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Diagnostic and Strategy for the Malaysian Industrial & General Rubber Goods Industry

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Final Report

prepared for

UNIDO

RES&Co.

in consortium with

RAPRA TECHNOLOGY LTD.

August 1994

Executive Summary

Diagnostic & Strategy

In the First Interim Report, the major findings of our diagnostic of the Malaysian GIRG industry were as follows:

i.) the GIRG industry has developed rapidly over the past five years and has made impressive progress in domestic and export markets;

ii.) the industry continues to have features of an immature industry and the size of businesses is small by world standards. Nevertheless, there are no structural weaknesses in the industry and as the industry grows, it will develop a mature industry structure;

iii.) the industry has made rapid progress in establishing corporate capability. Though corporate capability is less developed than the industrialised countries, it is better than competitor countries within ASEAN and other low cost countries;

iv.) over the next decade, the industry is poised to grow rapidly through a combination of higher domestic demand and increased export opportunities, due to the greater internationalisation of trade in rubber products;

v.) the potential threats to the growth of the industry are a loss of competitiveness due to rising factor costs and the development of capability in lower cost countries, particularly if world-class companies from industrialised countries locate there;

vi.) the two main barriers to accelerating the development of corporate capability are lack of access to reasonably priced technological support to develop new compounds and products and to trouble - shoot manufacturing operations and export market development infrastructure.

Given this diagnostic, we recommended a two pronged strategy to develop the GIRG industry:

i.) accelerating the development of the industry by improving access to technological support and marketing infrastructure;

ii.) to attract internationally mobile investors to Malaysia by offering joint-ventures with local companies and thus both counter the threat posed by their relocating in competitor countries and to help strengthen the Malaysian industry.

In the Second Interim Report we set out the programmes we believed would help to implement the strategy effectively. Programmes were divided between three major and three other programmes as follows:

Major Programmes

Technology Centre

Establish a technology centre (GIRG Tec) dedicated to the needs of the rubber product industry. Because of the problems of cost recovery from a comparatively small rubber product industry, the institution should initially be based at RRIM and receive Government subvention. But over a three year period, it should be transformed from a self-accounting entity within RRIM (though with a separate board on which the private sector participates) into a full-fledged, independent, product development association.

In the period before a full-fledged GIRG Tec. is established, commission consultants to serve the industry's technical support requirements.

Export Market Development

Launch an export market development programme which would provide marketing assistance at an affordable cost to GIRG exporters. The programme would focus on export markets in W.Europe, USA and selected countries in the Asia-Pacific Region.

Alliances, Joint Ventures and Investor Promotion

Assist Malaysian manufacturers identify foreign partners for alliances and joint-ventures and promote interest in locating in Malaysia amongst leading international GIRG manufacturers.

Other Recommendations

Underdeveloped product areas

Closed cell sponge and oil related products represent products the manufacture of which is underdeveloped in Malaysia and for which demand is rising both in the domestic market and in the Asia-Pacific region. The short-term technical support to be provided to the industry should address issues related to existing GIRG manufacturers diversifying into these product areas.

In the case of calendered sheet and sheet products and adhesive tape, though Malaysian capability is underdeveloped and demand is increasing, investment requirements are high and there are doubts over viability. We therefore recommended commissioning feasibility studies.

Import substitution

Launch a programme to identify possibilities of substituting domestic production for the large amounts (MS250 million) of imported GIRG products.

Policies & Incentives

Prepare a position paper on reducing tariffs on imported inputs. Discuss with the industry association, MRPMA, ways of improving information on and take-up of incentives by small businesses.

Contents

Contents (contd.)

Contents (contd.)

Abbreviations

AFTA	ASEAN Free Trade Area
ASEAN	Association of South East Asian nations
CEPT	Common Effective Preferential Tariff
EC	European Community
GIRG	General & Industrial Rubber Goods
GRG	General Rubber Goods
IRG	Industrial Rubber Goods
IRSG	International Rubber Study Group
ITAF	Industrial Technical Assistance Fund
JETRO	Japan Exterant Trade Organisation
JV	Joint Venture
M&A	Mergers & Acquisitions
MATRADE	Malaysian External Trade Centre
MEXPO	Malaysian Export Centre
MIDA	Malaysian Industrial Development Authority
MIDF	Malaysian Industrial Development Fund
MITI	Ministry of International Trade & Industry
MRB	Malaysian Rubber Board
MRPMA	Malaysian Rubber Products Manufacturers Association
MRRDB	Malaysian Rubber Research & Development Board
NAFTA	North American Free Trade Area
NR	Natural Rubber
ODA	Overseas Development Administration
OEM	Original Equipment Manufacturer
R&D	Research & Development
RMA	Rubber Manufacturers Assocation (of USA)
RRIM	Rubber Research Institute of Malaysia
SMIs	Small & Medium Industries
SR	Synthetic Rubber
TOR	Terms of Reference
TPOs	Trade Promotion Organisations

Diagnostic

I Sector Definition, Characteristics & Data Sources

Sector Definition

It is conventional in the rubber industry to distinguish between tyre and non-tyre industries. But within the non-tyre industry there are a range of possible sub-divisions based either on products or end-uses. Terminology used is imprecise with the same term used to describe different product or end-use groupings and categories can have overlapping boundaries.

It is therefore important to clarify the definition of terms used.

In Malaysia, the Department of Statistics defines three sub-sectors of the rubber products industry - tyre and tubes, footwear and Other Rubber Products. Whereas the first two are discrete product categories, the latter - Other Rubber Products - covers a wide range of products serving industrial, medical and consumer uses.

The Malaysian Industrial Development Authority (MIDA) wished to focus this study on Other Rubber Products and within this sub-sector to exclude latex products such as examination, surgical and household gloves, catheters, condoms and thread in which Malaysia had already developed a world scale industry or about which plans had already been developed. The terms of reference (TOR) of the study listed the following products:

- **Industrial Rubber Goods**
  - beltings (transmission, V-belts, conveyor, position drivers)
  - hoses and tubes (moulded, wrapped, woven, hydraulic)
  - mountings (engine, machinery, vibration, bridge barriers, building mounts, shock absorbers)
  - cables

- **General Rubber Goods**
  - sports goods (golf balls, tennis balls, balls, paddlers, watersport items)
  - sheeting and matting
  - rollers
  - hot water bottles
  - floor covering
  - rubber bands
  - mouldings

In Malaysia, a distinction is made between industrial and general rubber goods, the latter covering mainly consumer goods but also some products serving industrial uses.

In the international rubber product industry, the products covered by the study would be termed hoses, belting and general rubber goods, though the term general rubber goods includes also latex gloves, catheters, condoms and threads which have been excluded from our study.

We have used the term general and industrial rubber goods (GIRG) to cover all the products included in the study. And within GIRG, further divided products in terms of industrial rubber goods, consumer goods and rubber compound. This terminology reflects the markets in which products are sold.

In addition to the products listed in the TOR there are a number of latex, foam and other products which can or may possibly be manufactured in Malaysia. We have included these in our study. The products covered by the term GIRG as used in this report are as follows:

- **Industrial Products**
  - beltings (transmission, V-belts, conveyor, position drivers)
  - hoses and tubes (moulded, wrapped, woven, hydraulic)
  - mountings (engine, machinery, vibration, bridge barriers, building mounts, shock absorbers)
  - cables
  - sheeting and matting
  - rollers
  - floor coverings
  - mouldings
  - tape

- **Consumer Goods**
  - sports goods (golf balls, tennis balls, balls, paddlers, watersport items)
  - toys, balloons
  - matting
  - hot water bottles
  - floor covering
  - stationery - rubber bands, erasers
  - foam bedding
  - inflatable rubber products

- **Rubber Compound**
  - masterbatch

Products such as matting and floor covering are both industrial and consumer goods.

The manufacture of rubber compound is included by the Malaysian Rubber Research and Development Board (MRRDB) in the category general rubber goods. The main businesses of many rubber compounders is the manufacture of compound for tyre retreading but they also manufacture masterbatch which is an input in the manufacture of GIRG products. The manufacture of masterbatch can thus be considered part of the GIRG sector.

Characteristics

The non-tyre industry including the GIRG sector can be divided broadly into two types of operations:

i.) operations dedicated to the manufacture of *specific products* such as belts, hoses and some consumer products.

ii.) operations based on various *processes* of rubber conversion such as compounding, moulding, extrusion and calendering (see figure 1)

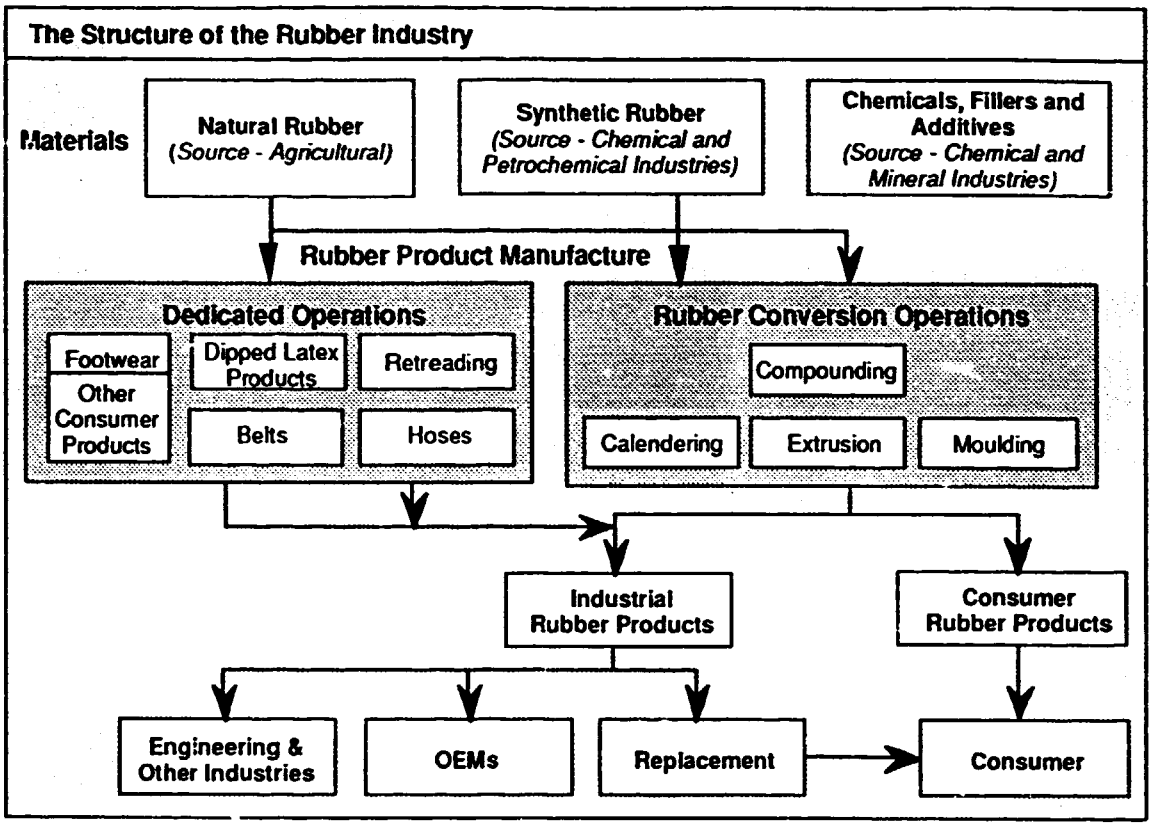


figure 1

In the GIRG sector worldwide a high proportion of industrial rubber goods and a significant proportion of consumer goods are made by rubber conversion operations. Taken together, the output of such operations is a very wide range of products which are often not given specific product categories. They are referred to in the industry simply as general mouldings or extrusions.

These conversion operations have considerable flexibility of product. They can easily adapt products to meet the needs of different applications and hence of the markets that they serve.

Analysing such operations in terms of products they currently manufacture is not productive as they are able easily to change the product they manufacture. It is more useful to evaluate them in terms of *capabilities* - to serve high or low value markets, to produce products of more or less technical sophistication and in terms of their ability to meet customer needs competitively.

The focus on capabilities rather than products has an important implication. Unlike other industries where increasing value added or serving more attractive markets often requires changing the product manufactured, in the GIRG sector it usually requires enhancing capability. *Hence strategies for the GIRG sector are capability driven rather than product driven and we have focused in this report on ways to impreove capability.*

Data Sources

Data at the level of the GIRG sector are not readily available in Malaysia. Published information from the Department of Statistics covering output, employment and value added do not provide breakdowns further than the level of Other Rubber Products.

External trade statistics do not contain a discrete category for trade in GIRG products. Whilst almost all industrial and some consumer goods are included under category 62 of the Standard Industrial Trade Classification - Rubber Products - foam bedding and sports goods are excluded from this category.

As a result, studies of the industry tend to use their own classifications and this makes data inconsistent. With no standard categories we too have had to carry out our own analysis using the definitions outlined above.

Our data sources include non-published data from the Department of Statistics prepared specially at our request, analysis of external trade statistics, use of various reports on the Malaysian rubber products industry, data from MRRDB which they have analysed specially for us, information from the Malaysian Rubber Product Manufacturers Association (MRPMA) and information from MIDA's own data-banks.

In addition, with MIDA's help and guidance, we undertook a survey of GIRG firms to collect additional data on the industry and its businesses. The survey does not provide statistically robust results but it has proved a useful cross-check on official data and provided insights on the capabilities, competitiveness and profitability of GIRG manufacturers that secondary data do not provide.

Lastly, information on the international rubber industry has been accessed from RAPRA's extensive data banks which include statistics from the International Rubber Study Group (IRSG), trade statistics on important export markets and a host of other industry sources.

II Perspectives, Performance and Economic Importance

This section profiles Malaysia's rubber products industry in the context of the international industry, examines the position of the GIRG sector within the rubber products industry, analyses its performance in the context of Malaysian economic growth and assesses its importance to the country's economic development.

International Comparisons

In contrast to Malaysia's pre-eminence as a world rubber supplier, its rubber products industry is not prominent in the world industry. It is smaller than the industries of the leading industrialised nations, many newly industrialised countries such as Korea, Taiwan and Brazil as well as those of the large developing countries such as China and India (see Figure 2).

Worldwide, rubber consumption is estimated at 14.7 million tonnes. Malaysia's rubber consumption represents less than 2% of world consumption.

