operations	Secondary Production Process: Technique	Secondary Production Process: Operation	Manufacturing Facilities: Description	Manufacturing Facilities: Qty.	Test Equipment	Other Information
Gajra Gears Sdn. Bhd.	90	31.25% (M'sian) 68.75% Foreign (India)	Total Factory Area = 3,813 sq. m	Crown Wheels & Pinions	60,000 Sets	Automotive Vehicles, Tractor & Industrial Application	Steel	N.A.	Pakistan, India, Australia, Thailand, S'pore, Indonesia, U.K., Sri Lanka, New Zealand, etc.	Metal Cutting	Turning, Drilling, Milling, Hobbing, Grinding, Lapping, Tapping, Gear Cutting, Spiral Bevel & Hypoid Gear Cutting	Heat Treatment Tool Making	N.A. Jigs Fixtures, Material - Stainless Steel & Mild Steel	Lathe	3	Hardness Testing Machinery	
														Multi Spindle Drilling & Tapping Machineries	3	Gleason Tester	
														Straightening Press, Rougher, Sharpener, Lapper, Finisher & Generator	8	Tooth Spacing Tester Rolls Carbon Deter-Minator	
														Universal Gear Machinery	1	Cutter Inspection Machinery	
														Grinding Machinery	2	Micrometer & Gauges	
														Carburising Furnace	2		
														Milling & Quenching Machineries	7		
														Tempering & Hardening Furnaces	2		
														Induction Heater			

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Appendix 24(CONT.)

MALAYSIA : MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS, TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 198[illegible]

Name Of Company	No. Of Employee	Ownership	Buildings	Products			Material		Countries Exported To	Main Production Process		Secondary Production Process		Manufacturing Facilities		Test Equipment	Other Information
				Item	Quantity (Per Annum)	Application	Item	Source		Technique	Operations	Technique	Operations	Description	Qty		
German - Malaysian Precision Engineering Sdn. Bhd.	40 (1982)	60% (M'sian) 40% (Foreign) (1983)	Total Area = 1,300 sq. m Production Area = 1,000 sq. m	Rack Pinion Steerings	250,000	Hydraulic, Shipping, Automotive & Machine Construction Industries	Steel & Non - Ferrous Materials	N.A.	W. Germany ASEAN Countries, U.S.A.	Metal Cutting	Autolathe Milling, Drilling, Sawing Assembly	Surface Treatment	Galvanizing Operations	Trauls Autolathe	N.A.	Profile Projector	
														TD 26 To TB60	N.A.		
				Tierod	600,000									Index C29	N.A.	Corda Tester	
				Outer Ball Joints	800,000									Boley Incl. Spinner	N.A.	Auto Roughness Tester	
				Steering Linkages	600, 000 (1983)									Weiler	N.A.		
														Bridgeport	N.A.	Full Set Of Gauges	
														Emco	N.A.	Galvanized Testing Equipment	
														Tool Drilling	N.A.		
														Galvanized Line	N.A.		

MALAYSIA : MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS, TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

Name Of Company	No. Of Employee	Ownership	Buildings	Products: Item	Products: Quantity (Per Annum)	Products: Application	Material: Item	Material: Source	Countries Exported To	Main Production Process: Technique	Main Production Process: Operation	Secondary Production Process: Technique	Secondary Production Process: Operations	Manufacturing Facilities: Description	Manufacturing Facilities: Qty.	Test Equipment	Other Information
Hup Lee Coach Builders Sdn. Bhd.	44	100% (M'sian)	Workshop	Bus & Coach Bodies	70 Units	Transport Industry	Steel & Aluminium	N.A.	Nil	Sheet Metal Forming	Cutting, Shaping, Bending, Rolling, Milling	Surface Treatment	Painting, Spraying Of Finished Body Work	Shearing Machinery	1	Nil	Nil
				Truck Bodies	360 Units		Plates & Sections							Metal Cutting Machinery	1		
				Refuse Collecting Vehicle Bodies	120 Units							Joining Technique	Rivetting, Welding, (Gas, Electrodes, Spots)	Bending Machinery	1		
				Van Bodies	100 Units									Rolling Machinery	1		
				Stationwagon Bodies	200 Units												

MALAYSIA : MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS, TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

Name Of Company	No. Of Employee	Ownership	Buildings	Products: Item	Products: Quantity (Per Annum)	Products: Application	Material: Item	Material: Source	Countries Exported To	Main Production Process: Technique	Main Production Process: Operations	Secondary Production Process: Technique	Secondary Production Process: Operations	Manufacturing Facilities: Description	Manufacturing Facilities: Qty.	Test Equipment	Other Information
Malaysia Radiators Sdn. Bhd.	44	60% (M'sian)	Factory = 699 sq. m	Header Plate	15,000 pc.	Radiator Core	Copper Brass Strips	Japan/ France	Singapore Australia	Sheet Metal Forming	Cutting, Blanking, Deep Drawing, Shaping, Bending, Forming	Joining Technique	Welding, Soft Soldering Brazing	Hydraulic Press	1	Micrometer Vernier Calipers	$1 Million Investment For 1982/ 1983, Expansion To 15,000 Radiators Per Year
		40% (Foreign) (India)		Header	7,500 pc.	Radiator Core	Brass Sheets	Japan						Eccentric Press	2	Gauges	
				Support	7,500 pc.	Radiator Core	CRCA Sheet	Singapore						Shearing Machinery	1	Pressure Test Rigs	
				Tube	1.5 mil. pc.	Radiator Core	Solder							Bending Machinery	1	Vernier Height Gauge	
				Tin	1.5 mil. pc.	Radiator Core								Tube Forming Machinery	1		
				Radiator Assembly	3,600 pc.	Automotive & Industrial Engines								Tin Rolling Machinery	4		
				Radiator Core	7,500 pc.	Radiator								Spot Welding Machinery	1		
														Arc Welding Transformer	1		
														Baking Oven	1		

MALAYSIA MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS, TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

Name Of Company	Number Of Employee	Ownership	Buildings	Products: Item	Products: Quantity (Per Annum)	Products: Application	Material: Item	Material: Source	Countries Exported To	Main Production Process: Technique	Main Production Process: Operations	Secondary Production Pr: Technique	Secondary Production Pr: Operations	Manufacturing Facilities: Description	Manufacturing Facilities: Qty.	Test Equipment	Other Information
Perusahaan	187	0.1%	Factory =	Cast Iron		Automotive,	Grey	N.A.	Nil	Foundries	Green Sand	Metal	Turning,	Induction			
Best		Foreign	269 sq. m	Manhole,		Machinery &	Cast			/Castings	Casting,	Cutting	Shaping,	Furnace	2	Hydraulic	
Sdn. Bhd.		(S'pore)				Equipment	Iron						Drilling,			Loading	
				Covers &	144 Tonne						Carbon		Grinding,	Centrifugal		Test	
				Frames		Machinery	Cast	N.A.			Dioxide		Lapping,	Pipe Casting		Machinery	
						Parts,	Steel				Sand,		& Sawing	Machine	1		
				Cast Iron	4,096 Tonne	Housing						Joining				Carbon	
				Pipes &		Industry					Centrifugal	Technique	Welding	Moulding		Deter -	
				Fittings							Casting		(Gas Electric)	Machine	1	Minator	
														Sand Mixer	5	Thermo -	
																Electro -	
														Lathe	1	Meter	
														Drilling		Water	
														Machine	3	Pressure	
																Test	
														Saw	2	Machinery	

Appendix 24 (CONT.)

MALAYSIA : MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS, TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

Name Of Company	No. Of Employee	Ownership	Buildings	Products			Material		Countries Exported To	Main Production Process		Secondary Production Process		Manufacturing Facilities		Test Equipment	Other Information
				Item	Quantity (Per Annum)	Application	Item	Source		Technique	Operations	Technique	Operations	Description	Qty.		
United Bolt & Nut Sdn. Bhd.	95	100% (M'sian)	Production Shop = 2,323 sq.	Bolts & Nuts	1,363 Ton	Automotive Engineering Construction	Wire Rod	Japan	U.K., Sri Lanka, Kenya, Indonesia, Australia	Solid Metal Forming	Cold Forming		Nil	Nut Press	11		
											Hot Forging			Nut Former	8		
											Wire Drawing			Nut Tapper	25		
														Bolt Form.	1		
														Header	11		
														Trimmer	15		
														Roller	14		
														Wire Drawing	5		
														Straightening	2		
														Friction Press	3		
														Lathes	5		
														Shaper	1		
														Vertical Milling	1		
														Drills	2		
														Press	6		
														Thread Cutting	3		
														Shearing	2		

Appendix 24 (CONT.)

MALAYSIA : MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

Name Of Company	No. Of Employee	Ownership	Buildings	Products			Material		Countries Exported To	Main Production Process		Secondary Production Process		Manufacturing Facilities		Test Equipment	Other Information
				Item	Quantity (Per Annum)	Application	Item	Source		Technique	Operations	Technique	Operations	Description	Qty.		
United Industries Sdn. Bhd.	129	100% (M'sian)	Factory = 16,198 sq. m	Exhaust Muffler	300,000 Pieces	Vehicles, Industrial Use	Steel Sheets	Japan	Hong Kong Australia	Sheet Metal Forming	Cutting, Blanking, Deep Drawing, Shaping, Bending, Rolling, Forming	Joining Technique	Welding (Gas, Electrodes, Spot, Seam, Inert Gas) Soft Soldering	Hydraulic Press	7	Nil	Investment Of $2.5 Million For A Pipe Forming Line In 1982. For 1983, $2 Million To Be Invested In A New Machinery To Boost Production By 30% Yearly
				Exhaust Pipes	120,000 Pieces	Vehicles, Industrial Use								Inclinable Power Press	15		
														Power Press	31		
														Carbon Dioxide Welding Machinery	14		
														Welding Machinery	21		
														Spot Welding Machinery	11		
														Seam Welding Machinery	4		

APPENDIX 25

MALAYSIA : MOTOR VEHICLE ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1987

NAME OF COMPANY	NO. OF EMPLOYEE	OWNERSHIP	BUILDINGS	PRODUCTS			MATERIAL		COUNTRIES EXPORTED TO	MAIN PRODUCTION PROCESS		SECONDARY PRODUCTION PROCESS		MANUFACTURING FACILITIES		TEST EQUIPMENT	OTHER INFORMATION
				ITEM	QUANTITY (PER ANNUM)	APPLICATION	ITEM	SOURCE		TECHNIQUE	OPERATIONS	TECHNIQUE	OPERATIONS	DESCRIPTION	QTY.		
Ambadi Engineering Bhd.	96	1.86% Foreign (India)	Production Shop & Admin. Area = 1,538 sq. m	Motorcycle, Industrial & Bicycle Chains	300,000 Units (50% Capacity)	Motorcycle, Bicycle, Industrial & Drives	Cold Rolled Alloy & Carbon Steel, Cold Drawn Open Hearth Alloy Steel Wire, Cold Rolled Bright Finished Alloy & Spring Steel Strip	Japan/ W. Germany	Nil	Sheet Metal Forming	Blanking & Piercing, Forming & Pressing, Deep Drawing, Centerless Binding	Metal Cutting	Machining, Spinning, Polishing & Tubes Manipulation	Mechanical Press	12	Hardness Testing Machinery	Material Handling Facility, 2 Ton Forklifts, 1 1/2 Pallet Trucks, Chemical Lab For Analysis Of Plating Chemicals
														Wire Cutting	2		
				Clutch Plate	20,000 Units (20% Capacity)	Engineering Industry						Heat Treatment	Hardening (Oil), Case Hardening, Tempering, Carbo Nitriding, Annealing	Tube Manipulation	1	Tensile Testing Machinery	
														Tube Cutting, Frazing	2	Life Test Machinery	
				Pressed Heat Treated & Assembled Parts	$0.2 Million (13% Capacity)	Hardware & Components						Surface Treatment	Bright, Semi - Bright & Trinickel, Zinc Plating, Copper Plating, Blackening & Color Passivation	Tumbling Stations	4	Length Measuring Set	
				Electrical Stamped Parts	N.A.	Electrical Appliances								Rotary Furnace	3	PH Meter	
				Electro - Plating	N.A.	Various Protective Finishes								Electro - Plating Plant	1	Chemical Weighing Balance	
												Joining Technique	Semi - Automatic Assembly Of Components Involving Press Fit & Rivetting	Zinc Plating Barrel	2		
														Centerless Grinder	1		
												Tool Making	Tool Room Work	Block Builder, Assembler, Rivetter, Preloader, Former	12		

APPENDIX 25 (CONT.)