International Comparison of Malaysia's Rubber Industry

Group	Country	Rubber consumption (000 tonne 1992)	Rubber consumption per capita (kg)	Rubber consumption per $m GDP(kg)
Leading industrial nations	USA	2,891	11.3	0.5
	Japan	1,766	14.1	0.5
	Germany	628	8.5	0.4
Newly industrialised countries	Brazil	401	2.6	1.0
	Korea	553	12.5	2.0
	Taiwan	307	15.0	1.7
ASEAN countries	Philippines	(1) 192	3.1	4.4
	Thailand	154	2.6	1.9
	Indonesia	168	0.9	1.4
	Singapore	16	5.9	0.4
Other developing countries	China	1,110	0.9	2.7
	India	516	0.6	1.9
	Malaysia	238	12.9	5.7

Note:: (1) Although this is the official figure given by the Philippine authorities, IRSG has considerable doubts over its accuracy. The figure is probably significantly overstated.

figure 2

Sources: International Rubber Study Group (IRSG), Malaysian Rubber Research and Development Board (MRRDB), Various international publications

Unlike rubber which is an internationally traded commodity grown in a limited number of countries, rubber product manufacture is spread across the world. Traditionally rubber products have been manufactured in the countries of consumption rather than supplied by a limited number of manufacturing countries. Hence, the level of concentration found in the rubber industry is not possible in the rubber products industry.

Rubber consumption is closely correlated with the GDP of a country which in turn is determined by the size of its population and level of development. The greater the GDP, the higher the demand for rubber products and the greater the level of rubber consumed to manufacture them.

Relative to the size of the country, Malaysia's rubber industry is well developed. In per capita terms, rubber consumption in Malaysia is comparable with the leading industrialised nations and substantially ahead of its ASEAN neighbours.

In per capita rubber consumption, the Malaysian rubber products industry is catching up with major industries such as those of Japan and Korea . In 1981, according to the medium and long term Industrial Master Plan (IMP) document, Malaysian per capita rubber consumption at 4.7kg per capita was below Korea's (6.6kg per capita) and substantually lower than Japan's (11.0kg per capita). Currently, its per capita consumption is not far behind Japan's and is equivalent to Korea's.

In terms of rubber consumption per unit of GDP, industrialising countries have a higher ratio than industrialised countries as rubber is one of the industries established early in the development cycle. Malaysia's ratio of rubber consumption to GDP is exceptionally high. It is far higher than other ASEAN countries.

But despite its high level of per capita consumption and the greater than proportionate rubber consumption in relation to its GDP, the industry remains comparatively small largely because of the small Malaysian population of approximately 18.5 million people.

Profile of the Malaysian Industry

The rubber industry in Malaysia is made up of three main sub-sectors: tyres and tubes; footwear; and other rubber products. Of these three sub-sectors, other rubber products is the largest, both in terms of value of output and rubber consumption, as shown in Figure 3 below. It accounts for 60% of the value of output and over 80% of rubber consumption.

Relative Size of the Main Sub-Sectors of the Rubber Products Industry - 1992

Sub-Sector	Value		Rubber consumption	
	M$ million	% of total	'000 tonnes	% of total
Tyres and tubes	855	31.4	39.8	16.7
Footwear	235	8.7	6.6	2.8
Other rubber products	1,634	60.0	191.6	80.5
Total	**2,724**	**100.0**	**238.0**	**100.0**

Sources: Department of Statistics, MRRDB

figure 3

This pattern of output and rubber consumption is unusual in international terms. In many industrialised and industrialising nations the non-tyre sub-sector accounts for roughly half the country's rubber consumption (Figure 4 below). Only in countries such as Singapore and Taiwan is non-tyre rubber consumption as high as Malaysia. This unusual pattern of output is caused by a combination of relatively poorly developed tyre sub-sector and a comparatively well developed other rubber products sub-sector in Malaysia.

Despite the predominance of non-tyre output, the Malaysian non-tyre industry remains small in world terms. Its output of M$ 1,869 million (US$ 747.6 million) represents just over 1% of the world non-tyre output of US$ 65 billion.

Rubber Consumption in Non-Tyre Sector

Country	% Rubber Consumed
Malaysia	83
Taiwan	74
Japan	40
Korea	52
Europe	44
USA	38
Thailand	54
Indonesia	55
Phillipines (1)	88
Singapore	99

Note: IRSG doubts the accuracy of these figures.
Source: IRSG

figure 4

Position of the GIRG Sector

Malaysia is unusual also in the fact that much of the ouput of the non-tyre/non-footwear sector is made up of latex goods. In the rubber products industry internationally, non latex GIRG would be the most important sub sector. This results from a relatively well developed latex goods sector and a poorly developed GIRG sector in Malaysia.

As Figure 5 shows, the majority of output and rubber consumption in the other rubber products sub-sector is made up of latex goods - gloves, condoms, catheters and latex thread - which account for over three quarters of output and rubber consumption.

Breakdown of Output of Other Rubber Products - 1992

	Value		Rubber Consumption	
Product Group	M$ million	% of total	'000 tonnes	% of total
Latex Products				
- gloves	953.9	58.4		
- catheters	83.5	5.1		
- condoms	10.6	0.6		
- latex thread	234.8	14.4		
Sub-total	1,282.8	78.5	147.1	76.8
GRG				
- industrial and consumer rubber goods	298.8	18.3	29.4	15.3
- rubber compound	52.4	3.2	15.1	7.9
Sub-total	351.2	21.5	44.5	23.2
TOTAL	1,634.0	100.0	191.6	100.0

figure 5

The predominance of latex based products in the output of other rubber products in Malaysia is very different from the situation internationally. In industrialised countries such as Japan latex products make up less than 5% of non-tyre rubber consumption, rather than the over 70% share they hold in Malaysia.

This is because Malaysia has established a strong position as a supplier of latex goods internationally and exports much of its output. Increasingly the main markets for latex products in the industrialised countries are being supplied from low cost manufacturing countries. And rubber producers such as Malaysia have a natural competitive advantage in supplying latex products for two reasons:

i.) latex does not travel well, in terms of maintaining consistency of product;
ii.) shipping latex products provides transport cost advantages over shipping latex - about 60% of latex is water.

The only country in which latex products start to approach such a dominant position in the non-tyre industry is Indonesia where they account for 43% of non-tyre output. Indonesia too has become a major supplier of latex gloves to the world market.

The GIRG sector in Malaysia, in comparison with the industries of the industrialised nations, is less developed. It accounts for 19% of non-tyre output and less than 22% of rubber consumption. In most industrialised nations the sector's contribution to output and rubber consumption would be in excess of 70%.

Malaysia's per capita consumption of GIRG at 2.5 kg is lower than Korea's (4.8), Singapore (5.5) and Japan's (5.5) and much lower than Taiwan (9.7). But it is ahead of the other ASEAN countries including Thailand (1.2) which is noted for its GIRG exports.

The Malaysian GIRG industry though not as advanced as those of industrialised nations is ahead of its closest ASEAN rivals.

Industry and Sector Performance

- Rubber industry

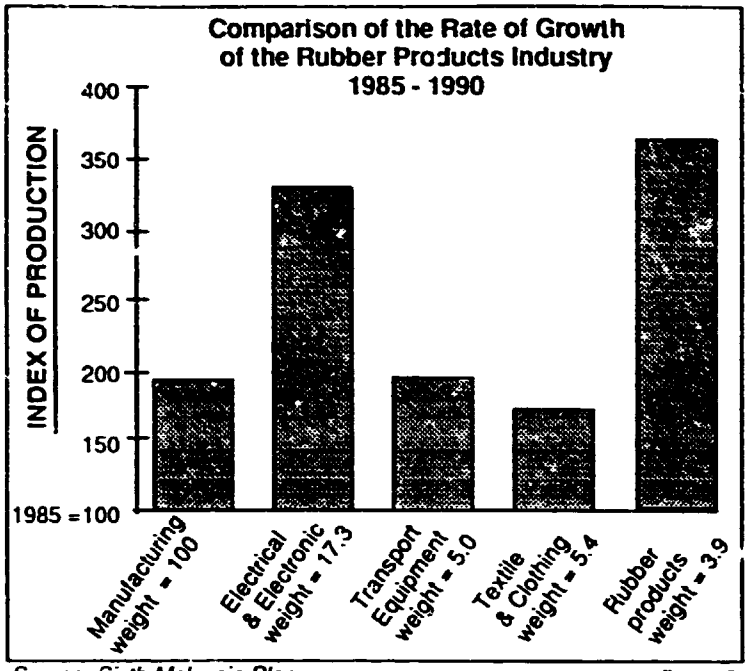
Over the past decade, the Malaysian economy and manufacturing industry have grown dramatically. In the 1980s, despite a fall in GDP in 1985, the economy averaged real GDP growth of nearly 6% per annum. There were two phases of growth coinciding with the Fourth (1980 - 1985) and Fifth (1985 - 1990) Malaysia Plans. During the fourth Plan growth averaged 5.1% but during the Fifth, it accelerated to 6.7% per annum.

In both phases, the growth of the manufacturing sector outpaced the economy as a whole. During the Fourth Plan the manufacturing sector grew at 5.4% per annum and during the Fifth, its average annual growth was an impressive 13.7%. Over the decade as a whole, manufacturing growth averaged 9.4% per annum.

But impressive as the growth of the manufacturing sector has been, over the decade the rubber products industry outperformed the manufacturing sector. During the Fourth Plan growth was comparatively slow at 3.6% per annum, but during the Fifth Plan, the rubber products industry recorded the highest growth of all sectors of manufacturing, averaging an astonishing 29.3% per annum.

Even the electronics and electrical sector, which has been the cornerstone of manufacturing growth in the country, recorded over the 1986-1990 period a marginally lower rate of growth (26.8% per annum). And other traditional sources of growth such as the textiles and clothing and wood and cork products sectors recorded less than half the level of growth of the rubber products industry (see Figure 6). But it should be noted that the relative size of the rubber products industry was much smaller

than these sectors.
This remarkable rate of growth of the rubber industry continued in the early 1990s, though growth slowed in 1992. Whilst manufacturing output increased by 13.9% in 1991 and 13.5% in 1992, the index of rubber products output increased by 19.8% in 1991 and 8.3% in 1992.



Source: Sixth Malaysia Plan

figure 6

The pattern of output growth is reflected in increases in rubber consumption. The decade of the 1980s was a period of very rapid growth in rubber consumption. Over the 1980-1992 period rubber consumption increased from 68,000 tonnes to the 1992 level of 238,000 tonnes, an average growth rate of over 12% per annum. Even though this is a dramatic rate of growth, the figure does not reflect the unprecedented rate of growth in recent years.

The period 1980-1992 was divided into two phases. In the first phase, 1980 to 1986, rubber consumption remained broadly static. In 1986, rubber consumption in Malaysia is estimated by MRRDB at 71,500 tonnes, as against the 1980 figure of 68,000. In the second phase lasting six years (1986 to 1992) rubber consumption increased over threefold, representing an average annual growth rate of 22.2% per annum.

Figure 7 traces the growth of GDP, manufacturing and the rubber products industry over the 1980 - 1990 period. Because of the exceptional rate of growth the rubber products industry is well on course to achieve the IMP target of 300,000 tonnes of rubber consumption by 1995.

The Growth of GDP, Manufacturing and the Rubber Products Industry 1980 - 1992

Indicator	Fourth Plan 1980-1985	Fifth Plan 1986-1990
	(% p.a.)	(% p.a.)
GDP	5.1	6.7
Manufacturing	5.4	13.7
Rubber industry output	3.9	29.3
Rubber consumption	1.0	21.3

figure 7

- Sector performance

Within this outstanding overall performance, the performance of the various sub-sectors of the rubber products industry varies considerably. Much of the growth has been due to the rapid growth in the output of other rubber products, and latex products in particular.

Figure 8 shows the breakdown of the value of output between the three sub-sectors of the rubber products industry over the 1980-1992 period and the rate of annual average growth achieved by each sub-sector.

Sub-sector	1980 Value of output (M$ million)	1992 Value of output (M$ million)	Average annual growth 1980-1992 in %
Tyres and tubes	299	855	9.1
Footwear	166	235	2.9
Other rubber products	186	1634	19.9
Total	**651**	**2724**	**19.9**

figure 8

Note: Figures are in current prices.

Sources: Department of Statistics, Malaysian Rubber Industry - Current Status, Future Prospects, MIDA

Of the MS2.1billion increase in the value of rubber product output, increased output of other rubber products accounted for nearly MS1.5billion. Output of tyres has also increased substantially by over MS0.5 billion, but the rate of growth has not been as impressive as that of other rubber products. Footwear output, in comparison with the other sub-sectors, has remained stagnant.

As a result, the contribution of the three sub-sectors to industry output has changed. In 1980 other rubber products accounted for 28% of industry output, but in 1992 the comparable figure was 60%. The contribution of both tyres and tubes and footwear has declined, the former from 46% to 31% and the latter from 26% to 9%.

The growth of the other rubber products sub-sector has been due mainly to the growth in the output of latex products.

Output of other rubber products increased from MS186 million in 1980 to MS1,634million in 1992, an increase of MS1,448 million. Of this increase, MS1,205 million (83%) resulted from the increase in the output of latex products as shown in Figure 9.

Growth of Output of Other Rubber Products 1980 - 1992

Product Group	1980 Value of Output (M$ million)	1980 % of total ouput	1992 Value of Output (M$ million)	1992 % of total ouput	Average Annual Growth (% p.a.)
Latex Products(1)	78	42	1283	79	26.3
GIRG					
- IRG and consumer	70	38	299	18	12.9
- rubber compounds	38	20	52	3	2.6
Sub-Total	108	58	351	21	10.3
Total	**186**	**100**	**1634**	**100**	

figure 9

Note: Includes products termed general rubber goods

Sources: Department of Statistics, Role and Prospects of the Malaysian Rubber Products Industry - Lim Sow Ching (1988)

Because of the growth of latex products the position of the GIRG sector in other rubber products has declined sharply. In 1980, GIRG was the predominant activity in other rubber products, but by 1992 GIRG manufacture had become a very small part of the sector.

In 1980, latex products together with some general rubber goods contributed 42% of the output of other rubber products. By 1992, latex products alone accounted for 79%. GIRG's share of other rubber product output fell from 58% in 1980 to 21% in 1992 as illustrated in figure 10.