MALAYSIA : MOTORCYCLES AND BICYCLES ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1987

NAME OF COMPANY	NO. OF EMPLOYEES	* OWNERSHIP	BUILDINGS	PRODUCTS: ITEM	PRODUCTS: QUANTITY (PER ANNUM)	PRODUCTS: APPLICATION	MATERIAL: ITEM	MATERIAL: SOURCE	COUNTRIES EXPORTED TO	MAIN PRODUCTION PROCESS: TECHNIQUE	MAIN PRODUCTION PROCESS: OPERATIONS	SECONDARY PRODUCTION PROCESS: TECHNIQUE	SECONDARY PRODUCTION PROCESS: OPERATIONS	MANUFACTURING FACILITIES: DESCRIPTION	MANUFACTURING FACILITIES: QTY.	TEST EQUIPMENT	OTHER INFORMATION
Far East Metalwork Sdn. Bhd.	210	100% Malaysian	Production Shop = 5735 sq. m	Frames, Front Forks, Brackets Lugs, Seat Pillar Rims, Lamp Brackets	120,000 pc. 120,000 pc. 150,000 pc. 120,000 pc. 500,000 pc. 120,000 pc.	Bicycle Assembling	Steel Tubing, Steel Strip (Hoop), Steel Sheet, Casted Parts For Front Fork	Malaysia/ Japan	Nil	Sheet Metal Forming	Shearing, Blanking, Bending, Rolling, Pressing	Metal Cutting	Turning, Drilling, Reaming, Milling, Grinding, Sawing, & Tapping	Rim Forming Machinery Power Press	2 7	Dial Gauges Alken Coulometric Thickness Tester	Makes Own Tools & Moulds
												Surface Treatment	Electroplating, Electrostatic Spraying, Enamelling	Lathe Milling Machinery	1 1		
												Joining Technique	Pre Welding, Carbon Dioxide Welding, Spot Welding & Brazing	Handle Tug Accurate End Cutting Machinery	1		
														Fork Stem Thread Cutting Machinery	1		
														Ball Race Tugs Lathe Cutting Machinery	1		
														Acid Pickling Tank	1		
														Power Coating Machinery	1		
														Enamelling Machinery	1		
														Electro-Plating Unit	1		
														Rim, Frame & Handle Polisher	N.A.		
														Welding Machinery	3		

APPENDIX 25 (CONT.)

MALAYSIA : MOTORCYCLES AND BICYCLES ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

NAME OF COMPANY	NO. OF EMPLOYEE	OWNERSHIP	BUILDINGS	PRODUCTS			MATERIAL		COUNTRIES EXPORTED TO	MAIN PRODUCTION PROCESS		SECONDARY PRODUCTION PROCESS		MANUFACTURING FACILITIES		TEST EQUIPMENT	OTHER INFORMATION
				ITEM	QUANTITY (PER ANNUM)	APPLICATION	ITEM	SOURCE		TECHNIQUE	OPERATIONS	TECHNIQUE	OPERATIONS	DESCRIPTION	QTY.		
Osaka Plastics Sdn. Bhd.	27	100% (M'sian)	Production Shop - 454 sq. m	Front Tender, Back Mirror, Front Cover, Foot Rest Rubber Side Cover	50,000 p.c. 300,000 p.c 40,000 p.c. 350,000 p.c 50,000 p.c.	Motorcycle Parts	A.B.S. P.V.C. P.M.M.A. P.P. L.D.P.E. H.D.P.E. (Injection Grade)	German M'sia Japan Japan German German	Nil	Plastic Processing	Injection Moulding	Metal Cutting	Turning, Shaping Drilling, Countersinking, Reaming, Milling, Broaching, Hobbing, Grinding, Sawing & Tapping	Injection Moulding Machineries Milling Machinery Shaper Centre Lathe	4 2 2 1	Height Gauge Dial Calipers Depth Gauge	Does Own Tool Design, Planned Investment On A Spark Erosion Machinery
												Tool Making	Moulds For Plastic Injection	Grinder	1		

APPENDIX 25 (CONT.)

MALAYSIA : MOTORCYCLES AND BICYCLES ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

NAME OF COMPANY	NO. OF EMPLOYEE	OWNERSHIP	BUILDINGS	PRODUCTS: ITEM	PRODUCTS: QUANTITY (PER ANNUM)	PRODUCTS: APPLICATION	MATERIAL: ITEM	MATERIAL: SOURCE	COUNTRIES EXPORTED TO	MAIN PRODUCTION PROCESS: TECHNIQUE	MAIN PRODUCTION PROCESS: OPERATIONS	SECONDARY PRODUCTION PROCESS: TECHNIQUE	SECONDARY PRODUCTION PROCESS: OPERATION	MANUFACTURING FACILITIES: DESCRIPTION	MANUFACTURING FACILITIES: QTY.	TEST EQUIPMENT	OTHER INFORMATION
Otomotif Malaysia Sdn. Bhd.	24	100% (M'sian)	Seat Production Shop = 1,220 sq.m Total Covered Area = 4,000 sq. m	Suzuki Seats	48,000	Motorcycles	Vinyl Leather Bayfit 3795W (Polyol), Desmodur MT10 (Isocyanate)	N.A.	Nil	Plastic Processing	Motorcycle Seat Mfg. Polyure - Therine Foam Moulding		Nil	Foaming Machinery	1	Foam Hardness Tester	
														Cure Oven	1		
														Crushing Roll Machinery	1		
														High Frequency Welder	2		
														Leather Cutting Machinery	2		
														Sewing Machinery	5		
														Drilling Machinery	1		
														Slitting Machinery	1		
														Hot Stamping Machinery	1		
														Infra Red Rays Heating Furnace	1		

APPENDIX 25 (CONT.)

MALAYSIA : MOTORCYCLES AND BICYCLES ANCILLARY/SUPPORTING INDUSTRIES - MAJOR RAW MATERIALS TECHNOLOGY AND MANUFACTURING FACILITIES OF SELECTED COMPANIES, 1982

NAME OF COMPANY	NO. OF EMPLOYEE	OWNERSHIP	BUILDINGS	PRODUCTS			MATERIAL		COUNTRIES EXPORTED TO	MAIN PRODUCTION PROCESS		SECONDARY PRODUCTION PROCESS		MANUFACTURING FACILITIES		TEST EQUIPMENT	OTHER INFORMATION
				ITEM	QUANTITY (PER ANNUM)	APPLICATION	ITEM	SOURCE		TECHNIQUE	OPERATIONS	TECHNIQUE	OPERATIONS	DESCRIPTION	QTY.		
Sin Heng Bicycle Manuf. Sdn. Bhd	46	34.49% Foreign (S'pore)	Workshop = 2,697 sq. m	Joint Clip,	131,000 pc.	Bicycle Frame,	Furniture, Pipe,	Japan	Nil	Sheet Metal Forming	Shearing, Pressing	Metal Cutting	Turning & Shaping	Double Column Press	3	Nil	Produces Dies For Own Use
				Fork End,	128,000 pc.	Rear Fork,	Metal Sheet	Japan						Power Press	10		
				Fork Crown,	64,000 pc.	Front Fork,						Surface Treatment	Chrome Plating, Spray Painting	Guillotine Shear	1		
				Lamp Bracket,	13,500 pc.	Bicycle Parts,						Joining Technique	Gap Welding, Resistance Welding	Electric Plating Silicon Rectifier	1		
				Chain Cover,	4,200 pc.	Bicycle Parts,						Tool Making	Own Tool Design	Solenium Rectifier	2		
				Chrome Plated Handle	32,700 pc.	Bicycle Parts								Resistance Welder	1		
														Welding Transformer	3		
														Spot Welder	1		
														Arc Welder	4		
														Lathe	2		
														Shaping Machinery	1		

APPENDIX 26

PROPOSED IMPORT DUTY ON TYRES, 1984/1985

(1) BTN Tariff Code	(2) Description	(3) Present Rate	(4) Proposed Rate
40.11	RUBBER TYRES OF A KIND NORMALLY USED:–		
100	on motor cars	50% or $4/– per kg. whichever is the higher.	50% or $8/– per kg. whichever is the higher.
200	on buses or lorries	50% or $4/– per kg. whichever is the higher.	50% or $8/– per kg. whichever is the higher.
410	on motor cycles	$3.97 per kg.	50% or $6/– per kg. whichever is the higher.
420	on motor scooters	$3.97 per kg.	50% or $6/– per kg. whichever is the higher.
430	on bicycles	$1.80 each	50% or $5/– each whichever is the higher.
440*	on wheel-barrows	New	50% or $2.00 per kg. whichever is the higher.

PROPOSED IMPORT DUTY ON TYRES, 1984/1985

(1) BTN Tariff Code	(2) Description	(3) Present Rate	(4) Proposed Rate
	INNER TUBES NORMALLY USED:–		
510	on motorcars	50% or $4/– per kg. whichever is the higher.	50% or $8/– per kg. whichever is the higher.
520	on buses or lorries	$3.09 per kg.	50% or $8/– per kg. whichever is the higher.
540	on motor cycles	$3.97 per kg.	50% or $6/– per kg. whichever is the higher.
550	on motor scooters	$3.97 per kg.	50% or $6/– per kg. whichever is the higher.
560	on bicycles	25¢ each	50% or 60¢ each whichever is the higher
590	other	50% or $4/– per kg, whichever is the higher.	50% or $8/– per kg. whichever is the higher.
	RETREADED TYRES NORMALLY USED:–		
710	on motorcars	$3.97 per kg.	50% or $8/– per kg. whichever is the higher.
720	on buses or lorries	$3.97 per kg.	50% or $8/– per kg. whichever is the higher.

APPENDIX 26 (CONT.)