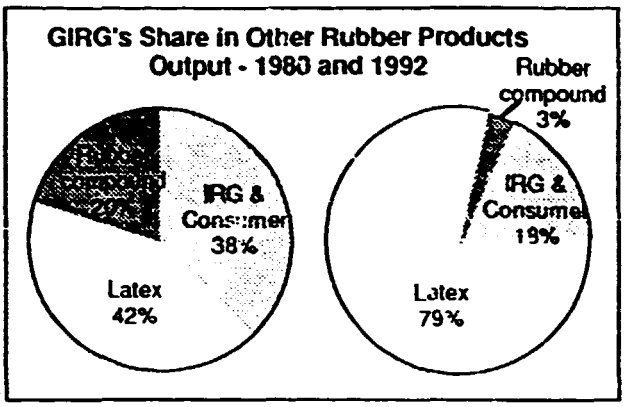


figure 10

The growth rate of latex products at an average 26.3% per annum for the 1980 - 1992 period was over twice the growth rate of GIRG (figure 9). The growth of GIRG output was constrained by the slow growth of the rubber compound sector.

In recent years, however, output of industrial and consumer goods has been increasing faster than other products, including latex products. Figure 11 presents recent changes in the output of other rubber goods.

Growth of Output of Other Rubber Products 1989 - 1992

Product	1989		1992		Average Annual Growth (% p.a.)
	Value of Output (M$ million)	% of total ouput	Value of Output (M$ million)	% of total ouput	
Latex Products					
- gloves	600.1	55	953.9	58	16.7
- catheters	57.3	5	83.5	5	13.4
- condoms	8.4	1	10.6	1	8.1
- thread	203.6	18	234.8	14	4.4
GIRG					
- IRG and consumer	176.2	16	298.8	18	19.3
- rubber compounds	52.2	5	52.4	3	-
Total	**1097.8**	**100**	**1634.0**	**100**	

figure 11

The year on year growth of each product's output is shown in index form in figure 12.

From data provided by the Department of Statistics, the output of all products, except gloves fell in 1992. But this is not borne out by either rubber consumption data or by our own consultations with the industry. In 1992, according to MRRDB data, rubber consumption for the manufacture of industrial and consumer goods increased by 18%. We believe that the fall in output shown in the Department of Statistics figures may be due possibly to inaccurate returns.

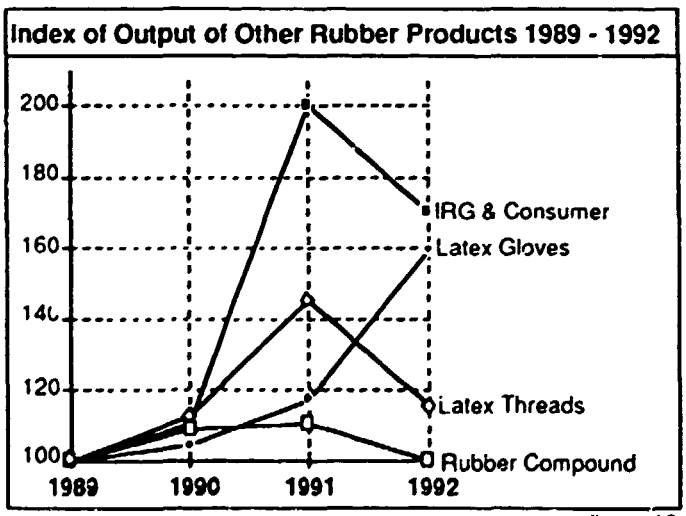


figure 12

■ Exports

Much of the growth of the rubber products industry has been due to the growth of exports. Over the 1982 to 1992 period exports of rubber products increased over ten-fold from M$214 to M$2,485 as shown in Figure 13 below.

The value of rubber exports has increased faster than exports of manufactures as a whole. The growth of manufactured exports has been the prime cause of Malaysia's remarkable economic growth in recent years. Over the 1982 - 1992 period they increased nearly ten-fold from MS7.5billion in 1982 to over MS71.9billion in 1992. But rubber products exports have increased faster and improved their share of manufactured exports from 2.8% in 1982 to 3.7% in 1992.

Exports of Rubber Products 1982 - 1992

	1982		1992	
	Value (M$ million)	% of total	Value (M$ million)	% of total
Sub-sector/product				
- tyres and tubes	11.6	6	145.1	6
- footwear	45.2	21	118.1	4
Other rubber products				
- latex products	107.9	50	2200.3	82
- GRG	49.7	23	222.2	8
Total	214.4	100	2685.7	100

figure 13

Note: In 1992 Malaysia also exported M$ 51 million of consumer products such as sports goods and foam bedding which are not included above.

Source: Malaysian Rubber Products Industry, - Current Status, Future prospects - MIDA

A very high proportion of the growth of rubber product exports has been due to the increase in exports of latex goods. Over the 1982 - 1992 period, exports of latex products increased twenty-fold from M$108million to M$2,200million. Of the M$2,471million increase in the value of rubber goods exports, latex goods products contributed over M$2,082million or 84%.

Exports of GIRG also performed well, but their growth failed to keep pace with latex products or manufacturing exports as a whole. Exports of GIRG increased by an average 16% per annum and their value increased nearly five-fold during the 1982-1992 period. But as exports of latex products increased so much faster, the share of industrial and consumer goods in rubber product exports has fallen from 23% to 8%.

■ Imports and Trade Balance

Imports of rubber products have also increased but not as fast as exports. The value of rubber products import increased from M$160.4 to M$406.4 million, an increase of over threefold as shown in figure 14.

Malaysian Imports of Rubber Goods 1982 - 1992

	1982		1992	
	Value (M$ million)	% of total	Value (M$ million)	% of total
Sub-sector/product				
- tyres and tubes	44.3	28	69.5	17
- footwear	18.4	11	32.5	8
Other rubber products				
- latex goods	6.0	4	50.7	13
- GIRG	91.7	57	253.7	62
Total	160.4	100	406.4	100

figure 14

In money terms, the largest increase in imports has been due to GIRG. Of the MS246 million increase in the value of imports, MS 162 million (66%) was due the to the increase in imports of GIRG.

Whereas Malaysia has a large overall trade surplus of over MS2 billion in rubber products in GIRG the country has a trade deficit. The deficit in GIRG products is due to the import of hoses and belting which the industry has only recently started to manufacture in significant volumes.

But the trade deficit in GIRG products has fallen over the decade from over $40 million to MS 31 million. This is commendable given the fast growth of Malaysia's manufacturing base which could have resulted in a very large increase of imports. And, if exports of rubber products such as sports goods are taken into account, the trade balance may be positive.

Economic importance

As a result of its growth during the 1980s and early 1990s, the rubber products industry has improved substantially its position in the Malaysian economy. The industry is small and its economic contribution limited in comparison with Malaysia's other industries, but this is the pattern in the rubber products industry worldwide.

The rubber products industry ranks eighth out of the fourteen major sectors of manufacturing in Malaysia, behind not only electrical and electronic products and chemicals, the two largest sectors in terms of manufacturing output, but also behind textiles and other resource based industries such as food, wood and non-metallic minerals. The growth of the 1980s took place from a very small base and although it was rapid, was not sufficient to turn the industry into a major contributor to the manufacturing sector as shown in figure15.

Comparison of Economic Contribution of the Rubber Products Industry

Indicator	1981	Latest year available
Weight in value of manufacturing output (1)	3.0	5.0 (1988)
Contribution to Malaysian value added	3.4	4.3 (1989)
Contribution to Malaysian employment	3.5	3.9 (1991)
Percentage of Malaysian manufactured exports	3.4	3.7 (1992)

Note: Weight in index and industrial production

figure 15

Malaysia's rubber industry though a comparatively small contributor to the country's manufacturing base, makes a greater contribution in Malaysia than the rubber product industry's of most other countries make to their manufacturing sector.

In industrialised countries such as Germany, Japan and the USA, the rubber product industry's contribution to manufacturing output, manufacturing value added and manufacturing employment is typically below 1.5%. And although the industry is more important in the newly industrialised countries such as Korea, its contribution in terms of manufacturing output and employment does not typically exceed 3%.

Compared with its ASEAN counterparts, Malaysia's industry matches Indonesia's industry in terms of the proportionate contribution it makes to manufacturing output, value added and employment, but its contribution is proportionately higher than the industries of Singapore and the Philippines. No data are available for Thailand.

The GIRG sector of the industry by virtue of its small share of output and exports may be considered to make a very small contribution to Malaysia's economic development. Its share of manufacturing output and exports is well below 1%. The sector provides employment to roughly 10% of the 42.6 thousand people employed in the rubber products industry. Natural rubber consumption in the GIRG industry represents approximately 3% of rubber production in Malaysia.

It should be noted, though, that official statistics underestimate the size of the GIRG sector in terms of output and employment. This is explored further in the following section, *Industry Structure*.

But the importance of the rubber industry and the GIRG sector to Malaysia's economic development does not lie exclusively in the extent to which it contributes to output, employment, exports or rubber consumption. In our view the sector's importance lies in the role it can play in economic development.

An important feature of the Malaysian economy is that manufacturing growth has led economic development. The Second Outline Perspective Plan for the 1990-2000 period (OPPII) seeks to continue this process and aims to increase manufacturing's share of GDP from the 1990 level of 27% to 37% in 2000. In the decade of the 1990s manufacturing is expected to average growth of 10.5% per annum in real terms

But to achieve this ambitious target will require a different strategy to that which succeeded during the 1980s.

Success in the 1980s was built on attracting internationally mobile investors using Malaysia's competitive advantages of low labour cost, excellent infrastructure and favourable economic environment. But for the future, Malaysia cannot hope to rely as heavily on attracting foreign investment as it has in the past. It has lost its labour cost advantage, competitors in ASEAN offer equally attractive incentives and competition for international mobile capital has increased from China and East Europe.

Further, during the 1990s, Government hopes to address the problem of a narrow manufacturing base. Currently, three sectors electrical and electronics, chemicals and off estate processing account for over 50% of manufacturing output. During the 1980s, manufacturing performance was heavily dependent on the growth of the electronic and electrical industry. By diversifying the manufacturing base Government hopes to reduce dependence on one sector.

The strategy adopted by Government to counter the threat of loss of competitive advantage in attracting foreign investment and to address the structural weakness of a narrow manufacturing base is to broaden and deepen the manufacturing base. Emphasis is to be given to improving inter-sectoral

linkages, both forward and horizontal. Resource based industries are expected to play a major role in the deepening of the manufacturing base. Malaysia continues to export a high proportion of raw materials in unprocessed and semi-processed form. Government hopes to increase value added by increasing the level of processing.

Resource based industries such as the GIRG industry which not only have high backward linkage but potentially also have high forward linkages with other sectors of the economy have a particularly vital role to play in the strategy.

Growth and development of the GIRG sector would not only help broaden and deepen the manufacturing base but also because the sector supplies other key industries such as automotive, construction and, to a lesser extent, electrical and electronic, would also help develop inter-sectoral linkages and help to integrate the economy.

Industry and Sector Overview

The picture that emerges from the above is that the Malaysian rubber industry though small in world terms, is relatively to the size of the country highly developed. Per capita rubber consumption is equal to the leading industrialised countries.

Over the past decade, the industry has outperformed Malaysia's manufacturing sector in terms of both output and exports, a striking achievement given that the manufacturing sector's growth has been outstanding against most industrialising and industrialised nations.

In comparison with the rate of growth of the rubber products industry worldwide, the Malaysian industry has also performed remarkably well. Over the 1982-1989 period, UN statistics show a growth of 3.1% in current price terms across the rubber products industry worldwide Even fast growth industries such as that of Korea managed a growth of just over 10% per annum during this period, compared with Malaysia's 13.7%

But much of the growth in output and exports has come from latex products. As a result, the profile of the Malaysian industry differs from the industries of most developed countries. The non-tyre sector is much larger in Malaysia than internationally and within the non-tyre sector latex goods account for a disproportionately high percentage of output and rubber consumption.

The value of GIRG output and exports has also increased substantially but their growth has been overshadowed by latex products. The GIRG sector in Malaysia is comparatively less developed than in industrialised countries. Per capita consumption is below Japan, Korea, Singapore and Taiwan but ahead of ASEAN countries. Encouragingly in recent years, the output of industrial and consumer goods has started to increase at a rate faster than that of latex products.

Malaysia is a large net exporter of rubber products but in the GIRG sector in industrial goods the country runs a trade deficit. The trade deficit is due mainly to hoses and belting.

The rubber products industry and hence the GIRG sector do not make a large contribution to Malaysia's manufacturing base. And the GIRG sector is a small contributor to natural rubber consumption in Malaysia. But the importance of the GIRG sector lies in its role in economic development rather than its size.

Growth and expansion of the sector would help achieve government objectives in terms of broadening and deepening the manufacturing base. It would help also to integrate an economy which currently has few inter-sector linkages.

III Industry Structure

This section examines industry participants, the structure of output, degree of concentration, integration and intensity of competition in the GIRG sector. It highlights potential structural weaknesses and strengths of the sector.

Historic Development

The GIRG sector in Malaysia dates back to the 1920s when Linatex was formed to manufacture rubber lining to serve Malaysia's mining industry. But for many years afterwards, little development took place and the sector was limited to the activities of a few companies. The modern development of the GIRG sector can be divided into three phases.

Phase I - the period up to the early 1970s in which the industry remained in its infancy with a few pioneering companies starting to manufacture industrial and consumer goods.

Phase II - from the early 1970s up to the mid 1980s when the industry expanded rapidly with the stimulus of import substitution. Most new entrants were Malaysian entrepreneurs.

Phase III - a period from the mid 1980s to date which is characterised by growing maturity of the industry, export orientation and very rapid growth. A large proportion of new entrants have foreign participation.

In Phase I, companies which had been established to manufacture footwear or bicycle tubes started to manufacture low technology moulded rubber goods. In Phase II, the range of products manufactured expanded rapidly. The rapid growth of the economy together with protection from imports encouraged the manufacture of other moulded and extruded products but the technical sophistication of the products remained low. Belts and hoses, for instance, were at this stage mainly imported.

During Phase II, though a limited number of foreign companies established operations in Malaysia, most new entrants were Malaysians who had earlier worked for one of the pioneering companies or in other parts of the rubber industry.

In the latest phase of development, emphasis amongst new entrants has shifted towards the manufacture of higher value added products. Foreign companies have entered the sector either as a response to their customers locating in Malaysia or to take advantage of the availability of cheaper labour and in some periods, raw materials.

Industry Participants

There are no firm estimates available on the number of firms active in Malaysia's GIRG sector. The Department of Statistics' records show that in 1992, 108 firms were active in the Other Rubber Products sub-sector but do not provide further details of their activities. Besides, the Department's coverage is limited to firms employing over 30 staff and hence is not comprehensive.

MIDA's records show that as of 31st December 1991, 71 firms were active in the GIRG sector. MIDA's records include all licensed companies - companies with paid up capital of over M$2.5 million or 75 employees - and those which have applied for incentives. GIRG manufacturers are eligible for special incentives in the form of tax reductions or exemptions.

But, despite the attractiveness of incentives, not all firms apply. Therefore, in order to develop a comprehensive data base of firms active in the sector we have canvassed widely industry sources such as the Rubber Research Institute of Malaysia (RRIM), the Malaysian Rubber Research and Development Board (MRRDB), the Malaysian Rubber Products Manufacturers Association (MRPMA) as well as consulting MIDA's own data bank.

We identified 120 firms whose main business is the manufacture of industrial and consumer goods and rubber compounds. In addition, approximately 20 companies whose main business is the production of rubber, tyres, footwear or latex products also manufacture GIRG.

Our investigations also revealed the existence of a large number of informal sector businesses engaged mainly in the manufacture of industrial goods. These companies were often owner managed, operated from un-licensed premises and employed one or two persons.

Such informal sector businesses were not registered with any trade association, were often not registered for tax purposes and did not use the facilities of institutions such as RRIM. It is therefore impossible to estimate their number accurately.

From our investigations, it is clear that official data on output, value added and employment collated by the Department of Statistics substantially underestimates GIRG sector activity. Data on output and employment provided by the Department of Statistics covers only firms which employ over 30 persons. But in the GIRG sector there are a large number of companies which employ less than thirty persons and they are not included in official estimates. Export data of course have universal coverage and when they are presented in juxtaposition to output figures reveal the extent of underrecording of output data as illustrated in figure 16.

According to the figures above, almost all domestic output of industrial and consumer goods is exported and domestic consumption met almost entirely by imports. This is not borne out by consultation with industry experts in Malaysia and our own survey.

Output and International Trade in Industrial Goods

	1992 (M$ million)
Output of industrial and consumer goods	298.8
less exports of GIRG	(222.2)
plus imports of GIRG	253.7
Apparent consumption	330.3

figure 16

The more plausible view is that a substantial amount of output originates in small companies and is not recorded by the Department of Statistics.

MRRDB's rubber consumption survey is more complete but does not comprehensively cover the formal sector and of course takes no account of the informal sector.

Based on our own investigations we believe that a better estimate of output and rubber consumption in the GIRG sector may be as shown in figure 17:

Estimates of the Size of the GIRG Sector 1992			
Product Group	Nº of firms in Formal sector	Output (M$ million)	Rubber consumption (000 tonnes)
IRG	60	250 - 300	25
Consumer Goods	34	150 - 175	10
Rubber Compound	26	100 - 125	15
Total	120	500 - 600	50

figure 17

The information above accords with data we obtained from our survey of GIRG firms, data published by MRPMA on company turnover and examination of MRRDB returns. But it should be noted that these are estimates rather than hard data.

Ownership

A large majority (over 75%) of GIRG firms are Malaysian owned. Foreign participation in the industry varies considerably between the 3 product areas. It is lowest in rubber compounds and highest in consumer products as shown in figure 18:

Foreign Participation in the GIRG Sector			
Product Area	Wholly foreign owned firms	Joint ventures with foreign firms	Proportion of firms with foreign participation
IRG	3	9	20%
Consumer Goods	3	11	41%
Rubber Compound	-	2	8%
Total	6	22	23%

figure 18

The presence of foreign firms is particularly high in sports goods and toys. In some products such as balloons and water sport equipment the proportion of foreign ownership is very high. Of the 5 companies licensed to manufacture swimming caps for instance, all have foreign participation.

Foreign firms have been attracted to Malaysia, in addition to the country's low labour costs, infrastructure and sound economy, by the advantage of locally available latex, saving transport costs in moving latex, and during the late 1980s lower natural rubber prices in Malaysia. Up to 1990, rubber consumed in Malaysia was exempt from export cess of 20 sens/kg on natural rubber. This made natural rubber in Malaysia 6-12% cheaper than on the international market.

Joint ventures with Malaysian firms is the preferred investment route for foreign investment.

Most companies within the GIRG sector are independent companies rather than subsidiaries. The majority are family owned or closely held companies. Very few are floated on either the Kuala Lumpur or international stock markets.

Size Distribution of Firms

By international standards, most Malaysian GIRG firms are small in terms of turnover. The largest of these firms has a turnover below M$ 40 million (US$ 15 million) which by the standards of Western Europe and North America would be considered the small side of medium sized.

For the analysis of size distribution within the Malaysian GIRG sector, we have followed categories used by the Ministry of Trade & Industry (MTI) and other institutions, as follows:

- Large companies - *companies which meet the criteria of eligibility for a manufacturing licence - paid up capital of M$2.5 million or 75 employees*
- Medium size - *companies which employ over 30 persons and so are covered by the Department of Statistics with paid up captial of between M$ 0.5 million and M$ 2.5 million are considered medium sized.*
- Small companies - *companies employing less than 30 persons and with paid up capital below M$ 0.5 million are considered small*

Using this criteria, the size profile of firms within the GIRG sector is shown in figure 19. The highest proportion of large firms are in consumer goods (35%) followed by rubber compounds (30%) and IRG (28%). it should be noted that these figures cover the formal sector only. If informal firms are included the proportion of large firms in IRG would fall substantially.

Size Profile of Firms in the GRG Sector

Product Area	Size of Firm			Proportion of Large firms
	Large	Medium	Small	
IRG	17	15	28	28%
Consumer goods	12	10	12	35%
Rubber compound	8	7	11	30%

figure 19

The pattern of size distribution between the sectors reflects their capital intensity. IRG products often have low economic scale particularly if masterbatch can be bought in from specialist manufacturers. Hence it is easy to establish and operate small firms in these products. Scale is discussed further under Corporate Capability below.

The proportionally higher number of large firms in the consumer goods sector is due also to the greater presence of foreign firms in this product area. Almost all firms with foreign participation are large enough to require manufacturing licenses and so employ over 75 people or have paid up capital over M$ 2.5 million.

Structure of Output & Level of Concentration

As is the case with the non-tyre industry worldwide, the GIRG sector in Malaysia is fragmented. The five largest companies account for less than 25% of sector output and the top 10 less than 40%.

But in Malaysia the situation varies considerably between the three product areas. Figure 19 shows that whereas the IRG sector is highly fragmented the rubber compound sector is concentrated. The 5 largest rubber compound companies account for over 70% of output.

Level of Concentration in the GRG Sector	
Product Area	**Share of Top 5 Firms in Output**
	(%)
IRG	35
Consumer Goods	49
Rubber Compounds	71

figure 20

The proportion of output accounted for by large firms as defined above, is high. In IRG, they account for 55% of output, in consumer goods 75% and in rubber compounds, over 91%. But it should be noted that large firms in Malaysia would be considered small to medium sized worldwide.

Integration/Specialisation

The level of vertical and horizontal integration in the sector is limited. With few exceptions, rubber producers have not on the whole ventured downstream into the GIRG sector. And, companies in other parts of the rubber industry have also limited their involvement in the GIRG sector, though tyre and footwear companies manufacture some GIRG products.

Within the GIRG sector, there is generally a lack of product focus or specialisation. Many companies and particularly those established in the first and second phase of development manufacture a very wide range of products. It is not unusual for manufacturers of industrial goods to attempt the manufacture of consumer goods and rubber compounders, often have small moulding or extrusion operations producing industrial products.

In contrast to GIRG industries worldwide, products made by the Malaysian GIRG industry are predominantly of natural rubber (NR). MRRDB figures show that over 85% of the rubber consumption by the GIRG sector is of NR. For the rubber product industry as a whole the figure is over 90%. This contrasts with the less than 20% share NR holds of non-tyre rubber consumption in countries such as Japan, Germany, USA, France and Italy.

The manufacture of high performance products increasingly calls for the use of synthetic rubber alongside and often in greater proportion than NR. The focus on NR based products may disadvantage the Malaysian industry.

Intensity of Competition

Because of the rapid growth in output, the level of competition within the sector is low. Net profit margins of 15-20% are common against margins of 5% to 10% in highly competitive industries.

Competition is increasing in low technology moulded products such as door stoppers, car mats and auto components, and in some instances could be termed intense. In products such as stoppers, competition from the informal sector is forcing formal sector businesses to exit the market In car mats, a shake out of the industry has occurred. Many firms were attracted to the manufacture of mats for the domestic and export markets. But most have now exited the market leaving it to a few specialists who are able to manufacture good products at low prices.

But for the sector as a whole, for the foreseeable future competitive intensity is not likely to be high. Evidence suggests that the rate of new entrants may have peaked. With the market continuing to grow and the rate of new entrants slowing, competitive intensity will not increase rapidly.

Evidence of the slow down of new entrants comes from a number of sources. MIDA's rate of approvals of projects in the GIRG sector, for instance, peaked in 1989 and 1990 when 12 and 14 projects were approved respectively. The 1992 figure is 5 projects.

In addition, development finance institutions such as the Malaysian Industrial Development Finance (MIDF), report that with higher returns available in other sectors, the number of GIRG sectors applicants for loans for new projects is low.

Structural Strengths and Weaknesses

The sector is still far from mature. The small size of firms, fragmentation, lack of specialisation and intensity of competition suggest that will be some years before the sector achieves maturity.

- **Weaknesses**

The main weaknesses of the sector stem from the small size of firms, their lack of product specialisation and focus on NR based products and the absence of competitive intensity.

Small size inhibits the ability of a company to invest and to take on the challenge of developing distant export markets. The GIRG sector internationally is becoming more capital intensive and Malaysian firms may find it difficult to keep pace with new technology. The high export propensity of the sector means that continued export growth will be important in the future. Small size may inhibit firms from taking on the challenge of export growth.

The lack of product specialisation, although not infrequent in developing countries, is a disadvantage in international markets. Rubber products are becoming more sophisticated and a lack of product focus could prevent Malaysian firms from paying sufficient attention to product innovation. Focussing on NR based products limits the ability to manufacture high performance products.

In the absence of competitive intensity, firms have little incentive to become more efficient, increase value added and to develop new markets. This not only serves to undermine the interest of their customers but can also be the cause of failing to keep pace with competition from other countries.

- **Strengths**

The sector's main strengths are the large number of firms, particularly small and informal firms, and the presence of foreign companies.

The large number of firms offers the sector the strength to withstand downturns without major loss of capacity and the advantage that future growth could result from the activities of any number of companies. Potentially, the large number of small and informal sector firms could do much to address the lack of competitive intensity and force larger firms to either diversify or increase efficiency and value added.

Small size, although a disadvantage in terms of investment and marketing has the advantage of keeping overheads low. In some markets, small firms can compete against competitors with greater resources or lower factor costs.

The presence of foreign companies in the sector provides it with access to international markets and know-how. Foreign firms, particularly firms from leading industrialised nations, serve to introduce new technology, manufacturing practices and product standards which help the industry adapt to changes in international markets. The products they manufacture are, on the whole, up to world standards but because of Malaysia's low cost base, can be sold at highly competitive prices. They also provide the sector with ready access to export markets.

Overall, the GIRG sector's structure should not serve to limit its growth and development. The structural weaknesses reflect the immaturity of the sector. As it develops, it should be able to address its main weaknesses.

But it is possible that cushioned by its currently high profit margins and as a result of new entrants not coming forward as rapidly as they have in the past that the sector fails to keep pace with international competition. This could curtail the growth of the sector and cause it to fail to fulfil its potential.

IV Markets

This section examines markets for Malaysia's GIRG products and analyses market characteristics which will influence the sector's future growth and development.

A high proportion of GIRG products are exported. This section examines both domestic and export markets for each of the three major product groups.

In general, the domestic market for GIRG products has been buoyant over the past five years. But, export markets have recently been depressed. Despite recession in export markets, IRG exports have continued to grow and consumer goods exports have kept up well.

IRG

Industrial rubber goods find a wide range of applications in almost all sectors of industry. They are used for one of two purposes:

i.) as intermediate inputs in the manufacture of original equipment (OE); or
ii.) for replacement of rubber parts used in original equipment.

It is a feature of IRG products that their demand derives from trends in the end-use sectors in which they are sold. The level of sales of the original equipment in which they are used determines the demand for IRG products.

■ IRG Market - Domestic

In the past, demand for IRG in Malaysia has been limited by the structure of manufacturing output. Many of the largest manufacturing sectors in Malaysia are not intensive users of rubber products - chemicals, off-estate processing, textile and clothing and wood are not intensive users of rubber products as to a lesser extent are electrical and electronics, food and non-metallic mineral products.

Sectors which are intensive end-users for rubber products have in the past been comparatively poorly developed in Malaysia - automotive and machinery. The country's comparatively narrow manufacturing base results also in IRG sales being focussed on fewer end-uses.

In Malaysia the two most important sectors in which IRG products are used are automotive and construction. Other important sectors are electrical and electronic, mining and printing and copying.

No firm data are available as to the proportion of IRG sales to each sector. But our survey of GIRG manufacturers and information provided by industry sources would suggest the following pattern of IRG sales:

- automotive is the largest end-use sector, followed by construction. These sectors together account for roughly half the domestic sales of IRG products;

- three other sectors - electrical and electronic, mining and printing and copying - together account for a further 20-30% of sales;

- the remainder of sales are divided between a large number of other sectors with replacement parts for off-road machinery possibly largest of these other end-uses.

This pattern of output differs from the position in highly industrialised countires as follows:

- the automotive sector is less important in Malaysia than it is in countries such as Japan, the US and Western Europe;
- the construction and mining sectors are more important end-uses in Malaysia than in developed countries;
- sales for use in off-road equipment are more important in developed countries and for oil and gas field machinery are more significant in other oil and gas producers such as the UK and US than they are in Malaysia;
- sales to the electrical and electronic sector account for a higher proportion of GIRG output in Malaysia than they do in most developed countries.

The differences in the pattern of sales results from variances in levels of development of end-use sectors in each country. We examine below levels of development of each important rubber using sector in Malaysia along with the characteristics of the sector as a market for rubber products.

Overall, almost all sectors in Malaysia have been experiencing very rapid growth but particularly the automotive sector which is a major user of rubber products. This has caused the domestic market to grow rapidly.

■ Automotive

Compared with countries such as Japan and the US, the Malaysian automotive industry is in its infancy. Consequently sales to this end use have yet to reach their full potential.