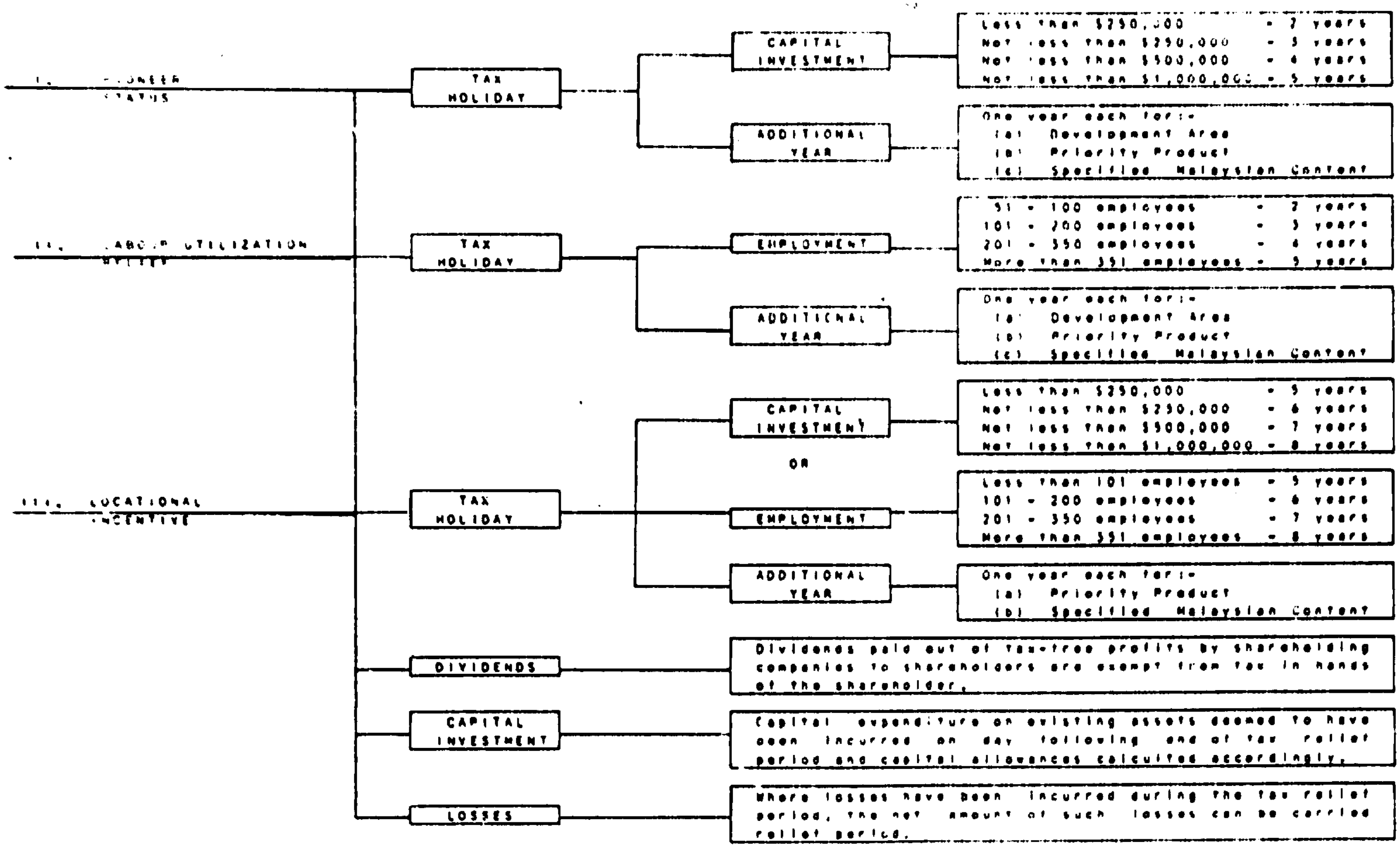
PROPOSED IMPORT DUTY ON TYRES, 1984/1985

(1) BTN Tariff Code	(2) Description	(3) Present Rate	(4) Proposed Rate
740	on motor cycles	\$3.97 per kg.	50% or \$6/– per kg. whichever is the higher.
750	on motor scooters	\$3.97 per kg.	50% or \$6/– per kg. whichever is the higher.
760	on bicycles	\$1.80 each	50% or \$5/– per kg. whichever is the higher.
	TRACTOR, IMPLEMENT AND EARTH-MOVER TYRES:–		
810	weighing not more than 726 kg. each	\$3.97 per kg.	50% or \$5/– per kg. whichever is the higher.
820	weighing more than 726 kg. each	5%	50% or \$5/– per kg. whichever is the higher.
	SOLID TYRES:–		
911	not exceeding 10 cm in external diameter	5%	50% or \$2/– per kg. whichever is the higher.
912	exceeding 10 cm but not exceeding 25 cm in external diameter	\$1.30 per kg	50% or \$2/– per kg. whichever is the higher.
913	exceeding 25 cm in external diameter	5%	50% or \$2/– per kg. whichever is the higher.

Source : Malaysia National Budget, 1985

APPENDIX 27

INVESTMENT INCENTIVES ACT 1968



INVESTMENT INCENTIVES ACT 1968

IV. INVESTMENT TAX CREDIT

- Amount not less than 25% of capital expenditure incurred on factory, plant or machinery for approved project.
- ADDITIONAL 5%
  - (a) Development
  - (b) Priority Products
  - (c) Specified Malaysian Content
- Tax relief equals amount of credit and credit can be carried forward in case of loss or insufficiency of income until fully utilised against subsequent profits.
- Dividends paid out of tax free profits exempted from tax hands of shareholders.

V. EXPORT INCENTIVES

- DEDUCTIONS FOR PROMOTION OVERSEAS
  - Qualifying Expenses
    - (a) Overseas Advertising
    - (b) Supply of free samples overseas
    - (c) Export market research
    - (d) Preparation of overseas tenders
    - (e) Supply of technical information overseas
    - (f) Public relations work connected with export
    - (g) Expenses directly contributable to the exhibits and/or participation required in trade or industrial exhibitions approved by the Minister of Trade and Industry.
    - (h) Fares in respect of travel overseas by employees of companies of business.
    - (i) Accommodation and sustenances expense incurred by Malaysian businessmen going overseas for business subject to $200/- per day.
    - (j) Cost of maintaining sales offices overseas for the promotion of exports.
- ACCELERATED DEPRECIATION ALLOWANCE
  - Only resident companies qualify
  - Must export 20% of value of total production
  - Given only in respect of capital expenditure incurred on modernization
  - Rate - 40% per annum
- EXPORT ALLOWANCE
  - 5% of the f.o.b. value of export sales, given to all exporters, including traders effective from basis year 1983

VI. SPECIAL INCENTIVES FOR APPROVED AGRICULTURAL INDUSTRIES

- INVESTMENT TAX CREDIT AMOUNTING TO 50% OF QUALIFYING CAPITAL EXPENDITURE
  - Activities Eligible For This Incentive:
    - (a) Cultivation of food crops and fruits.
    - (b) cultivation of vegetables
    - (c) Rearing of fresh water fish and prawns and marine culture.
    - (d) Rearing of livestock formeat and dairy products.

VII. HOTEL INCENTIVES

- Pioneer status; accelerated depreciation allowance; Industrial building allowance (with theexception ofK.L. District and Penang Island); abatement of income Tax on a percentage of chargeable income (depending on hotel location) for a period of 12 years; hotel tax credit.

VIII. INCREASED CAPITAL ALLOWANCE

- CAPITAL ALLOWANCE
  - (a) For qualifying plant expenditure, the rate of annual allowance is 40%.
  - (b) For qualifying building expenditure incurred on the construction of a building, the annual allowance is 3% of that expenditure.
  - (c) For qualifying building expenditure incurred on the purchase of a building, the permitted fraction is multiplied by one and one half.

APPENDIX 28

LIST OF AUTOMOTIVE COMPONENTS PRIORITY PRODUCTS

Manufacture of components, accessories, spare parts, supplies, fitting for motor vehicles

Accessories, all types

Bus and motor car seat frames

Components, accessories, spare parts, supplies and fittings for tractors and other earth-moving plants

Parts and fittings for the engine

Parts and fittings for the suspension system

Parts and fittings for the transmission system

Parts and fittings for the steering system

Parts and fittings for the braking system

Parts and fittings for the exhaust system

Parts and fittings for the cooling system

Parts and fittings for the electrical system

Parts and fittings for the window and windscreens

Parts and fittings for trim, upholstery, dashboard and seats

Parts and fittings for chassis and body

Rubber parts and fittings

Source : MIDA

LIST OF APPROVED CKD DELETED COMPONENTS

COMPONENTS	DATE OF DELETION
i) Tyres, tubes and valzes	Since comencement of assembly operations in 1967
ii) Batteries	Since comencement of assembly operations in 1967
iii) Paints and chemicals	Since comencement of assembly operations in 1967
iv) Drive chains for motorcycles	August 1975
v) Safety seat belts	September, 1978
vi) Safety glass	April, 1980
vii) Leaf springs for commercial vehicles	December 1980
viii) Exhaust systems	December 1980
ix) Mud-flaps Rear view mirror for motorcycles	November 1981
x) External side body protective mouldings for passenger cars and commercial vehicles	November 1981
xi) Carpets and underlays	November 1981
xii) Seat paddings	December 1981
xiii) Wire harness	February 1982
xiv) Spokes and nipples	December 1982
xv) U-bolts, spring pins, shake pins/bolts of leaf spring suspension systems	July 1983
xvi) Radiator hoses	August 1983

Source : Engineering Industries Division, MIDA

LIST OF COMPONENTS UNDER CONSIDERATION FOR MANDATORY DELETION

Component/Parts under consideration for Mandatory Deletion

i) Control cables for motorcycles

ii) Shock absorbers (passenger vehicles)

iii) Friction materials for motorcycles

Component/Parts which could be deleted soon

i) Steel wheel rims for passenger and light commercial vehicles

ii) Radiators for passenger and commercial vehicles

iii) Alternators, regulators, starter motora, wiper motors, windshield washers for passenger and commercial vehicles

iv) Seat complete with slides for passenger and commercial vehicles

v) Coil springs for passenger and light commercial vehicles

vi) Internal trims, upholstery, headlining & sun visor

vii) V-belt

viii) Clutch assembly (passenger & commercial vehicles)

ix) Wire harness for motorcycles

x) Horns

xi) Screw jack

xii) Shock absorbers for motorcycles

xiii) Meters, locks, switches, light assembly & ignition coil for motorcycles

xiv) Water reserve tank

Source : MIDA

MALAYSIA : SOURCING OF APPROVED CKD DELETED COMPONENTS

	COMPONENTS	LOCAL MANUFACTURERS
i)	Tyres	Dunlop Malaysian Industries Bhd Goodyear Malaysia Bhd
ii)	Batteries	Yuasa Battery (M) Sdn Bhd Chloride (M) Sdn Bhd Century Battery Sdn Bhd
iii)	Safety seat belts	Brimal Sdn Bhd
iv)	Safety glass	Malaysian Sheet Glass Bhd MCIS Safety Glass Sdn Bhd
v)	Leaf springs for Commercial vehicles	Auto Parts Manufacturers Sdn Bhd
vi)	Exhaust systems	United Industries Sdn Bhd Automotive Industries Sdn Bhd
vii)	Carpets & Underlays	Carpets International Malaysia Sdn Bhd
viii)	Seat paddings	Coco Industry Sdn Bhd
ix)	Wire harness	Amalgamated Parts Manufacturers Sdn Bhd
x)	Paints & Chemicals	Nippon Paints Sdn Bhd ICI Paints (M) Sdn Bhd
xi)	Spokes and nipples	Armstrong Cycle Parts Sdn Bhd
xii)	U-bolts, spring pins, shakle pins/bolts of leaf, spring suspension systems	Belton Sdn Bhd
xiii)	Radiator hoses	Syarikat Lian Hwa Manufacturing Sdn Bhd Fudex Rubber Manufacturing Sdn Bhd
xiv)	Suspension Shock Absorbers	Auto Parts manufacturers Co Sdn Bhd Kayaba (M) Sdn Bhd
xv)	Starter Motors, Voltage Makers, Alternators	Nippondenso (M) Sdn Bhd
xvi)	Side Mouldings	We-Li Industries Sdn Bhd

Source : MIDA

APPENDIX 32(a)

COMPONENTS TO BE PRODUCED BY HICOM

Product	Component/Part
Base Engine	
Cylinder Head	Cylinder head Cylinder head cover & cap Intake & exhaust valve Camshaft Valve spring Camshaft sprocket
	Rocker arm Rocker arm shaft Push rod - (Push rod not required for overhead cam engine)
	Rocker shaft bracket
Cylinder block	Cylinder block Connecting rod Timing chain cover Flywheel housing
Crank case	Crank shaft Flywheel Crank shaft pulley Crank shaft sprocket
Suspension	
Front suspension	Front strut axle - (Suspension strut could be produced by shock absorber maker Knuckle spindle has to be inhouse manufacture by HICOM)
	Suspension arm
Brake system	
Front wheel brake	Disc rotor
Rear wheel brake	Brake drums - (Cast iron brake drums could be produced by existing foundry)

APPENDIX 32(a) (cont)

COMPONENTS TO BE PRODUCED BY HICOM

Product	Component/Part
Body	
Under body	Rear panel Firewall (dash panel) Floor assembly Floor parts Wheel arch Reinforcement upper instrument Inner panel side Engine compartments Engine compartment part Others
Side panel	Side frame Rear fender Slide pillar Wheel housing inner Others
Roof	Roof assembly
Front fender	Fender assembly Fender outer panel Fender reinforcement Others
Door	Door assembly Glass framing Outer panelling Inner panelling Door reinforcement inner Door reinforcement outer
Front hood	Hood assembly Bonnet panelling Bonnet frame
Rear hood	Hood assembly Tail door panelling Tail door frame Finish trunk rear

APPENDIX 32 (a) (cont)

COMPONENTS TO BE PRODUCED BY HICOM

Product	Component/Part
Transaxle	
Transmission case and cover	Housing assy-clutch Transmission case
Transmission gear	Gear Shaft Sleeve & hub set-coupling
Shift lever & fork	Rod Fork Yoke assy-striking Interlock-striking Checking assy-reverse Boot-rod striking Lever assy-select
Transmission control linkage	Support assy-link Rod assy-control Lever assy-control Cover-socket, boot socket Stopper shift lever
Final drive	Case-differential Pinion-mate Gear-side Shaft
Front drive shaft	Shaft assy-front drive R.H. Shaft assy-front drive L.H.
Steering	
Steering gear	Articulated shaft - (Could be grouped under Appendix 34) Steering box

Source : HICOM

TABLE 32(b)

PRELIMINARY LOCAL CONTENT PROGRAMME FOR MALAYSIAN NATIONAL CAR

	SCHEDULE OF COMMENCEMENT		ITEMS TO BE LOCALISED
	ASSEMBLY	MACHINING	
Axle	July '88	July '89	Knuckle, Front-Hub, Welding of Rear suspension arm, Rear spindle, Rear hub & drum
Engine	Jan '90	Jan '92	Intake manifold, Exhaust manifold, Flywheel, Front Case
		Jan '93	Cylinder head, camshaft, connecting rod
		Jan '94	Cylinder block, crankshaft, Bearing Cap
Trans-mission	Jan '96	Jan '96	First gear, Reverse idle gear
		Jan '98	Transmission case, clutch housing, differential gear case.
		Jan '99	Low + Hi gear, 2nd, 3rd, 4th gear.
		Jan '2000	Sleeves, (3 items), input-output shaft, intermediate gear, differential-drive gear.

Table 32(c)

TIME SCHEDULE FOR THE PRODUCTION OF AUTOMOTIVE PARTS IN MALAYSIA

Items \ Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
A. PRESS		←	→												
B. AXLE															
(1) Assembling				←→											
(2) Machining					←→										
C. ENGINE															
(1) Assembling					←	—	→								
(2) Machining 1st Stage							←	→							
2nd Stage								←	→						
3rd Stage									←	—	→				
D. TRANSMISSION															
(1) Assembling											←	—	→		
(2) Machining 1st Stage															
2nd Stage														←	→
3rd Stage															←

Source: HICOM

APPENDIX 33

COMPONENTS THAT HAVE BEEN MANDATORILY DELETED
AND/OR TO BE DELETED SOON

Product	Component/Part
Other Engine Components	
Cooling System	Radiator* Radiator hose & clamp* Fan belt*
Lubrication system	Oil filter*
Ignition system	Spark plugs*
Inlet & cutlet system	Air filter element*
Electrical component	
Charging system	Alternator or generator* Regulator* Battery*
Starting system	Starter motor* Switch magnetic assembly*
Others	Horn Motor wiper*
Wiring	
Wire harness	Chassis wiring harness* Sub wiring harness*
Exhaust system	
Muffler	Muffler* Exhaust pipe*
Tail pipe	Tail pipe*
Fuel system	
Fuel tank	Fuel tank assembly
General chassis component	Wheel (disc & rim) Tyre & tube*
Others	Paint & thinner*

APPENDIX 33 (Cont)

COMPONENTS THAT HAVE BEEN MANDATORILY DELETED AND/OR TO BE DELETED SOON

Product	Component/Part
<u>Trim panel soft trim</u>	
Interior component	Sound proofing Carpet & floor mat*
Luggage component	Carpet & rubber mat* Jack assembly
<u>Seat</u>	
Frame	Seat frame Seat adjuster
Cover	Seat cover Seat pad*
Others	Headrest
<u>Glasses</u>	Glass doors* Windshield* Back lite*
<u>Suspension</u>	
Front suspension	Front spring Front shock absorber
Rear suspension	Rear spring Rear shock absorber*
<u>Brake system</u>	
Front wheel brake	Disc brake pad*
Rear wheel brake	Shoe and lining*
<u>Clutch</u>	
Clutch system	Clutch disc*
<u>Convenient and accessory equip</u>	
Convenient and accessory equip	Air condition* Safety belt* Mud flaps* Wheel nuts*

Note : *There are existing manufacturers.

Source : HICOM

APPENDIX 34

COMPONENTS WHERE THE VIABILITY OF PRODUCING THEM LOCALLY RESTS ON THE EXISTENCE OF SOLE SUPPLIER

Product	Component/Part	
<u>Base engine</u>		
Cylinder block	Engine piston*) Piston ring)	- (Single casting facilities is desirable; machining and grinding could be carried out by more than one project)
	Cylinder liner*	- (Existing foundry facilities could be used while machining and grinding could be carried out by more than one project)
	Piston pin	
Crank case	Connecting rod bearing	- (Specialist manufacturer of bearings on large scale production)
	Main bearing	
<u>Other engine</u>		
<u>Components</u>		
Cooling system	Thermostat) Water pump) Fan pulley)	- (Could be made by more than one supplier
Lubricating system	Oil pump) Fuel pump) Carburetor or) injection pump)	- (Could be produced by more than one specialist manufacturer)
Inlet & outlet system	Intake manifold) Exhaust manifold)	- (Inhouse manufacturer or could be produced by more than one supplier)
<u>Brake system</u>		
Front wheel brake	Caliper Cover Adaptor	
Rear wheel brake	Cylinder	

COMPONENTS WHERE THE VIABILITY OF PRODUCING THEM LOCALLY RESTS ON THE EXISTENCE OF SOLE SUPPLIER

Product	Component/Part
Brake master cylinder	Bodymaster cylinder Piston Chock valve
Power brake booster	Booster brake
Brake line	Hose) Connector) - (Could be produced by) more than one supplier)
Others	Connecting parts) Brake pipe) Anti-skid valve)
Clutch	
Clutch system	Clutch cover complete
Clutch control	Main clutch cylinder assembly
Others	Oil pipe) - (Could be made by more than Clutch level) one manufacturer)
Steering	
Steering column	Steering column Switch unit support - (Could be made by more than one supplier)
Steering	Track rod Tie rod end

Note : * There are existing manufacturers.

Source : HICOM

APPENDIX 35

OTHER COMPONENTS WHERE MORE THAN ONE MANUFACTURER
MAY BE VIABLE

Product	Component/Part
Other engine	
Components	
Cooling system	Radiator cap Electrical fan Thermostatic switch
Ignition system	Distributor Ignition coil
Electrical component	
Others	Linkage
Wiring	
Cable	Fuse box
Exhaust system	
Fuel tank	Fuel tank gauge
Trim panel soft trim	
Interior component	Headlining assembly Door trim Sunvisor Armrest Cowl slide trim Pillar garment Roof side inner & garment Parcel shelf Centre console Window handler regulator Door window regulator mechanism
Others	Door weatherstrip
Mounting parts	Weatherstrip

APPENDIX 35 (Cont)

OTHER COMPONENTS WHERE MORE THAN ONE MANUFACTURER MAY BE VIABLE

Product	Component/Part
<u>Lamps</u>	
Exterior	Headlamps - (Specialist manufacturers on large volume production desirable) Rear combination lamp Turn signal lamp License plate lamp
Interior	Roof lamp
<u>Suspension</u>	
Front suspension	Front stablizer bar Front spring bumper
Rear suspension	Rear spring bumper
<u>Other body component</u>	
Bumper	Bumper front Bumper rear Energy absorber
Front grill	Radiator grill Others
<u>Steering</u>	
Steering wheel assembly	Steering wheel Horn control cover
Steering	Damper level
<u>Instrument panel control</u>	
Instrument panel	Instrument panel Glove box Covers

Source : HICOM

APPENDIX 36

STANDARD COMPONENTS WHICH CAN BE USED BY THE NATIONAL CAR AND OTHER MAKES

Product	Component/Part
Cylinder head	Timing chain or belt
Crank case	Oil pan
Others	Engine gasket Oil lever rod Engine mounting with bracket Engine underpover
<u>Other engine</u>	
<u>Components</u>	
Cooling system	Fan shroud Cooling fan Water reserve tank Fan relay
Lubrication system	Oil pressure switch
Inlet & cutlet system	Oil filter housing Air filter housing
Engine control	Control cable
Other	Other bracket
<u>Electrical component</u>	
Others	Bracket Wiper blade Wiper arm Windscreen washer tank Battery tray Battery holder Relay Washer nozzle & hose
<u>Wiring</u>	
Cable	Spark plug cable* Battery cable* Body ground cable*
<u>Exhaust system</u>	
Others	Bracket & clamp

STANDARD COMPONENTS WHICH CAN BE USED BY THE NATIONAL CAR AND OTHER MAKES

Product	Component/Part
Fuel system	Fuel pipe & tube
Fuel line	Fuel filter*
Others	Bracket & support
General chassis component	
Wheel & tyre	Wheel caps or cap rim and centre
Trim panel soft trim	
Hood component	Sound proofing
Luggage component	Sound proofing Spare wheel cover Protector fuel tank Tools and bag
Lamps	
Others	Bracket
Suspension	
Brake master cylinder	Reservoir
Power brake booster	Vacuum hose
Brake line	Brake tube
Parking brake control	Lever parking brake Button & spring Rod push Cables parking brake
Others	Bracket
Clutch	Brake pedal
Clutch control	Return spring
Others	Clutch pedal Hose, vacuum

Note : * There are existing manufacturers

STANDARD COMPONENTS WHICH CAN BE USED BY THE NATIONAL CAR AND OTHER MAKES

Product	Component/Part
Body	
Door	Hinge & other
Front hood	Hinge & other
Rear hood	Hinge & other
Transaxle	
Transmission case and cover	Oil seal Bush, bolt, etc.
Transmission gear	Bush Bearing Ring
Shift lever & fork	Ball check and spring
Transmission control linkage	Knob hand lever Bush
Finak drive	Bearing Shim
Steering	
Others	Bracket & gasket
Instrument panel control	
Instrument panel	Ciger lighter Switch
Instrument cluster	Revolution counter Clock Pressure gauge Speedo-meter Fuel gauge Temp. gauge Lamps
Convenient and accessory equip	
Convenient and accessory equip	Radio

Source : HICOM

APPENDIX 37

PRELIMINARY LIST OF AUTOMOTIVE COMPONENTS

	AUTOMOTIVE COMPONENTS	JVC*	OTHERS
1.	BODY PARTS		
	Bumpers	x	x
*@	Carpets		x
	Door-handles		x
	Door Hinges		x
	Door Locks		x
	Emblems		x
*@	Floor Mats		x
	Fuel Tanks	x	
*@	Glass		x
*@	Mouldings		x
	Radiator Grilles		x
	Rubber Dampers		x
*@	Safety Belts		
@	Seat Frame	x	
*@	Seat Covers and Seat Pads		x
*@	Sun Visors		x
	Window Frames		x
	Window Regulators		x
	Body Panels	x	
2.	ELECTRICAL PARTS		
	Alarm Buzzers		x
	Cigarette Lighters		x
	Clocks		x
*@	Coolers & Air Conditioners		x
	Flasher Lamps		x
@	Flasher Units		x
	Front Combination Lamps		x
	Generators		x
	Head Lamps		x
@	Horns		x
	Interior Lights		x
	Meters (Speedometers, Tachometers, etc.)		x
@	Motors		x
	Radios		x
	Rear Combination Lamps		x
	Rear Mirrors		x
@	Regulators		x
	Relays		x
	Stereos		x
	Switches (including Fuses)		x
	Windshield Washers		x
	Windshield Wipers (including Blades)		x
*@	Wire Harness		x