Prior to the mid 1980s sales of IRG automotive rubber components in Malaysia were limited to the replacement market. OE manufacture of cars and commercial vehicles was limited to assembly from complete knocked down (CKD) or semi-knocked down (SKD) kits with almost all the rubber components imported.

Since then a number of important developments have taken place which have resulted in a substantial increase in OE sales and, in turn, in the demand for rubber automotive components much of which has been met by products manufactured in Malaysia.

i.) in the mid 1980s, the national car project (Proton) commenced car production in Malaysia. Proton's output has increased to nearly 120,000 vehicles. Proton has pursued a policy of local sourcing

ii.) gradually, car assemblers have started to source a greater proportion of their rubber components from within Malaysia because the Malaysian industry is now able to meet their technical specifications cost-effectively;

iii.) the output of motorcycles has increased from 182,000 units in 1985 to over 223,000 units in 1991 with the majority of rubber components now supplied domestically;

iv.) output of commercial vehicles has nearly doubled from 35,000 units in 1985 to over 64,000 in 1991.

It is a characteristic of supplying OE manufacturers (OEMs) in the car industry that not only must their suppliers be able to meet their product specifications, but they must also be able to assure OEMs of a high level of integrity of supply - product quality is maintained at a uniformly high standard and that delivery is reliable and timely.

New suppliers find it difficult to penetrate this market even if they are able to demonstrate that their products are able to compete on technical specification and price. Hence, the process of the GIRG sector being able to supply Proton, the car and vehicle assemblers and motorcycle industry has been slow.

But gradually, Malaysian auto-component manufacturers have been successful in convincing Proton and the other vehicle manufacturers and assemblers of the integrity of their products and currently most auto-components are sourced locally. The main exceptions are timing belts, some hoses and tubing and engine mountings which continue to be imported.

A few of the car assemblers continue to import other rubber auto-components also, but the value of these products is limited. In 1992, the total value of imported auto-components, other than hoses, tubing and belting was MS4million.

Despite the growth of the OE market, the replacement market remains the larger of the two market segments. Malaysia still has a large population of comparatively old cars which continue to generate a substantial demand for replacement parts. Most replacement parts are supplied locally, though some assemblers continue to import branded replacement parts.

The greater size of the replacement market in relation to the OE market is unusual in developed countries. Typically, in these countries, the proportion of sales to each market would be in favour of OE. The predominance of the replacement market in Malaysia is caused by a combination of comparatively low vehicle output and longer life span of vehicles.

The replacement market is served through distributors who supply retailers, garages and fleet operations. Traditionally, success in this market has been influenced strongly by price competitiveness. But the market is becoming more quality conscious.

The relatively less demanding nature of this market has meant that many more IRG manufacturers supply the replacement market as compared with the OE market.

■ Construction

The importance of the construction sector to IRG sales is due to the sector's rapid expansion during the 1970s and early 1980s and the relatively low technical sophistication of the rubber products it consumes. The expansion of the sector created the demand for rubber goods and the relatively low level of sophistication of the products allowed the Malaysian rubber products industry to supply them.

By the mid-1980s the construction sector was considerably larger than most manufacturing sectors and hence had a higher demand for rubber products. In 1985, the construction sector held a 4.8% share of GDP. In comparison the share of the largest of the manufacturing sectors - chemicals and electrical and electronic - in GDP was less than 3.5% whilst sectors such as transportation equipment which includes cars, accounted for around 1%.

After a period of decline in the mid 1980s, the construction sector boomed in the late 1980s and has been growing at double digit rates during the 1990s, faster even than manufacturing. Demand for rubber products is therefore strong and growing.

In the construction sector, rubber products are used in both structural applications such as bridge and expansion bearings and waterstop and in indoor uses such as flooring, door stops and window seals. These are relatively simple, low value added products in which domestic producers have substantial natural protection from imports. The domestic industry has therefore been able to meet the construction sector's needs competitively.

■ Electrical and Electronics

Malaysia is a major exporter of electrical and electronic appliances and this has led to the electrical and electronic sector being a substantial end-use for IRG products. Electrical and electronic appliances are not intensive users of rubber products but the sheer volume of these products made in Malaysia makes this an important end-use.

The electrical and electronic industry has grown at a very fast rate during the 1980s and this has led to a substantial increase in demand for rubber products.

Malaysian manufacturers have been able to supply much of the needs of the foreign multinationals manufacturing electrical and electronic appliances within the country. Most grommets, rings, seals and profiles used by the appliance industry are made locally. In addition for some technically demanding products such as capacitor seals, Japanese companies have established manufacturing presence in Malaysia to supply their customers.

But in some products used in critical applications the electrical/electronic manufacturers continue to import their requirements. They have tried to source locally in the interest of reducing costs and the working capital tied up in imports, but are not convinced of the ability of the Malaysian industry to provide the high integrity of supply that they are seeking.

As is the case with supplying OEMs in the automotive industry, supplying critical parts to electrical/ electronic suppliers requires not only meeting their technical specification but assuring them of the integrity of supply. Malaysian manufacturers have yet to achieve this.

■ Other End Uses

This includes a large range of industrial uses ranging from mining, non-metallic mineral products to manufacturing sectors such as engineering and metal products.

Malaysia's comparatively low GDP, caused by its small population and level of development and the country's narrow manufacturing base have meant that some sectors of industry have either failed to develop or are very poorly developed in Malaysia.

Of particular importance to the consumption of IRG products is the very limited amount of machinery made in the country. There is no OE demand for rubber products in the manufacture of off-road vehicles, recreational vehicles, printing and copying machinery which are major users of rubber products in other countries.

Other types of manufacturing machinery including machine tools, machinery for mining, non-metallic mineral industry are also important users of rubber products but are also poorly developed in Malaysia.

In addition, rubber products such as conveyors used in other sectors such as food, non-metallic minerals and mining are supplied with machinery. As the machinery is not manufactured in Malaysia, it is imported with rubber products manufactured outside the country.

Hence in these important end-uses, demand for rubber products is limited to the replacement market.

In these sectors, demand for IRG depends in the short term, on the import of plant and equipment into the country. Provided imports remain high, they will result in an increase in the population of plant and equipment in the country and hence increase replacement demand for rubber products. In the longer term it is possible that Malaysia would develop industries to manufacture these products. This would constitute a major new opportunity for the supply of rubber goods.

■ IRG Exports

The major proportion of Malaysia's IRG exports do not form specific product categories. In export statistics they are classified as articles of rubber not elsewhere specified as shown in Figure 21.

Over the past five years, the main growth in exports has been in hoses and in other articles of rubber.

Exports of hoses have increased over five-fold from M$5.6million in 1985 to M$ 28.2 million in 1992. Exports of other articles of rubber have more than doubled from M$48.9 in 1988 to M$121.2million in 1992. In contrast, over the same period belting exports have increased only 54% from M$ 3.5 million to M$ 5.4 million.

Exports of IRG - 1992

Main Products Exported	Value (M$ million)
Tubes, pipes and hoses	28.2
Conveyor or transmission belting	5.4
Other articles of rubber (1)	121.2

Note: (1) Includes rubber bands and erasers which may be considered consumer products. Excluding these product exports of articles of rubber amount to M$ 104.5 million

Source: Department of Statistics

figure 21

The majority of hose exports (55%) are of products reinforced with textiles and other material followed by unreinforced hose. Higher value metal reinforced hose and hose with fittings account for a very low proportion of hose exports.

USA, Singapore, Italy, UAE, Netherlands and Hong Kong account for over 80% of total hose exports. These major export destinations represent a good mix of markets between countries in the Far East, North America, Europe and the Middle East, but it is noticeable that large markets such as Germany and UK do not have prominence as export destinations.

The majority of belting exports are V-belts. Belting exports are mainly to Singapore and other neighbouring countries including Indonesia.

Exports of other rubber articles include flooring, articles of cellular rubber, seals and rings and erasers and rubber band. But the largest category is by far articles of rubber not elsewhere specified (nes). Rubber bands and erasers are in our definition, classified as consumer goods and are dealt with in subsequent paragraphs.

Exports of other articles or rubber n.e.s. are mainly to Japan, Singapore, Thailand, the UK, USA, Germany, Australia and Korea. It is interesting that although the majority of exports are to countries with higher labour costs than Malaysia's, exports to lower cost countries such as Thailand and Indonesia are also substantial. It indicates that in these products the Malaysian industry is more developed that its ASEAN neighbours and able to offset their labour cost advantage.

With few exceptions, Malaysia's IRG exports do not command a high market share of any country's market. This is due principally to the nature of IRG markets worldwide and the pattern of international trade in IRG products. The proportion of a country's IRG requirements that are supplied by imports is low. In the three main world markets for IRG products, Western Europe, USA and Japan the proportion of non-tyre rubber consumption accounted for by imports does not exceed 25%, as shown in figure 22.

The main reason for this is the high proportion of IRG which are sold to OEMs. In Europe it is estimated that two-thirds of IRG sales are to OEMs.

OEMs prefer to purchase directly from known suppliers with a track record of product integrity. Increasingly they audit the manufacturing operations of their suppliers. The result is close, symbiotic relationships between purchasers and vendors.

The Share of Imports in Non-Tyre Rubber Products Consumption

Country/Region	Value of Imports as % of consumption
Japan	7%
US	16%
Western Europe (I)	22%

Note: Excludes intra EC trade *figure 22*
Source: Various Industry Estimate

In the face of these relationships imports find it difficult to enter the market. When OEMs decide to import, they prefer suppliers known to them in nearby countries, hence the predominance on intra-EC trade.

In recent years, the proportion of imports in domestic consumption has increased in all industrialised countries.

In most world markets, Malaysian IRG exports also do not hold a significant share of imports. The exceptions are Japan in which Malaysia is a major supplier of Japanese imports of automotive and other rubber products, flooring, masterbatch and gaskets, washers and seals. But even in Japan, Malaysia importance is greater in volume than value terms sugesting that the country is a low value source of supply.

The main souce of imports into the industrialised countries are other industrialised countries Japan and USA in Western Europe, Western Europe and USA for Japan and Western Europre and Jpan for the USA. Industrialising countries such as Korea and Taiwan are only now beginning to make major in roads into these countries.

The success in exporting to other industrialised market depends on developing a reputable product integrity. And, so far, this has been confined to manufacturers in other industrialised countries.

Malaysian exports have on the whole yet to develop the reputation for product quality required to penetrate much of the markets of industrialised countries, particularly OEMs. To date, their main customers are distributors serving the low value segments.

Part of the problem is market presence. The small size of Malaysian IRG manufacturers limits the amount of pro-active marketing they can carry out in export markets and to some extent, the market intelligence they can afford.

It is not suprising that the main export destination for IRG exports are the Far East countries of Japan, Singapore, Taiwan and Korea which are also the main source of imports. A two-way trade appears to have developed in IRG products between these countries and Malaysia.

This is because of the familiarity of firms from these countries with the Malaysian industry. The familiarity of these firms with the Malaysian industry has allowed them to take the lead in importing from Malaysia and this has facilitated the development of IRG exports.

Consumer Goods

Consumer goods markets are as difficult to penetrate as IRG markets. Branding and access to distribution networks are the main obstacles. Because of Malaysia' s comparatively small population most consumer goods are exported.

- Consumer Goods - Domestic

The domestic market for consumer goods is limited by the size of the population and to a lesser extent the income levels and lifestyles of the people.

The main types of consumer goods manufactured in Malaysia are:

- household goods such as bath mats, plungers etc
- stationery including rubber bands, erasers etc
- sports goods including snorkels, flippers, swim fins, swim caps, masks, rubber balls,
- foam bedding

Whilst domestic demand for all products is limited by population, the markets for household goods, stationery and bedding are comparatively better developed. Indeed, small volumes of these items are imported.

But the large majority of sports goods manufactured have to be exported. The domestic demand for swimming aids, for instance, and most balls is limited. This is a combination of the small population, the comparatively lower leisure time available to Malaysians and the lower per capita income of the country in comparison with industrialised countries which limits participation in sports, particularly amongst lower income households.

In sports goods, consumers in high value segments of the market also have strong brand loyalty. Hence even if a domestic manufacturer was able to make good product competitively, it may find it difficult to sell their product in this segment unless they develop an internationally known brand. New manufacturers may be forced to sell to lower value price sensitive segments of the market.

The combination of a small market and brand loyalty has prevented the manufacture of some rubber sports goods. Tennis balls are an example of this. In golf balls, where demand in Malaysia is higher, domestic manufacture has been limited to one company.

■ Export Markets - Consumer Goods

The main types of consumer goods exported from Malaysia are rubber bands, swim caps, balloons, rubber toys, swim aids and foam bedding as shown in Figure23.

With the exception of balloons, exports of consumer goods, having increased in the 1980s, have levelled off or fallen in the 1990s. Balloon exports, however, have increased nearly four-fold ove. the past five years.

Export destinations for these products are in the high income countries of North America, Europe, Australasia and the Far East, particularly Japan, Korea and Taiwan. In addition to consumer purchasing power, this pattern of trade reflects also the nationality of the foreign investors who have established manufacturing operations in Malaysia.

Major Consumer Goods Exports - 1992

Products	Value of Exports (M$ million)
Rubber bands	14.4
Swimming caps	12.4
Balloons	11.8
Swim Aids (snorkels, fins, other water sport equipment)	7.5
Foam bedding	6.1
Hot water bottles	4.5
Erasers	3.9
Golf balls	3.8
Rubber toys	3.5
Other balls	0.6

figure 23

Malaysia has a major presence in important world markets for balloons, swimming aids, erasers and hot watrer bottles, though in balloons it trails Thailand and in swimming aids and water sport equipment, Taiwan. In other products, however it is well behind competitiors in Taiwan, Korea, and other industrialised countries.

Export markets for consumer goods are difficult to penetrate. The main barriers to entry are:

i.) brand awareness and loyalty are high. This makes it difficult for new entrants to penetrate the market;

ii.) product certification such as the 'kite' mark in the UK or approval by industry associations are common. It takes time and expense to obtain the necessary certification.

iii.) access to distribution channels is difficult. Large chains and department stores buy only one or two branded goods in addition to their own label offerings.

iv.) increasingly, markets such as those for sports goods have become fashion orientated and require the ability to anticipate changes in consumer preferences.

The branded segments of the market for consumer rubber products are dominated by manufacturers from the industrialised countries, either located in the country of consumption or with satelite manufacturing in low cost countires and new entrants are usually restricted to selling to distributors serving low value unbranded markets. This market segment is smaller than branded and own-label segments and prices in this segment are lower.