APPENDIX 37 (Cont)

PRELIMINARY LIST OF AUTOMOTIVE COMPONENTS (1)

	AUTOMOTIVE COMPONENTS	JVC*	OTHERS
3.	ENGINE PARTS		
*@	Air Cleaners		x
*@	Batteries		x
	Bearing Metals		
	Camshafts	x	
	Connecting Rods	x	
	Cooling Fans		x
	Crankshafts	x	
	Cylinder Heads		x
*@	Cylinder Liners		x
	Distributors		x
	Exhaust Manifolds	x	
*@	Exhaust Pipes		x
*@	Exhaust Silencers		x
*@	Fan Belts		x
*@	Gaskets (for cylinder heads intake & exhaust pipes)		x
	Glow Plugs		x
@	Ignition Coils		x
	Intake & Exhaust Valves	x	
	Intake Manifolds	x	
	Oil Coolers		x
*@	Oil Filters		x
	Oil Pans		x
	Oil Pumps		x
*@	Pistons		x
*@	Pistons Pins		x
*@	Pistons Rings		x
*@	Radiators		x
*@	Spark Plugs		x
@	Starters		x
	Thermostats		x
	Timing Belts		x
*@	Timing Chains		x
	Timing Gears	x	
	Timing Gear Cases	x	
	Valves Springs		x
	Water Pumps		x
4.	FUEL PARTS		
	Carburetors		x
*@	Fuel Filters		x
	Fuel Injection Equipment		x
	Fuel Pipes (Metal)		x
	Fuel Pipes (Non-metal)		x
	Fuel Pumps (Electrical)		x
	Fuel Pumps (Mechanical)		x

APPENDIX 37 (Cont)

PRELIMINARY LIST OF AUTOMOTIVE COMPONENTS

	AUTOMOTIVE COMPONENTS	JVC*	OTHERS
5.	**POWER TRAIN - CHASSIS PARTS**		
	Air Brake Assemblers		x
	Air Brake Hoses		x
	Air Brake Valves		x
	Aluminium Wheels		x
	Anti Skid Assemblies	x	
	Axle Housing		x
	Ball Joints (for steering assemblies & suspension)		x
	Brake Booster		x
	Brake Drums		x
*@	Brake Linings		x
	Brake Pipes		x
	Brake Return Springs		x
	Brake Safety Assemblies (Tandem Master Cylinders, Safety Cylinders, etc.)		x
	Brake Shoes		x
	Chassis Springs		x
	Clutch Assemblies		x
*@	Clutch Facing		x
	Clutch Forks		x
	Disc Brake Assemblies		x
*@	Disc Pads		x
	Disc Rotors	x	
	Drum Brake Assenlies		x
	Drum Brake Back Plate		x
	Master Cylinders		x
	Oil Brake Hoses		x
	Power Steerings		x
	Propeller Shafts (including Front Wheeel Drive)	x	
	Rear Axle Shafts	x	
*@	Shock Absorbers		x
	Steering Assemblies		x
	Steering Knuckles	x	
	Steering Lock Assemblies		x
	Steering Wheels		x
	Tie Rods Assemblies	x	
	Transmission	x	
	Transmission Fork Shafts		x
	Transmission Shift Forks		x
	Universal Joints		x
@	Wheels		x
	Wheel Caps		x
	Wheel Cylinders		x

PRELIMINARY LIST OF AUTOMOTIVE COMPONENTS

	AUTOMOTIVE COMPONENTS	JVC*	OTHERS
6.	MISCELLANEOUS PARTS		
	Bushings		x
*@	Control Cables		x
	Metre Cables		x
*@	Oil Seals		x
	Packings		x
*@	Rubber Hoses		x
	Small Coil Springs		x
	Vinyl Hoses		x

Notes :

@ indicates product that are approved by Government for local manufacture.

* JVC - HICOM/MMC/MC Joint Venture.

Others - Private sector joint ventures or HICOM joint ventures, with MMC Vendors or others.

(1) discussed between HICOM/MACPMA, JAN 29, 1983.

Source : HICOM

APPENDIX 38

LOCAL CONTENT PROGRAMME FOR BODY STAMPING PARTS

First Stage (1)

Types of Components

1) Front fender
2) Quarter panel outer
3) Roof drip channel rear
4) Quarter panel inner
5) Roof panel
6) Roof rail front
7) Roof rail rear
8) Rear shelf panel
9) Rear shelf reinforcement
10) Hood outer panel
11) Hood inner panel
12) Trunk lid outer panel
13) Truck lid inner panel
14) Roof bow
15) Rear end panel outer
16) Rear end panel corner
17) Rear end panel inner
18) Trunk lid bracket
19) Rear floor pan
20) Rear floor side sill
21) Rear pillar
22) Rear pillar reinf.
23) Grill filler panel
24) Front bumper reinf.
25) Front bumper stay reinf.
26) Front bumper stay
27) Rear bumper reinf.
28) Rear bumper stay
29) Shelf corner panel

Second Stage (2)

Types of Components

1) Front end crossmember
2) Head lamp support panel
3) Rear floor sidemember
4) Front fender shield inner
5) Front fender shield outer
6) Strut house panel
7) Strut house bracket
8) Engine mount bracket
9) Engine mount reinf.
10) Front and gusset
11) Front sidemember front inner
12) Front sidemember front gusset
13) Front sidemember plate rear
14) Front sidemember front outer
15) Front hook reinf.
16) Rear floor sidemember reinf.
17) Rear floor sidemember extension
18) Dash panel
19) Dash panel reinf.
20) Cowl top panel inner
21) Cowl top bulkhead
22) Cowl top panel outer
23) Front floor pan
24) Front floor side sill inner
25) Front floor crossmember
26) Front floor sidemember
27) Rear floor extension
28) Rear floor extension reinf.
29) Rear floor crossmember
30) Front sidemember rear inner
31) Front sidemember rear outer
32) Front sidemember rear lower
33) Front sidemember rear gusset
34) Front frame upper rear inner
35) Front frame upper rear outer
36) Battery tray
37) Front floor side sill in.trt.
38) Backbone reinf. rear
39) Backbone reinf. front
40) Fuel tank upper
41) Fuel tank lower
42) Steering column bracket A
43) Steering column bracket B
44) Fuel tank support crossmember
45) Dash panel crossmember
46) Dash panel crossmember side
47) Steering gear housing bracket
48) Front end cover panel

Third Stage (3)
Types of Components

1) Front pillar outer upper
2) Roof drip channel front
3) Front pillar outer lower
4) Front pillar inner upper
5) Front pillar inner lower
6) Rear wheel house inner
7) Shock absorber bracket lower
8) Center pillar outer
9) Center pillar inner upper
10) Center pillar inner
11) Center pillar inner lower
12) Center pillar reinf. lower
13) Front floor side sill outer
14) Front door panel outer
15) Front door panel inner
16) Front door hinge reinf. upper
17) Front door hinge reinf. lower
18) Front door sash channel A
19) Front door sash channel B
20) Front door sash channel C
21) Rear door panel outer
22) Rear door panel inner
23) Rear door sash channel A
24) Rear door sash channel B
25) Rear door sash channel C
26) Rear door hinge reinf.
27) Roof side rail outer
28) Roof side rail inner
29) Roof drip channel center
30) Quarter panel outer lower
31) Front door belt line outer
32) Front door belt line reinf. inner
33) Rear door belt line reinf. outer

Fourth Stage (4)
Types of Components

1) Roof panel
2) Tailgate outer panel
3) Tailgate inner panel
4) Quarter panel outer
5) Roof drip channel rear
6) Quarter panel extension
7) Quarter panel inner
8) Rear pillar inner
9) Rear end panel outer
10) Rear end corner panel
11) Rear end panel inner
12) Tailgate latch bracket
13) Rear bumper stay
14) Roof rail rear
15) Rear pillar reinf.
16) Rear floor pan
17) Rear floor sidemember extension

Notes:

1) Group of body stamping parts (29 items) solely used for "MNC 41" will be localized commencing from around 6 months later.

2) Group of body stamping parts (48 items) relating to the under-floor portion which are common between "MNC 41" and "MNC 44" will be localized commencing from around 3 months later from 1st stage.

3) Group of body stamping parts (33 items) relating to side-structure portion which are common between "MNC 41" and "MNC 44" will be localized commencing from around 3 months later from 2nd stage.

4) Group of body stamping & other parts (17 items) solely used for "MNC 44" will be localized commencing from around 12 months later from the start-up production of "MNC 44", of which period is necessary from the view point of worker's training and MNC will make and supply such parts to Malaysia in KD pack during such period.

APPENDIX 39

SHARE OF THE WORLD PRODUCTION OF PASSENGER CARS
BY MAJOR PRODUCING COUNTRIES 1974 AND 1983

COUNTRIES	1974 ('000)	1974 %	1983 ('000)	1983 %	AVERAGE ANNUAL GROWTH RATE (%) (1974 - 1983)
GERMANY	2,840	11.08	3,878	12.85	3.52
FRANCE	2,699	10.53	2,961	9.80	1.03
U.K	1,534	6.00	1,045	3.46	-4.18
ITALY	1,631	6.36	1,396	4.63	-1.71
SWEDEN	327	1.28	345	1.14	0.60
SPAIN	705	2.15	1,142	3.78	5.50
USSR	1,119	4.37	1,320	4.37	1.85
JAPAN	3,932	15.34	7,152	23.70	6.87
U.S.A.	7,325	28.58	6,781	22.47	-0.85
OTHERS	3,522	13.74	4,155	13.77	1.85
WORLD TOTAL	25,624	100.00	30,175	100.00	1.83

SOURCE : ANNUAL REPORT OF DAIMLER - BENZ, 1983

EXPORTS OF MOTOR VEHICLES AND COMPONENTS IN WORLD TRADE BY COUNTRY, 1978
(US $ MILLION AND PERCENTAGE)

COUNTRY	TOTAL A/		PASSENGER CARS		COMMERCIAL VEHICLES		COMPONENTS	
	VALUE A/	%	VALUE A/	%	VALUE A/	%	VALUE A/	%
Germany, Rep. of	19,940.4	20.4	11,831.4	24.5	2,841.4	14.8	5,166.2	18.6
Japan	19,034.0	19.5	10,616.8	22.0	4,694.3	24.5	1,836.4	6.6
United States	13,079.7	13.4	3,700.9	7.7	2,179.3	11.4	7,162.2	25.8
Canada	9,583.2	9.8	4,124.3	8.5	2,481.4	12.9	2,977.5	10.7
France	9,429.4	9.6	5,548.5	11.5	1,026.0	5.3	2,787.0	10.0
United Kingdom	5,519.0	5.6	1,812.4	3.8	1,007.2	5.3	2,667.1	9.6
Belgium/Luxembourg	5,282.3	5.4	4,075.0	8.4	513.7	2.7	672.9	2.4
Italy	4,695.7	4.8	2,301.1	4.8	737.7	3.8	1,503.2	5.4
Sweden	2,502.8	2.6	945.0	2.0	870.0	4.5	678.5	2.5
Spain	1,274.3	1.3	868.1	1.8	157.1	0.8	227.0	0.8
Other developed	2,598.5	2.7	625.9	1.3	759.0	4.0	1,104.3	4.0
Total developed	92,939.3	95.1	46,449.4	96.3	17,267.1	90.0	26,782.3	96.4
Czechoslavakia	905.3	0.9	140.4	0.3	321.5	1.7	378.1	1.4
Poland	139.2	0.1	139.2	0.3	-	-	-	-
USSR	2,214.0	2.3	1,078.5	2.2	1,118.1	5.8	-	-
Total CMEA B/	3,258.5	3.3	1,358.1	2.8	1,439.6	7.5	378.1	1.4
Brazil	551.6	0.6	183.3	0.4	225.0	1.2	143.1	0.5
Argentina	146.0	0.1	35.0	0.1	42.6	0.2	68.1	0.3
Mexico	256.2	0.3	63.7	0.1	44.5	0.2	[illegible]	0.5
Yugoslavia	246.3	0.2	43.6	0.1	83.1	0.4	[illegible]	0.4
India	100.8	0.1	0.9	-	29.2	0.2	[illegible]	0.2
Total developing country producers	1,300.90	1.3	326.5	0.7	424.4	2.2	[illegible]37.2	1.9
Singapore	145.3	0.1	69.4	0.1	115.8	0.1	58.5	0.2
Hong Kong	35.8	-	17.5	-	6.0	-	11.8	-
Korea, Rep. of	79	0.1	42.3	0.1	26.3	0.1	8.0	-
Malaysia	1	-	-	-	-	-	-	-
Columbia	14.5	-	-	-	-	-	13.9	0.1
All developing countries	1557	1.6	455.7	0.9	472.5	2.5	629.4	2.1
Grand Total	97,774.8	100.0	48,263.2	100.0	19,179.2	100.0	27,789.8	100

SOURCES : Calculated from United Nations Bulletin ... and United Nations Yearbook... (various years).