Foreign firms, therefore, have a particularly important role to play in the expansion of exports. They can provide the market access necessary to develop sizeable volumes of exports and to penetrate attractive markets. Malaysia's export performance in consumer goods has relied on firms with foreign participation. Domestic firms have tended to stay in low value products such as hot water bottles and bath mats.

Masterbatch

The market for rubber compound in Malaysia is limited mainly to compound for retreading. The sale of masterbatch to downstream rubber product manufacturers is yet to become as prevalent as it is in western industries. The sale of retread compound falls outside the scope of the study.

Masterbatch is mainly exported from Malaysia. In the domestic market, most formal sector companies carry out their own compounding facilities. Even firms whose scale does not justify in-house compounding have their own compounding facilities.

Exports of carbon masterbatch are mainly to Japan, Singapore, USA and countries of western Europe. Exports of rubber compound, having grown up to 1991, declined in 1992 largely as a result of the recession in these countries.

Developing exports of a product that serves as the basic raw material for rubber product manufacturers requires establishing a close relationship between buyer and seller. Exports of masterbatch therefore are mainly to countries who are familiar with the capabilities of the Malaysian industry.

There is a growing trend to sourcing-in masterbatch. Small companies find it uneconomic to compound and concerns over pollution control are making some look to overseas suppliers.

Market Overview

In general the domestic market for GIRG products has remained buoyant whilst export markets have recently been depressed. The continued growth of exports of IRG in the face of difficult market conditions overseas reflects the growing competitiveness of Malaysia's rubber products industry.

The markets for GIRG products are in general difficult to penetrate. In the case of IRG and rubber compound, there is a need to establish a high level of confidence in the supplier. In consumer goods, there are difficulties in penetrating markets in which branding and access to distribution networks plays an important role.

But whilst the obstacles to developing IRG markets can be overcome slowly by newcomers, the problems for Malaysian manufacturers of consumer products are perhaps more intractable. The absence of a sizeable domestic market makes it particularly difficult to establish a secure base from which to attempt to penetrate export markets. In consumer goods, foreign participation is a distinct advantage.

V Corporate Capabilities

In this section we examine the capabilities of Malaysian GIRG businesses and their ability to compete internationally. Our findings are the result of detailed examination of the rubber product industry in Malaysia. They are based on visits to some 24 companies, a detailed examination of published and unpublished information on the industry and contacts with industry experts.

Approach

The study was undertaken in two consecutive stages:

Stage 1 A detailed questionnaire was prepared by us and despatched by MIDA to some 50 rubber product companies. The purpose of this was to:

- ensure a uniformity of enquiry throughout the investigation
- alert the companies to the project and the issues which were being addressed
- provide a permanent record of the main features of a many as possible of the companies concerned.

25 companies responded.

Stage 2 24 of the companies were visited by one or more members of the team accompanied by a representative of MIDA. In each company discussions took place with senior management and in all but a few cases the manufacturing facilities were visited.

Concurrently with this investigation detailed information was collected from MIDA, RRIM, MRPMA, MRRDB and other sources on other companies.

It should be noted at this point that the selection of the companies for visit was undertaken by MIDA. Inevitably this selection was slanted towards firms which MIDA had close contact with. This biased the survey towards large, more progressive companies as it is companies of this type which require manufacturing licenses or avail themselves of incentives. We sought to mitigate any possible distortions through discussions with industry sources such as MRPMA, MRRDB, materials suppliers and others.

In reviewing the findings from this study we are mindful of the need to preserve the confidentiality of the companies. The following remarks therefore concentrate on generic issues and not on the performance of the individual companies.

General Findings

The 24 companies visited by us represented a very wide range of activities. (see figure 25). They ranged from small businesses serving local markets, with little if any expectation or intention of developing an export business, through to more extensive businesses with significant export activity and an ability to serve the more demanding domestic markets such as the automotive sector. The sample therefore reflected a great diversity of equipment and expertise.

Although 14 of these companies employed more than 100 people not one would qualify as a *large* company by UK and Western European standards - usually taken as 500 employees. In turnover terms the disparity in size between Malaysian and international GIRG manufacturers is even greater with only a small handful of companies which would rank amongst the *medium sized* businesses in Europe.

Summary List of Companies Visited

Ref	Nº of Employees	Turnover (M$ million)	Activities / Products
1	350	9.6	General Industrial & Extrusions
2	250	17.0	Rubber Bands
3	80	7.9	Industrial Hose
4	414	26.0	Abrasive Lining/Sheet
5	12	1.1	Bridge Bearings, Rubber Gtops
6	250	17.6	Transmission, V-Belts
7	49	8.0	High Pressure Hose
8	30	2.4	Cables, Textile insulated
9	100	3.6	Specialist Moulding, Extrusions
10	50	2.0	Mouldings for Electronics
11	100	5.6	Rubber Aprons & Audio Parts
12	80	7.0	Heavy Mouldings
13	N/A	N/A	Swim Caps, Mats
14	102	6.0	Bath Mats- light Colours
15	150	9.0	Swim Fins, Masks
16	7	0.3	Seals
17	80	5.0	Shaped Hoses, Mouldings
18	170	10.0	Moulded Parts
19	N/A	N/A	Sports Balls
20	N/A	N/A	Condenser Seals, Air Conditioning Equipment
21	150	4.6	Compound, Auto Parts, Bearings
22	140	7.5	Tyre Compound, Mouldings, Rollers
23	N/A	N/A	Rollers, Mouldings
24	35-40	2.5	Rubber Caps, Mats, Mouldings
25	151	35.0	Camel Back, Retread, Compounds

figure 24

Products

In general, the Malaysian industry manufactures the full range of GIRG product and this is borne out by the companies in our survey.

The companies represented a comprehensive range of activities which tended to reflect the historical development of the industry but with a bias towards new inward investments.

In the IRG products however there were gaps in products manufactured including some notable high value rubber products such as:

- products for the oil industry
- proofed fabrics
- closed cellular sponges
- solid rubber medical products
- adhesive/medical tapes
- high/medium performance conveyor belts

In consumer products, almost all products were manufactured with the notable absence of inflatable products and tennis balls. But, in some product areas such as rubber toys and sports balls, the manufacturing base consisted of few companies.

The gaps in products manufactured may be explained by:

i.) there has hitherto been only a small demand for such products in Malaysia;

ii.) entry into such markets requires resources for product development in technologies in which there is little experience in Malaysia and/or capital investment beyond the scale of most of the operations represented during the course of this visit;

iii.) in products such as tennis balls and conveyors world oversupply has made it difficult for new entrants.

In general, products are well made and con ɔrm to international standards. But, in almost all IRG products, it was possible to up-grade specification and to improve aspects of product quality to increase value added.

Resources

■ Buildings and Factory Layout

Companies which had recently been set up were generally housed in premises which were well designed and such operations were well laid out and used good housekeeping practices. This is reflected in better control of work in progress, quality and working conditions - an important factor given the difficulty of recruiting into the rubber industry described in sections VI and VII.

On the other hand many older companies which had not recently moved are working in cramped and unsuitable buildings. Space is misused, factory layout and housekeeping is poor. However this is probably a transient problem. With strengthening management skills the problems are increasingly being addressed and three of the companies are moving or planning to relocate to new premises.

■ Equipment

Moulding companies which had recently been set up or which had moved into new premises were in general using new compression presses. We would have expected a greater use of injection moulding equipment - given that they were targeting to manufacture components for the demanding information technology and automotive markets. The situation was less satisfactory in the extrusion area where with one notable exception the equipment was not up to modern standards and often lacked basic down stream equipment such as haul off units etc.

Older established companies were however using equipment of varying degree of age. This is not uncommon in the rubber industry - especially in the case of large capital equipment such as mixers the life of which can be significantly extended by refurbishment and replacement of major parts.

On balance new investment has been concentrated in the moulding sector. The full benefits of this are however likely to be eroded by the lack of good tools. This inhibits the industry's ability to manufacture products competitively (see section VI - Infrastructure and Support) and may restrict its ability to compete for more advanced - and therefore higher added value - products.

Plant and equipment generally utilise technology that may be considered adequate but does not encorporate recent technological innovations for high precision such as lasers or automation including robotics. This is not surprising given the scale of Malaysian operations.

- Laboratories, R&D Facilities

Only a few had well established laboratory resources. However there has been a significant move in many companies towards the acquisition of quality control testing equipment and in most cases such equipment is being set up under laboratory conditions. None of the companies visited had laboratory facilities suitable for innovative R&D - a small amount of innovative work is being undertaken but usually it involved the use of shop floor equipment.

General Management

Inevitably there is great variability in the quality of management - as is the case throughout the world. Some of the firms, notably but not exclusively the more recently set up operations, are generally working to modern standards in terms of conditions of employment, working environment, the control of waste etc.

However we found much less evidence of sound business management practices outside companies with overseas ties. Most of the factories were overmanned, there was little evidence of investment in people in the form of training and career development. This will inevitably change as managers find themselves confronted with a more competitive market, higher labour costs and work force shortages.

The need for this is perceived amongst the more talented individuals in some companies - especially those family companies whose second generation management has been exposed through their education to practices in developed countries. Progressive improvement can therefore be expected.

Improvements could be accelerated were the industry to work more cohesively in the development of skills. Unfortunately we found little evidence of any enthusiasm for such collaboration. On the contrary we encountered mistrust between companies, anxieties about staff being *poached* with loss of in-house *secrets*. This level of mistrust extends to suppliers such as tool makers and technology support resources such as the RRIM. There is therefore a need for a campaign to undo these attitudes.

Marketing

We found little evidence of any formal marketing activity as it is normally understood. There is a general lack of knowledge or understanding of markets outside Malaysia or indeed the character of the competitive environment. *Export Sales* are undertaken by senior management/proprietors but few make consistent effort to identify new opportunities.

The weakness is recognised by most of the managers interviewed for the project and there is a general desire for better marketing information. However in many cases this seems to be perceived as an identification of specific opportunities rather than as mechanism for the development of a structured marketing strategy. There is clearly a need for the development of more formal information gathering activities as well as training in its use.

Technological Skills

We encountered few skilled and innovative technologists who were working towards a continuous improvement of their processes. In the majority of cases there was an absence of technological innovation and little pressure from senior management for continuous improvement in products and efficiency. Technological expertise is in general concentrated on primary processes. We encountered little evidence of a sound understanding of modern issues such as the cost of quality, economic implications of long work in progress times etc.

In mitigation we would note that capacity for innovation is, to some extent a matter of scale and it must be said that we would probably find a similar situation in developed countries amongst companies of a similar size and in similar areas of business.

We found only very limited ability for product design. This is an important constraint since there is an increasing trend for end users to rely on the technological competence of their rubber product makers not only to ensure that the right compound is used but also to participate in product design and development.

Manning Levels and Waste Management

Overall we found that manning levels were significantly higher than we would expect to find in, for examples, the UK. As can be seen from the following chart some 75% of the companies had a turnover of less than £20,000 sterling per employee - a level below which few if any companies in the UK operate - and it should be noted that our survey covered the better companies in the GIRG sector.

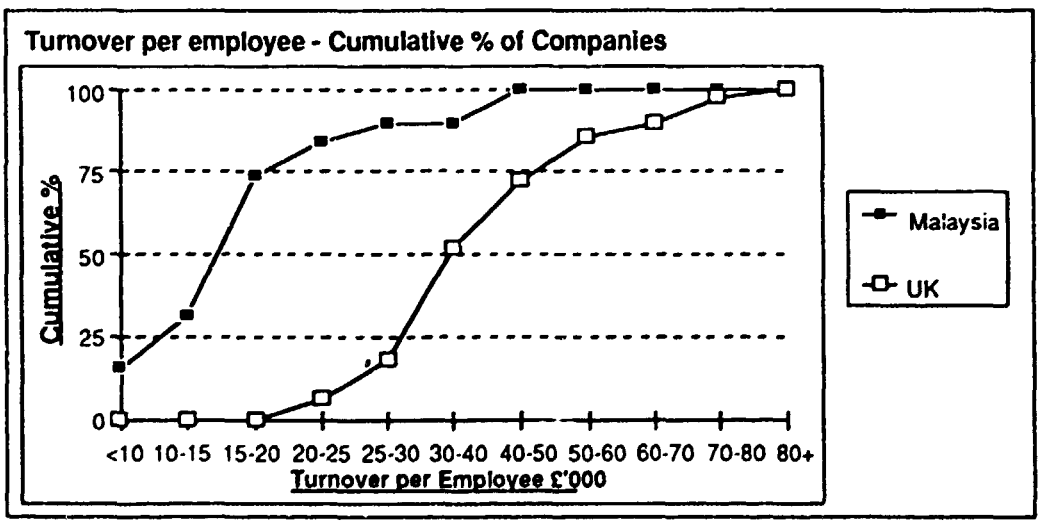


figure 25

The detailed reasons for this level of overmanning could not be established within the time available for each visit. However they appear to be at least in part due to poor working conditions and factory layout - see above. In the case of moulding operations considerable labour appears to be being used in post finishing operations - trimming etc - the need for which might be obviated with better tooling (which would reduce the amount of flash).

High levels of rejects is almost certainly a further contributory factor. We encountered unacceptably high levels of this throughout the industry. Technical management appear to be unable to get to grips with this problem and there is insufficient pressure from senior management to reduce waste.

This is a critical area for competitive manufacturing and will require a great deal of attention throughout the industry.

Overall Comparison with World Rubber Product Makers

Probably the most effective way to consider the relative position of the Malaysian rubber product industry is to classify their activities in four classes as follows:

- World Class
  Has the resources and competence to compete against similar companies in its chosen market. The company may however be restricted by size from being a world scale operation.

- Threshold World Class
  On the threshold of becoming a world class company; may already be exporting to a limited extent and could become an effective supplier outside Malaysia once some readily removable obstacles are addressed

- Good Domestic Supplier
  is capable of supplying the more exacting levels of domestic demand but lacks the resources - scale, technology, equipment, market expertise, to make a significant entry into the export field.

- Domestic
  satisfies the local market for simple rubber products; few resources for improvement.

In most developed countries the rubber industry is made up of a great number of companies which fall into the Good Domestic or Domestic category. Indeed many of the smaller ones (£1 to £2 million turnover) tend to work within relatively narrow geographical confines. Such companies would not normally consider themselves as entrants into other countries - development in the European Community notwithstanding.

Companies providing components to the automotive and other sectors are increasingly having to become world class even though they may only be seeking to supply their domestic markets. This is because many of their customers are world class and often world scale.

■ Labour Supply Costs

Malaysia has substantial unit labour costs advantages against the developed countries but is disadvantged when compared with manufacturers in most developing countries. Its labour costs are equivalent to Poland and other countries in Central Europe.

Shop floor labour costs in Malaysia are quoted as being in the region of M$ 550 to M$ 700 per month - ie between M$ 8,000 and M$ 10,000 per annum after taking account of social wage costs. This is comparable to current levels in Poland.

In the UK average shop floor labour costs are of the order of M$ 55,000 per annum inclusive of social wages. This means that Malaysian rubber product manufacturers enjoy a significant - some 6 fold - unit labour cost advantage over their counterparts in developed countries.

But in comparison with Thailand where average labour costs for unskilled labour are M$ 260 per month, Malaysian labour costs are high. And of course labour costs in Indonesia, China and India are considerable lower.

Our analysis shows that the Malaysian industry fails to exploit fully its competitive advantage against manufacturers in developed countries. Overmanning and low labour productivity are dissipating Malaysia's advantage.

Figure 28 sets out the cost of manufacture of two types of GIRG products with varying labour content. If the Malaysian industry were exploiting fully its labour cost advantage, its cost structure would appear as shown in figure 29.

Typical Make Up of Direct Costs for Compound for GIRG Part and an Engine Mount in a Developed Country % Direct Costs

Factor	GIRG Part	Engine Mount
Material	35	74
Direct Labour	32	19
Utilities	6	3
Manufacturing	6	4
Total Direct Costs	**100**	**100**

figure 28

Potential Make Up of Direct Costs for GIRG Part and an Engine Mount in Malaysia using European Productivity as a Base - % Direct Costs

Factor	GIRG Part	Engine Mount
Material	55.0	74.0
Direct Labour	5.5	3.3
Utilities	6.0	3.0
Manufacturing	6.0	4.0
Total	72.5	84.0
Cost Competitive Advantage over UK	**27.5%**	**16%**

figure 29

Based on the six-fold advantage Malaysia holds on labour cost, the proportion of cost made up by direct labour would fall from 32% in a developed country to 5.5% in Malaysia for the GIRG part and from 19% to 3.3% in the engine mount. This assumes that labour productivity in Malaysia is equivalent to the West.

But our survey showed that labour productivity was 2.5 to 3 times lower in Malaysia. Malaysia's cost advantage was therefore substantially eroded. The total cost advantage was reduced from 27.5% to

some 16% for a comparatively simple GIRG part and from 16% to 10% for a complex engine mount. These estimates are confirmed by comparing the proportion direct costs make up of turnover of two UK companies, with their Malaysian counterparts are shown in figure 30.

Ratio of costs of Direct Labour to Turnover - %				
	Products A		Products B	
	Malaysia	UK	Malaysia	UK
Direct LabourCosts/Turnover - %	15	34	10	27

Source: The above data for the UK are actual figures obtained from two of Rapra's clients during recent work (1992/3).

figure 30

Note: Products A are a combination of general rubber mouldings and extrusions - we expect productivity to improve by a further 10% - reducing the ratio to 31%. Products B are higher added value rubber products involving non elastomeric components - we expect this ratio to improve to 14% before the end of 1993.

Labour productivity in Malaysia is equivalent to lower cost countries with less developed industries such as Sri Lanka or Thailand. Hence against these countries the country has a labour cost disadvantage.

The competitiveness of Malaysia in labour cost terms can be improved. It should be possible to improve productivity to approach developed country levels. There are wide variations in Malaysian labour productivity with companies with foreign ownership or participation significantly ahead of home grown companies.

- Labour Supply

Poor supply of labour is a major constraint on expanding operations and undermines investor willingness. Shortage of labour adds to disruption of output and high labour turnover adds to costs. This is discussed further under Infrastructure and Support below.

- Establishment Costs & Overheads

The competitive position as regards land and building costs is similar to labour costs. They are substantially lower than developing countries but higher than many developing countries particularly in urban centres such as Kuala Lumpur.

Machinery costs and hence depreciation charges are lower than developed countries because machinery is older and less advanced. In this repsect Malaysia suffers no cost disadvantage against lower cost countries.

Other overheads are generally much lower than developed countries particularly in family owned businesses.

Product Quality

Overall the quality of products leaving the factory reflect a strong sensitivity to quality. This is a powerful competitive edge over neighbouring rubber product countries. As indicated in Corporate Capabilities above, Malaysia has an above average proportion of companies capable of working to or on the threshold of world class companies.

Against developed countries, Malaysian products on the whole meet international standards but in many instances, product specification and performance could be improved to penetrate higher value segments of the markets and to compete against market leaders.

Delivery and Service

Lead times of manufacturers are reasonable but with few exceptions, the industry does not work to short order lead times which are the norm in Japan, Europe and USA.

Customer service particularly to OEMs and in export markets are not up to developed country standards. Malaysian industry with the exception of foreign companies has not as yet developed the ability to plan and manage distribution networks that can ensure a high level of customer service.

Capacity for Innovation

Taken overall the general rubber product industry is uncompetitive vis a vis manufacturers of similar products in developed countries. However it has a competitive edge over rubber product makers in other ASEAN and intermediate developing countries, as set out under Corporate Capapbilities.

Infrastructure and Support

This is discussed in length in the following section, Infrastructure and Support. Technological support is weak thereby failing to exploit the potential competitive advantage of expertise in rubber technology and infrastructure developed by a large rubber industry. Export marketing infrastructure is poor.

Competitiveness is undermined also by lack of good tool making - both in terms of local manufacturers seeking to upgrade product and in devliery schedules.

Nevertheless, against many other developing countries Malaysia has better infrastructure and support for rubber goods.

Supply of Technologists and Managers

Malaysia is probably better placed than most of its neighbouring competitors in the supply of technologists. But investors are likely to be increasingly confronted with problems in recruiting good local managers and technologists.

The country is overall reasonably well endowed with rubber technologists and has some experienced managers. However, as indicated below, many of these are locked into family owned companies and do not represent a sufficiently mobile pool of skills. Technological skills are more focussed around basic rubber technology than product development and production problem solving.

Inward Investment

As a location for inward investment, Malaysia can offer excellent transport and communication infrastructure, strong economy, stable Government and an attractive package for investment. However, in these attributes its competitors are catching up with Malaysia, especially ASEAN countries.

And, in the shortage of labour, rising labour and establishment costs it is significantly disadvantaged. Moreover, many competitor countries offer potentially larger markets than Malaysia, offering both lower labour cost and entry into a large new market.

Overall Assessment

The Malaysian industry can compete on cost against industries of developed countries and has the quality of product to penetrate these markets. However, product and quality up-grading will be required to compete against market leaders in developed countries.

The Malaysian industry has significant cost disadvantages against other developing countries but is able to compete against them because of superiority in product quality. Rising costs within Malaysia may, however, exacerbate its cost diadvantage and competitors may catch up in quality.

There is substantial scope for improving cost competitiveness of Malaysian industry. Labour productivity is low and wastage levels high.

As a location for inward investment, Malaysia is losing its advantages. Competitors can also offer lower labour costs, plentiful labour and large markets.

In principle it is entirely possible for a rubber product company which is adequately supplied with materials and appropriately trained people to function independently of any other external support or infrastructure - provided they are working within an unchanging market environment. In developed countries there are many companies of this type - they are characterised by long term stability of management, in-house technology, product range and markets and competitive situation. Malaysia too has its share of such companies as outlined in corporate capability above.

However, almost by definition, such companies are rarely able to manage change. They lack the management skills, marketing knowledge and the technical resources needed to respond to changes in the markets, technology and the competitive environment. Their further development and, in some cases, survival depend on ready access to one more of the following resources:

- secure supply of all the necessary materials, tools and utilities;
- technological support - product and process development, testing facilities;
- stable supply of manpower and resources for its training;
- support for the development of marketing strategies and their implementation.

Such comments may be considered to apply to all industry. However they are even more relevant to the rubber industry because - unlike most other materials conversion industries such the plastics or metals sector - most rubber product makers have to make their own materials from a variety of ingredients. Successful production of any rubber product entails the achievement of a technological compromise involving:

- the selection of the correct ingredients for a compound which will both respond appropriately to conversion processes and result in a product capable of meeting requirements which are often very technologically demanding;
- the use of conversion processes which themselves are capable of imparting variability to the product.

Therefore any rubber product company seeking to improve the quality of its output or to meet the technical requirements of a new product needs resources for testing and in many cases compound and product development. Such resources and skills are expensive and in most developed countries, only larger or highly innovate companies have such technological and R&D resources in-house. The remainder rely on external technology support from their suppliers of materials and equipment and dedicated laboratories and institutions.

The need for such technological infrastructure is, as is apparent from earlier sections, more important for Malaysia than in more developed countries for the following reasons:

- most companies in Malaysia are too small to support such resources in-house;

- the industry is going through a major period of technological change which raises the demand for such resources;

- the future of Malaysian rubber industry lies in an ability to respond to technological change in the market place.

Similarly, as we have demonstrated under corporate capabilities, the industry requires an infrastructure capable of delivering training in technology, marketing as well as resources for export development.

The availability of the appropriate resources is therefore essential issue for consideration. In this chapter we comment on our findings in Malaysia.

Raw Materials, Tools and Supply of Utilities

■ Raw Materials

There are essentially three components of materials supply:

- Natural Rubber
- Synthetic Elastomers
- Chemical Additives and Fillers

• Natural Rubber

The GIRG industry continues to have first class access to Natural Rubber which still accounts for some 85% of its rubber consumption. Malaysian GIRG manufacturers have the advantage of sourcing NR from a country which has led the world rubber industry in terms of quality. Recent steps by MRRDB are aimed to ensure Malaysia retains this advantage, but given the fact that NR is subject to influence from a wide variety of agronomic and other factors, problems with variable constituents will remain.

Potentially, Malaysian GIRG manufacturers have the advantage of ensuring consistent supply of raw material by working closely with their suppliers. By signing long term contacts with suppliers, GIRG manufacturers would be assured consistent supply or where problems occur to work back quickly to their origin.

In practice, however, only large GIRG companies with sufficient purchasing power are able to benefit from long term supply contracts. Smaller companies would benefit by working together, perhaps through MRPMA.

We have identified some problems in product variability which may be attributable to the wide spread use of SMR10 and 20 field grade which is potentially quite variable since the contents of one component - latex/sheet material is unspecified. The situation is discussed in greater detail in Annex A.

- Synthetic Elastomers

Unlike its major competitors the Malaysian rubber industry does not have the benefits of local supply of synthetic rubber materials. This has little effect on the economics of GIRG operations - however there is some loss of competitive advantage vis a vis rubber product makers operating in countries which have SR producing resources.

The majority of world class suppliers of synthetic materials are represented in Malaysia either directly or through agents and we have had no reports of significant problems in obtaining the required materials. So far as we have been able to establish prices of such materials are comparable to those paid by rubber product makers in other countries.

However overall consumption of individual types of synthetic elastomer is low. As a result suppliers of such materials have little incentive to provide local *technical services* support for their customer. Such services are generally provided from supplier centres as far afield as Japan. This has the effect of reducing the level of technology support available to GIRG manufacturers.

To some degree this would be offset by the setting up of indigenous synthetic rubber production. However, so far as we have been able to establish there is little prospect of this occurring in the foreseeable future.

There is some suggestion that Japanese synthetic elastomer suppliers are slipstreaming behind Japanese GIRG manufacturers who are setting up operations in Malaysia and that specifications are being manipulated to secure these companies as outlets for Japanese suppliers. This may result in unfair advantage for Japanese suppliers and prevent other suppliers from operating in Malaysia.

- Chemicals, Additives and Fillers

Here again the situation is analogous to that of synthetic elastomers. GIRG manufacturers are heavily dependent on imported materials but we did not identify this as a constraint on the development of the rubber product industry. With the exceptions of carbon black and zinc oxide which are available locally but priced above international levels and imported industrial textiles, prices are comparable to those paid in competing countries.

- Tools & Machinery

Access to good tool makers, capable of producing high quality moulds and dies within acceptable time frames, is a sine-qua-non for rubber product manufacturers. It is clear from our discussions with rubber product makers in Malaysia that they are obliged to rely extensively on tool making overseas for higher quality tools.

Though in cost terms, Malaysian manufacturers, by shopping around in what is becoming a highly competitive market for moulds and dies, may not be disadvantaged, in three ways the absence of domestic supply would disadvantage the ability of GIRG manufacturers to supply high quality markets:

- distance makes it impossible to go through the process of iteration required to develop moulds ideally suited to new products. Malaysian manufacturers have to accept moulds as delivered;

- Distance may also result in slow response which could make it difficult to quote for new business in time;

- long lead times in supply of moulds, in turn, make Malaysian manufacturers uncompetitive in terms of delivery schedules.

We understand that mould and die making is improving in Malaysia. Government has targeted this sector for promotion both in the small business sector and as part of the machinery sector.

Malaysia manufactures some machinery for the GIRG industry, though most of the machinery manufactured is for the rubber, not the rubber product industry. Nevertheless, there is a plentiful supply of internationally manufactured new and second-hand machinery available in Malaysia. Machinery from China is particularly competitively priced against other international suppliers and readily available in Malaysia.

■ Utilities

In common with other Malaysian industry the rubber sector is subject to the under-supply of electricity in certain parts of the country. Whilst this causes difficulty to some degree for all industry, rubber product makers can be especially affected - thus.

- unscheduled power failure can cause loss of material which is undergoing curing at the time of the cut;

- the need to clean out presses where this has occured can significantly reduce productive output for several hours after each episode.

The average cost of electricity is comparable to that being encountered in Europe and in the USA. Such differences as do exist have only a marginal effect on competitiveness given that energy rarely accounts for more than 5% of total manufacturing costs.

Water supply and telecommunications and the transport network are excellent in Malaysia and contribute to competitiveness. A cause for concern is shipping costs which are higher from Malaysia than from competitor countries such as Korea and Taiwan. This problem is being addressed by the Government and should ease, we understand in the next few years.

Environmental Concerns

There are three issues which come into play:

i.) Although the rubber industry is not a major polluter it does generate some hazardous wastes and these must be disposed of under controlled conditions. There is a lack of resource for this - indeed we suspect that there is insufficient understanding of the way to cope with it. The focus on incentivising companies to undertake development of disposal facilities rather than through public provision, fails to address the problem that for many types of waste public provision is the only economic solution.

ii.) In-process environmental control is becoming increasingly important. In the United Kingdom an increasing number of rubber product making companies are seeking to upgrade their systems to achieve a new environmental standard BS7570. Malaysia lags behind in this.

iii.) In the short term there will be a tendency for some manufacturers in industrialised countries to seek to export their environmental problems to countries operating lower standards. This may favour Malaysia where although standards are high, implementation and scrutiny are weak. However such advantage will be short lived and inward investors are likely in the long run to wish to work to standards similar to those of their own countries.