A/ Includes exports of motorcycles, not shown separately on table.

B/ Data for Hungary and the German Democratic Republic not available.

APPENDIX 41

MAJOR OECD IMPORTERS OF AUTOMOTIVE PRODUCTS FROM DEVELOPING COUNTRIES, 1979
(US $'000)

SOURCE	ALL OECD	US	CANADA	JAPAN	FED. REP. OF GERMANY	FRANCE	UNITED KINGDOM	OTHER
TOTAL IMPORTS	89008.8	24483.8	11664.6	705.8	8,183.00	5,914.00	8274.8	29782.8
Total developing	737.40	409.70	27.40	17.10	130.9	23.3	22.7	106.3
Latin America	506,551	229,704	12,319	1,268	118,895	15,030	3,282	56,053
Brazil	179,667	104,163	772	71	28,457	5,642	1,953	38,609
Mexico	297,356	185,699	11,506	1,137	89,254	5,728	177	3,855
Argentina	18,167	4,379	-	1	91	1,038	178	12,480
Colombia	3,078	609	-	-		2,462	7	-
Venezuela	2,608	2,558	21	2		-	20	7
Peru	1,816	1,779	16	1	6	-	14	-
Uruguay	1,024	24	-	-	847	-	36	117
Other	2,835	493	4	56	240	160	897	985
Africa a/	11,558	8	0	7	362	4,090	1,632	5,459
		-	-	-				
Morocco	3,753	4	-	-		3,319		430
Mozambique	797	-	-	-		-		797
Egypt	881	-	-	-		-	96	785
Other	6,127	4	-	7	362	771	1,536	3,447
Asia b/	219,268	109,974	15,057	15,857	11,664	4,154	17,776	44,786
Lebanon	2,740	-	4	-	93	2,586	34	23
Saudi Arabia	8,692	-	-	-	413	25	5,349	2,905
India	10,368	2,453	139	9	1,282	80	2,141	4,264
Singapore	8,026	3,325	80	3,699	13	80	313	516
Philippines	32,729	545	-	6,240	7,507	-	2,875	15,562
Korea, Rep. of	30,022	12,152	3,161	3,523	39	15	33	11,099
Hong Kong	6,962	2,793	1,370	75	85	14	406	2,219
Other	119,727	88,706	10,303	2,311	2,232	1,354	6,625	8,198

Note : a/ Excluding South Africa
b/ Excluding Isreal

Source : Organization for Economic Co-operation and Development, Trade by Commodities: Imports, 1979

APPENDIX 42

IMPORTS AND EXPORTS OF SUB-GROUPS OF TRANSPORT EQUIPMENT SECTOR FOR SELECTED COUNTRIES, 1979, (US $MILLION)

SUB-GROUPS	WORLD MARKET				DEVELOPED MARKET				DEVELOPING MARKET			
	IMPORT	%	EXPORT	%	IMPORTS	%	EXPORTS	%	IMPORTS	%	EXPORTS	%
Passenger Cars	55,213	100.00	55,039	100.00	49,226	89.20	54,455	98.90	5,987	10.80	5,840	1.10
Lorries and Special Vehicles	16,223	100.00	19,030	100.00	9,866	60.80	18,513	97.30	6,357	39.20	517	2.70
Motor Vehicle Parts and Accessories	33,077	100.00	30,822	100.00	26,926	81.40	30,049	97.50	6,151	18.60	773	2.50
Cycles Motorised or Not	4,411	100.00	4,322	100.00	3,429	77.70	3,970	91.90	982	22.30	352	8.10

SOURCE : UN, YEARBOOK OF INTERNATIONAL STATISTICS, 1980

APPENDIX 43

IMPORTS AND EXPORTS OF SUB GROUPS OF TRANSPORT EQUIPMENT SECTOR FOR SELECTED COUNTRIES, 1980, (US $'000)

SUB-GROUPS	MALAYSIA		PHILIPPINES		INDONESIA		KOREA		AUSTRALIA		UNITED KINGDOM		JAPAN		WEST GERMANY	
	IMPORTS	EXPORTS	IMPORTS	EXPORTS	IMPORTS	EXPORTS	IMPORTS	EXPORTS	IMPORTS	EXPORTS	IMPORTS	EXPORTS	IMPORTS	EXPORTS	IMPORTS	EXPORTS
Passenger Cars	347,748	1,294	71,840	1,204	165,414	-	5,966	49,680	529,015	72,417	4,902,289	1,949,250	452,030	16,114,582	4,832,400	14,561,610
Commercial Vehicles	331,036	2,737	80,777	-	570,816	462	33,890	47,966	546,628	28,046	866,278	1,387,960	31,015	7,000,673	619,023	4,933,566
Parts of Motor Vehicles	61,622	1,370	124,824	30,252	79,340	3,579	122,897	20,489	460,580	82,008	1,489,925	3,598,566	101,476	7,166,418	2,070.383	6,647,581
Motorcycles & Parts	72,027	337	6,085	-	7,398	-	624	879	97,197	335	295,994	20,340	30,284	2,802,307	271,858	117,475
Bicycles & Parts	1390 (1)	1,622	5,724	525	64,147	-	8,977	17,877	58,815	334	138,353	143,772	13,507	794,357	274,136	217,281
Aircrafts	9,783	1,255	88,617	-	36,514	1,579	336,602	125,267	142,352	52,527	3,330,773	2,859,442	781,197	27,474	1,812,159	1,539,201
Aircraft Parts	58,743	8,724	34,358	159	22,031	548	20,499	10,047	102-727	56,607	657,781	1,550,369	218,553	59,733	1,258,728	1,055,250

NOTES : (1) NON MOTORISED CYCLES

SOURCE : UN, DEPARTMENT OF STATISTICS, ANNUAL STATISTICS OF EXTERNAL TRADE, 1981
YEARBOOK OF TRADE STATISTICS, 1982

APPENDIX 44

CAR OWNERSHIP WITH RESPECT TO PER CAPITA GNP BY REFERENCE COUNTRIES

REFERENCE COUNTRIES	PASSENGER CARS IN CIRCULATION ('000)	GNP AT 1975 PRICES (MILLION U.S. $)	POPULATION (MILLION)	CAR OWNERSHIP RATE (r) ** Y	REAL GNP PER CAPITA (U.S. $) X
MALAYSIA	629	* 14,983	14.42	0.044	1,039.0
(REFERENCE GROUP 1)					
INDONESIA	630	31,515	150.52	0.004	209.4
PHILIPPINES	479	22,027	49.53	0.010	444.7
THAILAND	397	* 22,427	48.13	0.008	466.0
(REFERENCE GROUP 2)					
BRAZIL	8,149	* 172,599	121.55	0.067	1,420.0
KOREA, SOUTH	249	31,750	38.72	0.006	820.0
SINGAPORE	165	* 9,422	2.44	0.068	3,861.5
(REFERENCE GROUP 3)					
AUSTRALIA	5,950	* 103,315	14.86	0.400	6,952.6
CANADA	10,367	193,521	24.21	0.428	7,993.4
(REFERENCE GROUP 4)					
JAPAN	23,660	664,949	117.65	0.201	5,651.9
UNITED KINGDOM	15,438	* 247,478	55.83	0.276	4,432.7
U.S.A.	123,467	1,890,100	229.81	0.537	8,224.6
(REFERENCE GROUP 5)					
FRANCE	19,130	* 399,566	53.96	0.354	7,404.8
WEST GERMANY	23,236	495,915	61.67	0.377	8,041.4

NOTES : * GNP AT 1975 PRICES IN U.S. MILLION $

** r = CAR OWNERSHIP RATE = $\frac{\text{NO. OF CARS IN CIRCULATION}}{\text{POPULATION}}$

SOURCES : (1) STUART SINCLAIR, THE WORLD CAR : THE FUTURE OF THE AUTOMOBILE INDUSTRY, EUROMONITOR PUBLICATION LTD., U.K. 1983

(2) IMP, INTERNATIONAL FINANCIAL STATISTICS, APRIL 1983

APPENDIX 45

MALAYSIA : DATA FOR MOTOR VEHICLES WITH RESPECT TO GNP, POPULATION AND GNP PER CAPITA, 1961 - 1983

YEAR	DEMAND FOR PASSENGER CARS	DEMAND FOR COMMERCIAL VEHICLES	DEMAND FOR MOTOR CYCLES	REAL GNP ($ MILLION) (1970 = 100)	REAL GNP PER CAPITA ($)	POPULATION (MILLION)
1961	14,023	4,732	13,776	6,689	810	8.26
1962	14,353	4,791	14,019	7,186	844	8.51
1963	18,236	6,751	18,142	7,417	848	8.75
1964	19,600	5,248	19,533	7,984	890	8.97
1965	19,861	4,905	19,754	8,948	972	9.21
1966	20,110	4,578	19,805	9,562	1,010	9.47
1967	19,455	4,550	19,325	10,002	1,029	9.72
1968	18,810	4,307	18,551	10,421	1,048	9.94
1969	26,188	5,512	25,888	11,259	1,109	10.15
1970	27,185	7,396	26,880	11,953	1,149	10.40
1971	28,915	7,114	28,354	12,667	1,184	10.70
1972	33,275	6,943	33,015	13,903	1,264	11.00
1973	45,724	9,478	45,213	15,365	1,359	11.31
1974	52,784	13,305	52,295	16,545	1,425	11.61
1975	47,945	13,085	47,540	16,916	1,419	11.92
1976	49,742	13,495	49,456	18,731	1,530	12.24
1977	69,823	15,898	69,321	20,146	1,603	12.57
1978	76,365	17,089	76,101	21,343	1,647	12.96
1979	63,365	16,702	62,831	23,308	1,752	13.30
1980	104,646	28,929	104,242	25,363	1,893	13.40
1981	108,044	24,999	107,477	27,218	1,972	13.80
1982	107,532	21,811	106,335	28,689	1,991	14.41
1983	110,973	N.A.	N.A.	29,770	2,020	14.74

NOTE (1) ANNUAL NEW REGISTRATION IS USED AS A PROXY TO DEMAND FOR MOTOR VEHICLES FOR SARAWAK, ANNUAL INCREASE IN REGISTRATION IS USED INSTEAD

SOURCES : (1) MMVAA
(2) MINISTRY OF FINANCE, ECONOMIC REPORT, VARIOUS ISSUES
(3) MINISTRY OF TRANSPORT, YEARBOOK OF TRANSPORT STATISTICS MALAYSIA, VARIOUS ISSUES

APPENDIX 46

MALAYSIA : DEMAND FOR MOTOR VEHICLES WITH RESPECT TO GNP, POPULATION, LABOUR FORCE, GNP PER CAPITA, PUBLIC TRANSPORT, PRICE AND OPERATING COST

YEAR	DEMAND FOR PASSENGER CARS	DEMAND FOR CKD P.C. 1600 C.C AND BELOW	DEMAND FOR CKD P.C. 1600 C.C AND ABOVE	DEMAND FOR CBU PASSENGER CARS	DEMAND FOR COMMERCIAL VEHICLES	DEMAND FOR BUSES	DEMAND FOR LORRIES AND VANS	DEMAND FOR MOTOR CYCLES	REAL GNP ($ MILLION) (1970 = 100)	REAL GNP PER CAPITA ($)	LABOUR FORCE	TOTAL REGISTRATION OF PUBLIC TRANSPORT	REAL PURCHASE PRICE OF P.C.	OPERATING COST OF PASSENGER CARS
1970	27,185	16,322	4,635	4,567	7,396	624	6,244	26,880	11,953	1,149	10.40	8,595		
1971	28,915	18,449	5,079	3,978	7,114	534	6,041	30,354	12,667	1,184	10.70	15,705		
1972	33,275	19,863	4,840	4,324	6,943	534	5,926	33,015	13,903	1,264	11.00	16,459		
1973	45,724	33,666	7,679	3,716	9,478	518	8,537	45,213	15,365	1,359	11.31	17,157	8,739	
1974	52,784	41,310	11,581	5,697	13,305	590	12,199	52,295	16,545	1,425	11.61	18,407	8,873	1,166
1975	47,945	31,666	7,313	3,840	13,085	950	11,735	47,540	16,916	1,419	11.92	20,655	10,946	
1976	49,742	36,477	7,754	3,756	13,495	1,060	11,953	49,456	18,731	1,530	12.24	23,180	11,148	
1977	69,823	46,054	9,503	6,824	15,898	1,030	14,406	69,371	20,146	1,603	12.57	25,841	12,084	1,908
1978	76,365	51,382	10,916	9,075	17,089	1,178	15,145	76,101	21,343	1,647	12.96	28,184	13,663	
1979	63,365	41,728	17,842	6,499	16,702	705	14,730	62,831	23,308	1,752	13.30	29,199	14,559	
1980	164,646	58,351	20,898	9,762	28,929	1,047	26,347	104,242	25,363	1,893	13.40	33,496	14,260	
1981	108,044	65,920	29,498	11,392	24,999	1,051	22,150	107,477	27,218	1,972	13.80	35,896	14,135	2,448
1982	107,532	63,452	20,165	8,561	21,811	1,358	19,237	106,335	28,689	1,991	14.41	38,863	14,962	2,592
1983	110,973	72,378	25,029	3,921	N.A.	N.A.	N.A.	N.A.	29,770	2,070	14.74	N.A.	19,174	

NOTE (1) ANNUAL NEW REGISTRATION IS USED AS A PROXY TO DEMAND FOR MOTOR VEHICLES FOR SARAWAK, ANNUAL INCREASE IN REGISTRATION IS USED INSTEAD

(2) PRODUCTION OF PASSENGER CARS IS USED AS PROXY TO DEMAND FOR CKD PASSENGER OF 1600 C.C. AND BELOW AND 1600 C.C. AND ABOVE

(3) IMPORTS OF CBU NEW IS USED AS A PROXY TO DEMAND FOR CBU PASSENGER CARS

(4) TOTAL REGISTRATION OF PUBLIC TRANSPORT COMPRISES OF TAXI, HIRED CARS AND BUSES

SOURCES : (1) MMVAA

(2) MINISTRY OF FINANCE, ECONOMIC REPORT, VARIOUS ISSUES

(3) MINISTRY OF TRANSPORT, YEARBOOK OF TRANSPORT STATISTICS MALAYSIA, VARIOUS ISSUES

APPENDIX 47

LINEAR REGRESSION - NATIONAL DEMAND FOR PASSENGER CARS WITH RESPECT TO SELECTED VARIABLES

Regression Equation	Standard Error	Adjusted R_2	T-Test	Sample Size	Time Period
(A) Total Passenger Cars					
$Y_1 = -22,345.5 + 4.46\ x_1$	0.2074	0.9544	21.49	N = 23	1961-1983
$Y_1 = -61,277.97 + 81.46\ x_3$	4.372	0.9402	18.63	N = 23	1961-1983
$Y_1 = 94,897.1 + 8.9\ x_1 - 16,714.5\ x_2$					
Variable x_1	1.11	0.9737	8.02	N = 23	1961-1983
Variable x_2	4,135.5		-4.04		
$Y_1 = -23,640.7 + 4.85\ x_{1_{t-1}} - 2687$ Dummy					
Variable $x_{1_{t-1}}$	0.296	0.9516	16.36	N = 22	1962-1983
Variable Dummy	6,876.5		-0.39		
$Y_1 = -23,705 + 4.855\ x_{1_{t-1}} - 184.06\ x_5$					
Variable $x_{1_{t-1}}$	0.274	0.952	17.7	N = 22	1962-1983
Variable x_5	347.0		-0.53		
$Y_1 = -23,066.45 + 4.83\ x_{1_{t-1}} - 0.0112\ Y_{1_{t-1}}$					
Variable $x_{1_{t-1}}$	1.03	0.9512	4.7	N = 22	1962-1983
Variable $Y_{1_{t-1}}$	0.225		-0.05		
$Y_1 = -22,818.97 + 4.78\ x_{1_{t-1}}$					
Variable $x_{1_{t-1}}$	0.23		20.81	N = 22	1962-1983
$Y_1 = -23,306.6 + 2.7\ x_1 + 1.93\ x_{1_{t-1}}$					
Variable x_1	4.12		0.65	N = 22	1962-1983
Variable $x_{1_{t-1}}$	4.37		0.44		
(B) Locally Assembled (CKD) Passenger Cars 1600 c.c. and below					
$Y_2 = -75,714.3 + 2.902\ x_1$	0.241	0.917	12.06	N = 14	1970-1983
$Y_2 = -48,332 + 57.46\ x_3$	4.625	0.922	12.42	N = 14	1970-1983

LINEAR REGRESSION - NATIONAL DEMAND FOR PASSENGER CARS WITH RESPECT TO SELECTED VARIABLES

Regression Equation	Standard Error	Adjusted R_2	T-Test	Sample Size	Time Period
$Y_2 = 47{,}348.21 + 57.97\ x_3 - 0.089\ x_6$					
Variable x_3	28.75	0.899	2.02	N = 13	1970-1982
Variable x_6	0.92		-0.096		
$Y_2 = -2{,}889.53 + 3.58\ x_1 - 2.11\ x_4$					
Variable x_1	0.92	0.866	3.9	N = 11	1973-1981
Variable x_4	1.77		1.2		
(C) Locally Assembled (CKD) Passenger Cars above 1600 c.c.					
$Y_3 = -10{,}087.6 + 1.12\ x_1$	0.103	0.399	10.82	N = 14	1970-1983
(D) New Imported (CBU) Passenger Cars					
$Y_4 = -1{,}743.95 + 0.4201\ x_1$	0.074324	0.7206	5.652	N = 13	1970-1982
$Y_4 = -5{,}812.24 + 7.8041\ x_3$	1.4421	0.7021	5.4115	N = 13	1970-1982

Note :
Y_1 = Demand for total passenger cars.
Y_2 = Demand for locally assembled (CKD) passengers cars 1600 c.c. and below.
Y_3 = Demand for locally assembled (CKD) passenger cars above 1600 c.c.
Y_4 = Demand for new and imported (CBU) passenger cars.
X_1 = Real GNP.
x_2 = Population.
x_3 = Real GNP per capita
x_4 = Average real purchase price of passenger cars 12000 c.c. and 1300 c.c.
x_5 = Tax.
x_6 = Total Registration of public transport.
$x1_{t-1}$ = Previous year real GNP.
$Y1_{t-1}$ = Previous year demand for passenger cars.

LINEAR REGRESSION - NATIONAL DEMAND FOR COMMERCIAL VEHICLES AND MOTORCYCLES WITH RESPECT TO SELECTED VARIABLES

Regression Equation	Std. Error	Adjusted R^2	T-test	Sample Size	Time Period
(A) Commercial Vehicles					
$Y_5 = -4,191.75 + 1.01\ x_1$	0.0792	0.8845	12.72	N = 22	1961-1982
$Y_5 = -12,654.8 + 18.09\ x_3$	1.48	0.8766	12.26	N = 22	1961-1982
(B) Buses					
$Y_6 = 66.741 + 0.0409\ x_1$	0.0096	0.5881	4.258	N = 13	1970-1982
$Y_6 = -1,426.97 + 186.2525\ x_2$	39.5487	0.6383	4.7094	N = 13	1970-1982
$Y_6 = -338.127 + 0.7715\ x_3$	0.1895	0.5649	4.0717	N = 13	1970-1982
$Y_6 = -3,833.224 - 0.07051\ x_1 + 493.61\ x_2$					
Variable x_1	0.0707	0.638	0.997	N = 13	1970-1982
Variable x_2	310.9		1.588		
(C) Lorries and Vans					
$Y_7 = -6,845.55 + 1.046\ x_1$	0.1382	0.8241	7.565	N = 13	1970-1982
$Y_7 = -4,914.94 + 2.2592\ x_7$	0.427	0.6923	5.291	N = 13	1970-1982
(D) Motorcycle					
$Y_8 = -35,776.53 + 5.05\ x_1$	0.4201	0.923	12.03	N = 13	1970-1982
$Y_8 = -89,040.304 + 97.413\ x_3$	7.6	0.9316	12.82	N = 13	1970-1982
$Y_8 = -34,744.84 + 0.148\ x_6 + 4.82\ x_1$					
Variable x_6	1.7	0.915	0.087	N = 13	1970-1982
Variable x_1	2.74		1.76		

Note: Y_5 = Demand for total commercial vehicles
Y_6 = Demand for buses
Y_7 = Demand for lorries and Vans
Y_8 = Demand for motor cycles
x_1 = Real GNP
x_2 = Population
x_3 = Real GNP per capita
x_6 = Total Registration of public transport
x_7 = Industrial GNP (mining, construction, wholesale and manufacturing)

APPENDIX 4B

MALAYSIA : BREAKDOWN OF ACTUAL DEMAND FOR PASSENGER CARS AND CAR OWNERSHIP RATE, 1970 - 1983

YEAR	TOTAL DEMAND PER YEAR	AGE OF PASSENGER CARS (USING NEW REGISTRATION) (1)										TOTAL NUMBER OF CARS IN CIRCULATION (IN UNITS) (2)	REPLACEMENT (UNITS) (3)	% OF REPLACEMENT TO TOTAL DEMAND	TOTAL REGISTRATION (UNITS)	CUMULATIVE TOTAL NUMBER OF CARS THAT HAS BEEN SCRAPED AS AT	CAR OWNERSHIP RATE (CARS PER 100 PERSON) (4)	POPULATION (MILLION)
		1	2	3	4	5	6	7	8	9	10							
1970	27,185	26,188	18,810	19,455	20,110	19,861	19,600	18,236	14,353	14,023	N.A.	N.A.	N.A.	N.A.	279,410	N.A.	N.A.	10.40
1971	28,915	27,185	26,188	18,810	19,455	20,110	19,861	19,600	18,236	14,353	14,023	226,736	N.A.	N.A.	308,888	82,152	21.20	10.70
1972	33,275	28,915	27,185	26,188	18,910	19,455	20,110	19,861	19,600	18,236	14,353	245,988	14,023	42.1	340,044	94,056	22.36	11.00
1973	45,724	33,275	28,915	27,185	26,188	18,810	19,455	20,110	19,861	19,600	18,236	277,359	14,353	31.4	382,609	105,250	24.52	11.31
1974	52,784	45,724	33,275	28,915	27,185	26,188	18,810	19,455	20,110	19,861	19,600	311,907	18,236	34.5	430,435	116,528	26.86	11.61
1975	47,945	52,784	45,724	33,275	28,915	27,185	26,188	18,810	19,455	20,110	19,861	340,252	19,600	40.9	477,807	137,555	28.54	11.92
1976	49,742	47,945	52,784	45,724	33,275	28,915	27,185	26,188	18,810	19,455	20,110	370,133	19,861	39.9	524,604	154,471	30.24	12.24
1977	69,823	49,742	47,945	52,784	45,724	33,275	28,915	27,185	26,188	18,810	19,455	419,846	20,110	28.8	590,066	170,220	33.40	12.57
1978	76,365	69,823	49,742	47,945	52,784	45,724	33,275	28,915	27,185	26,188	18,810	476,756	19,455	25.5	663,915	187,159	36.79	12.96
1979	63,365	76,365	69,823	49,742	47,945	52,784	45,724	33,275	28,915	27,185	26,188	521,311	18,810	29.7	716,293	194,962	39.20	13.30
1980	104,646	63,365	76,365	69,823	49,742	47,945	52,784	45,724	33,275	28,915	27,185	599,769	26,188	25.0	873,124	273,355	44.80	13.40
1981	108,044	104,646	63,365	76,365	69,823	49,742	47,945	52,784	45,724	33,275	28,915	680,626	27,185	25.2	971,517	290,889	49.30	13.80
1982	107,532	108,044	104,646	63,365	76,365	69,823	49,742	47,945	52,784	45,724	33,275	759,245	28,915	26.9	1,077,023	317,778	52.70	14.41
1983	110,973	107,532	108,044	104,646	63,365	76,365	69,823	49,742	47,945	52,784	45,724	836,943	33,275	30.0	1,187,996	N.A.	56.78	14.74

NOTES : (1) ASSUMING THAT THE AVERAGE LIFE SPAN OF A PASSENGER CAR IS 10 YEARS
(2) TOTAL NUMBER OF CARS IN CIRCULATION IS EQUIVALENT TO TOTAL NUMBER OF CARS DEMANDED OVER THE PAST 10 YEARS
(3) REPLACEMENT DEMAND COMPRISES MAINLY OF THOSE CARS THAT HAD BEEN SCRAPPED AFTER 10 YEARS OLD AND REPLACED WITH NEW CARS
(4) CARS OWNERSHIP RATE IS CALCULATED FROM TOTAL CARS IN CIRCULATION DIVIDED BY THE POPULATION SIZE

SOURCES : (1) MMVAA
(2) MINISTRY OF FINANCE, ECONOMIC REPORT, VARIOUS ISSUES
3) MINISTRY OF TRANSPORT, YEARBOOK OF TRANSPORT STATISTICS MALAYSIA, VARIOUS ISSUES

APPENDIX 49

MALAYSIA : BREAKDOWN OF PROJECTED DEMAND FOR PASSENGER CARS AND ESTIMATED CAR OWNERSHIP RATE, 1984 - 1995

YEAR	TOTAL DEMAND PER YEAR	AGE OF PASSENGER CARS (USING NEW REGISTRATION) (1)										TOTAL NO. OF CARS IN CIRCULATION (IN UNITS) (2)	REPLACEMENT (UNITS) (3)	% OF REPLACEMENT TO TOTAL DEMAND	TOTAL REGISTRATION (UNITS)	CUMULATIVE TOTAL NO. OF CARS SCRAPPED	CAR OWNERSHIP RATE (CARS PER 100 PERSONS) (4)	POPULATION (MILLION)
		1	2	3	4	5	6	7	8	9	10							
1984	110,468	110,973	107,532	108,044	104,646	63,365	76,365	69,823	49,742	47,945	52,784	901,687	45,724	41.4	1,298,464	396,777	59.70	15.11
1985	118,008	110,468	110,973	107,532	108,044	104,646	63,365	76,365	69,823	49,742	47,945	966,911	52,764	44.7	1,416,472	449,561	62.40	15.49
1986	126,245	118,008	110,468	110,973	107,532	108,044	104,646	63,365	76,365	69,823	49,742	1,045,211	47,945	38.0	1,542,717	497,506	65.90	15.85
1987	134,860	126,245	118,008	110,468	110,973	107,532	108,044	104,646	63,365	76,365	69,823	1,130,329	49,742	36.9	1,677,577	547,248	69.70	16.21
1988	143,871	134,860	126,245	118,008	110,468	110,973	107,532	108,044	104,646	63,365	76,365	1,204,377	69,823	48.5	1,821,448	617,071	72.60	16.56
1989	153,297	143,871	134,860	126,245	118,008	110,468	110,973	107,532	108,044	104,646	63,365	1,281,309	76,365	49.8	1,974,745	693,436	75.60	16.96
1990	163,155	153,297	143,871	134,860	126,245	118,008	110,468	110,973	107,532	108,044	104,646	1,381,099	63,365	38.8	2,137,900	756,801	79.60	17.35
1991	173,456	163,155	153,297	143,871	134,860	126,245	118,008	110,468	110,973	107,532	108,044	1,449,919	104,646	60.3	2,311,366	861,447	81.70	17.75
1992	184,251	173,466	163,155	153,297	143,871	134,860	126,245	118,008	110,468	110,973	107,532	1,526,126	108,044	56.6	2,495,617	969,491	84.00	18.16
1993	195,531	184,251	173,466	163,155	153,297	143,871	134,860	126,245	118,008	110,468	110,973	1,614,125	107,532	55.0	2,691,148	1,077,023	86.90	18.56
1994	207,330	195,531	184,251	173,466	163,155	153,297	143,871	134,860	126,245	118,008	110,468	1,710,482	110,973	53.5	2,898,478	1,187,996	90.60	19.01
1995	219,671	207,330	195,531	184,251	173,466	163,155	153,297	143,871	134,860	126,245	118,008	1,819,685	110,468	50.3	3,118,149	1,298,464	93.60	19.45

NOTES : (1) ASSUMING THAT THE AVERAGE LIFE SPAN OF A PASSENGER CAR IS 10 YEARS
(2) TOTAL NUMBER OF CARS IN CIRCULATION IS EQUIVALENT TO TOTAL NUMBER OF CARS DEMANDED OVER THE PAST 10 YEARS
(3) REPLACEMENT DEMAND COMPRISES MAINLY OF THOSE CARS THAT HAD BEEN SCRAPPED AFTER 10 YEARS OLD AND REPLACED WITH NEW CARS
(4) CARS OWNERSHIP RATE IS CALCULATED FROM TOTAL CARS IN CIRCULATION DIVIDED BY THE POPULATION SIZE

SOURCES : (1) MMVAA
(2) MINISTRY OF FINANCE, ECONOMIC REPORT, VARIOUS ISSUES
(3) MINISTRY OF TRANSPORT, YERABOOK OF TRANSPORT STATISTICS MALAYSIA, VARIOUS ISSUES

APPENDIX 50

TRANSPORT EQUIPMENT GROSS OUTPUT, IMPORT AND EXPORT 1968 - 1981

SUB-DIVISION	GROSS-OUTPUT (Y) ($)	IMPORT (M) ($cif)	EXPORT (X) ($f.o.b.)	DOMESTIC DEMAND D=Y+M-X	VALUE ADDED
MOTOR VEHICLE BODIES (MIC 38431)					
1973	14,384,000	296,822	14,915	14,665,907	14,695,737
1978	37,567,000	1,001,723	16,948	38,551,775	38,585,671
1981	74,899,000	1,133,260	-	76,032,260	76,032,260
MANUFACTURE & ASSEMBLY OF MOTOR VEHICLE (MIC 38432)					
1968	66,588,000	176,330,668	7,269,931	235,648,737	12,478,006
1973	154,907,000	421,055,701	11,757,153	564,205,548	36,239,000
1978	257,388,000	995,178,092	14,082,899	1,238,483,193	74,521,000
1981	454,860,000	1,592,813,500	11,732,316	2,035,941,184	119,996,000
MANUFACTURE OF MOTOR VEHICLE PARTS AND ACCESSORIES (MIC 38432)					
1968	1,021,000	59,853,606	2,872,211	58,002,395	547,000
1973	3,806,000	44,116,183	2,844,277	45,077,906	1,596,000
1978	35,715,000	90,404,479	2,958,684	123,160,795	15,526,000
1981	98,948,000	136,918,177	6,627,017	229,239,160	39,416,000
MANUFACTURE AND ASSEMBLY OF MOTORCYCLES & SCOOTER (MIC 38441)					
1968	-	5,038,608	127,781	4,910,827	6,941,000
1973	29,258,000	55,580,204	95,839	84,742,365	24,323,000
1978	41,181,000	104,706,909	248,378	145,639,531	37,709,000
1981	100,152,000	190,231,377	6,988,841	283,394,536	
MANUFACTURE AND ASSEMBLY OF BICYCLES, TRICYCLES & TRISHAWS (MIC 38449)					
1968	18,727,000	8,988,381	85,109	27,630,272	8,751,000
1973	18,605,000	13,043,140	1,574,210	30,073,930	5,811,000
1978	25,640,000	11,410,007	2,287,291	34,762,716	6,603,000
1981	48,889,000	11,887,692	900,829	59,875,863	12,802,000
MANUFACTURE AND ASSEMBLY OF TRANSPORT EQUIPMENT					
1968	86,336,000	250,211,263	10,355,032	326,192,231	8,751,000
1973	220,960,000	534,092,050	16,286,394	738,765,656	5,811,000
1978	397,491,000	1,202,701,210	19,594,200	1,580,598,010	6,603,000
1981	777,748,000	1,932,984,006	26,249,003	2,684,483,003	12,802,000

Source: Department of Statistics, Census of Manufacturing Industries and Survey of Manufacturing Industries, various years

APPENDIX 51

GNP & GDP Deflator

YEAR	GNP CONST/CURRENT	GDP CONST/CURRENT
1960	1.1896	
1961	0.7626	
1962	1.0190	
1963	0.9866	
1964	0.9954	
1965	1.0360	
1966	1.0156	
1967	1.0208	
1968	1.0348	
1969	1.0261	
1970	1.0000	1.0000
1971	1.0060	1.0047
1972	1.0044	1.0013
1973	0.8554	0.8540
1974	0.7568	0.7537
1975	0.7829	0.7776
1976	0.6940	0.6898
1977	0.6485	0.6455
1978	0.5898	0.5877
1979	0.5409	0.5395
1980	0.5060	0.5060
1981	0.5011	0.5011
1982	0.4866	0.4849
1983	0.4660	0.4651
1984	0.4433	0.4429
1985	0.4256	0.4393

SOURCE : EPU

APPENDIX 52

Consumer Price Index, Peninsular Malaysia

(1967 = 100)

YEAR	INDEX	AV. GROWTH RATE
1968	99.80	
1969	99.40	-0.40%
1970	101.30	1.91%
1971	102.90	1.58%
1972	106.20	3.21%
1973	117.40	10.55%
1974	137.80	17.38%
1975	144.00	4.50%
1976	147.70	2.57%
1977	154.80	4.81%
1978	162.40	4.91%
1979	168.30	3.63%
1980	179.50	6.65%
1981	196.80	9.64%
1982	209.6	6.50%

(1980=100)

1981	109.70	
1982	116.10	5.83%
1983	120.40	3.70%

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