A more systematic and structured approach to environmental concerns is required which aims to deliver a safe environment at least cost. But clearly this issue affects many industries and should be addressed at a higher level than the GIRG industry.

Technology Support

Ideally rubber product makers require access to six forms of technical support

- facilities for testing and analysis of materials and products;
- capabilities for compound development involving semi-scale equipment operated by technologists with a sound knowledge of the way in which technological and performance requirements may be addressed by suitable compound design;
- the means to provide speedy trouble shooting and failure diagnosis consultancy;
- resources for longer term collaborative R&D projects aimed at raising the technological capabilities of specific sectors of the industry;
- information on technological trends - covering not only changes in existing technologies but also the competitive effect of changes in other technologies;
- consultancy on quality and advance manufacturing practices.

In Malaysia technology support is provided mainly by MRRDB. Although its prime function is the development of the rubber industry, the organisation has also responded to Government's objective of higher value added within Malaysia by providing services to the rubber product industry.

MRRDB's services to the Malaysia rubber product industry are provided mainly through the RRIM, though the Malaysia Rubber Products Research Association (MRPRA) in the UK, an organisation established to service rubber users worldwide, can also occasionally serve as a technology resource to the Malaysian industry.

RRIM was originally established to serve the needs of the rubber industry. But gradually it has taken on the role of providing technological support also to the rubber product industry and established a technology centre. We examine the effectiveness of services provided by RRIM's technology centre and other sources of technological support which rubber product manufacturers require in the paragraphs below.

- Testing and Analysis

The industry has an exceptionally valuable asset in this field in the RRIM. The facilities are excellent and the laboratories are very well equipped. The industry speaks very highly of the service and reports frequent use of it.

- Compound Development

It is clear from our discussions with the industry, RRIM and representatives of the synthetic rubber manufacturers that the RRIM has adequate skills and equipment to assist the industry with its compound development. However we have formed the impression that they are not used as frequently as they could be for the following reasons:

- There is serious concern within the industry about *confidentiality* of the work undertaken by RRIM personnel. We suspect that at least some of these concerns are the result of gearing of limited anecdotal evidence. Nevertheless rubber product makers world-wide tend to have strong, and in many cases exaggerated, proprietorial feelings about their compounds; any suspicion that others might benefit from work done on their behalf is therefore a disincentive.

- Project lead times can be very long. RRIM quoted an elapsed time of up to two months and more between receiving instruction for development of a novel compound and the delivery of a fully evaluated formulation. This should be contrasted with the two to three weeks which would be the norm in other internationally recognised bodies.

- Trouble Shooting etc

Work of this nature requires extensive experience - especially in process and product engineering. Such skills appear to be in short supply throughout Malaysia - if only because of the rapid development of the rubber product industry in a short period of time. Some RRIM technologists probably have an understanding of the issues - however we doubt whether they have the depth of experience necessary to provide effective consultancy in this area.

The problem is clearly more serious for the *home grown* rubber product company than one which has the support of technology transfer from a world class company. Home grown companies are willing to use such consultancy assistance and we have encountered instances were MRPRA has been used but they question the levels of technical expertise available and have concerns over confidentiality, thereby further compounding the difficulty of building up local consultancy experience, within RRIM for instance.

■ Resources for Long Term R&D

RRIM has been and is involved in long term R&D. However much of this is focused on the exploitation of NR rather than on broader issues confronting Malaysian rubber product manufacturers. The principle of pre-competitive research projects supported by a number of companies is extremely common within Western Europe. The projects are intended to take participants to a common basis of technological competence from which they construct their own competitive positions. It is encouraged by National and EC operated schemes as assisting European industry to enhance its competitiveness in world markets.

We are led to believe that Malaysian rubber product industry would be willing to participate in such programmes. But at present such programmes do not exist.

■ Technological Information

RRIM is clearly an important channel for the formal communication of such information to individual companies. However we have noted little evidence of any proactive dissemination of such information. The only mechanism for this appears to be Plastics and Rubber Institute of Malaysia through its conferences and meetings. Here again this issue is more relevant to companies seeking to ensure their technological competitiveness in export markets.

■ Quality

It is to its great credit that, as can be seen from figure 31, Malaysia ranks alongside the most highly developed countries in terms of the number of companies registered for ISO 9000.

This interest is reflected in the activities of the rubber product industry and it was noteworthy that the majority of the rubber product makers visited had acquired or were in the process of purchasing quality control equipment - reflecting a strong commitment to the upgrading of quality. This level of interest was confirmed by suppliers of such equipment. The key agency in this area is SIRIM. Its activities in this area are clearly an important component in enhancing the capability of the Malaysian rubber product industry and could be used to market the industry internationally.

However it is not generally recognised that ISO 9000 is only a stepping stone along the quality route and the rubber industry's customers are progressively moving toward Total Quality Management. This calls for a complete revision of corporate attitudes to management in response to an increasingly competitive and fluid world market situation. It involves <u>all</u> personnel from the Managing Director to the telephone operator.

Number of Companies with ISO 9000 by Country

Country	Nº of Companies with ISO 9000
UK	25,000
Australia	1,400
USA	1,100
Canada	1,000
France	670
Ireland	559
Germany	488
Switzerland	390
Italy	341
Singapore	250
Malaysia	200

figure 31

Source: ISO9000 Quality Forum, Kuala Lumpur, May 1993

Effective implementation of this more often than not involves a substantial change in management style, training and shop floor attitudes. Although the underlying idea is straightforward and the implementation process is less formalised it nevertheless involves a sequence of steps which are very demanding. A total understanding and commitment is an essential prerequisite to success in the long run. It calls for a high degree of competence in quality management and the resources to ensure that all steps can be introduced.

Initially TQM was primarily the province of larger companies. However smaller companies are now moving down this path. For example Rapra Technology is currently assisting in the introduction of TQM to a UK rubber product maker whose turnover is of the order of only £1 million.

- Advance Manufacturing Practices

SIRIM is also the main vehicle for this form of assistance. Whilst very few of the rubber companies can benefit significantly from the application of advance manufacturing practices it is evident from the majority of our visits that the productivity of rubber product making companies would be significantly enhanced by advice on manufacturing practices and industrial engineering. This would contribute to major reductions in labour utilisation, reduce the costs associated with work in progress etc.

- Overall Assessment

Though in the field of compound testing and quality improvement the industry receives an efficient and effective service against the ideal of technological support, the Malaysian rubber product industry would be considered poorly served.

Problems of technology support are of three main kinds:

i.) the technical skills and experience available to provide support;

ii.) resource availability, which restricts RRIM's ability to provide services in a timely manner;

iii.) a lack of trust in institutions such as RRIM. The fear is that these institutions cannot provide confidentiality because their staff are likely to be poached by other companies or set up in business themselves.

Clearly, finding answers to these problems is in the interests of the industry itself. If it could contribute additional resources, it may be possible to find suitable expertise if not within Malaysia, then from overseas, to carry out work in a timely manner and to ensure that highly trained staff stay within the technology centre rather than leave. Our finding was that industry is willing to commit greater resources but finds the institutional set up not conducive to doing so.

It is also important to note that the uptake of funds such as the Industrial Technical Assistance Fund (ITAF) which are designed to help industry improve technology, and quality remains low. SIRIM may have been successful in developing interest in ISO 9000, but it has not been able to make available to the industry the assistance Government has provided in the field of technical assistance as a whole. The take-up of such incentives is discussed under Policy Framework in section VIII.

It is commonly believed that the reasons for poor uptake of iTAF are the same as for incentives generally. A distrust of authority and a perception of unnecessary form filling and bureaucracy. It will be important in the future to make such assistance more accessible.

Human Resource Availability and Training

We have identified three major issues of concern with respect to human resources.

- the supply of managers and supervisors for new businesses;
- the continuous availability of appropriately trained technologists and engineers;
- a consistent supply of shop floor personnel and the ability to retain them after training.

■ Management and Supervision

Historically there has been little if any emphasis on developing a cadre of professional managers within the home grown rubber product industry. Management has in general vested in the owners and supervision was supplied by technologists and/or *on-the-job* trained supervisors. Furthermore most home grown companies are family operations - thereby reducing the number of experienced managers willing to transfer their experience to other firms.

The recent influx of inward investment and joint ventures has stimulated a greater emphasis on management capabilities and this appears to be slowly working its way through to the better companies in the country. The growing emphasis on the management of quality as indicated above is also playing an important role. There is also anecdotal evidence of a growing appetite for training in management as a discipline. Furthermore the long term supply may be further stimulated by transfer of some high quality people from the public to the private sector.

But overall, management skills are limited and when available are focused on day to day operations. A critical deficiency is marketing skills. Marketing, as in most family owned businesses has been carried out by the owners. Resources and expertise available to expand markets especially overseas, is a major constraint for the industry.

The absence of a pool of trained managers and supervisors which could be used to expand output or establish new ventures is a major limitation to the industry's expansion either organically or through inward investment.

■ Technologists

Malaysia has always been fortunate to have at its disposal excellent rubber scientists many of whom will have honed their experience at the RRIM. However it has been less well endowed with sound, practical rubber technologists. Such people only gain relevant experience through extensive first hand exposure to day to day problems on the shop floor and in a manufacturing environment.

A significant proportion of the existing stock of such people are already engaged in the industry - often on their own account or as members of teams in some of the larger companies. Whilst there is a steady supply of good quality new graduates in technology there is some suggestions that these are drawn toward cleaner industries rather than the "black" rubber industry.

We therefore perceive that the increase in highly competent local rubber product manufacturers may be somewhat inhibited by the lack of suitable rubber technologists.

■ Factory Floor Labour

There is clear and ample evidence of a shortage of supply of local labour in many parts of Malaysia. There are also indications that this is more serious for the rubber product industry for the following reasons:

- in areas where light "clean" companies such as those in the electrical and electronic sectors exist there is strong reluctance to join the rubber product industry:

- the resulting mobility of people into and out of companies causes problems in those companies where the operation of rubber processes requires more than a few hours training:

- the advantage of low labour costs is undermined by the need to continuously retrain the workforce.

This places an overall constraint on expansion of existing business and is clearly contra-indicative for inward investing companies faced with the availability of low labour costs in other ASEAN countries and the PRC.

The human resource problem facing the industry is shared with other industries in Malaysia, but because of the preceived "dirtiness" is particularly acute in the GIRG industry. Whilst Government's recent liberalisation of the recruitment of migrant labour may offer a short-term alleviation of the situation, it is clear that the need to continually train the workforce will in the end make this practice uneconomic and untenable, particularly if in view of the need to continually upgrade quality.

The longer term answer for the rubber product industry lies in a highly trained and hence productive labour force making products of sufficiently high value to justify comparatively high wages. The industry is fortunate in having a good supply of trained scientists and technologists but needs to ensure that it holds on to this resource and utilises it effectively.

Much will depend on training to upgrade skills and productivity and human resource management practices to retain staff.

Export Marketing

Historically exports of the rubber product industry were promoted by the Malaysian Export Centre (MEXPO). A variety of inward and outward trade missions were organised, but it was clear from our discussions with the industry that only a small number of companies were able to benefit from such activities.

More recently the responsibility for this has passed to the Malaysian External Trade Development Corporation (MATRADE). Given its recent formation it is not possible to gauge its effectiveness. In essence its role and method of operation will however primarily be reactive to enquiries be they from aspiring Malaysian exporters or potential customers overseas though it aims also to train small and medium enterprises in export marketing . It aims to use the network of commercial counsellors in Malaysia's foreign missions to respond to enquiries and provide information as and when appropriate.

In addition to MATRADE, in recent years MRRDB, through its Malaysian Rubber Board (MRB) offices, has also targeted the promotion of Malaysian rubber product exports. But MRB's activities in support of rubber product exports are limited by resources. Recently, a decision has been taken to close a number of its offices and to focus activities in Kuala Lumpur and London only.

Further MRB's role is promoting the use of Malaysian rubber. The promotion of Malaysian rubber products may give rise to conflicts with its primary role. The Board's rubber customers may construe the promotion of rubber products as promoting the activities of competitors.

In our view, neither MATRADE nor MRB offer the type of support required by the Malaysian GIRG industry, particularly home grown manufacturers. And, the small size of these businesses means that they are not able to afford to carry out export development activities, in-house.

Our survey of manufacturers revealed that almost all companies surveyed, whether home grown or with foreign participation, viewed improved export development assistance as important to their future growth. And, many were willing to pay a higher cost for such assistance.

From our experience of export-market development in the rubber product industry, we believe that a programme aimed to provide company specific assistance to the GIRG sector would yield major benefits in export development. Industry would be prepared to bear a significant part of the costs of such assistance.

This section examines the policy environment for the rubber products industry and the way it has influenced the GIRG sector.

Government Attitudes & Objectives

The development of the rubber products industry in Malaysia has taken place with the active support and encouragement of Government. For much of the past two decades, it has been a priority industry and has benefited from tariff protection, investment incentives and direct support and subsidies.

Government motives in supporting the industry have changed with policy objectives. At various times, growth of indigenous industry, import substitution, diversification of the manufacturing base and increasing exports have been the prime focus of concern alongside the creation of wealth and jobs.

But for many years, underlying these various policy objectives has been always the aim of exploiting fully one of Malaysia's most abundant natural resources and thereby achieve the dual goals of increasing value added within Malaysia and to break the dependence on volatile international markets. The main objective of policy until recently has been to increase natural rubber consumption within Malaysia.

Historical Development of Policy

In broad terms, Government policy has evolved through three stages as follows:

i.) Stage I - Import Substitution
Up to the 1980s, the main aim of policy was import substitution and the key policy measure used was tariff protection. Synthetic rubber was considered a competitor to natural rubber and subject to import tariffs.

ii.) Stage II - Expansion
In the Fifth Plan (1986-1990) the focus of policy was expansion. As one of 12 priority industries, investments in the rubber industry attracted substantial tax incentives. In addition, natural rubber consumed within Malaysia was exempt the export cess of 20 sens/kg, making the cost of natural rubber lower than on international markets. Duty on synthetic rubber was removed.

iii.) Stage III - Targeted Growth
From 1990, under the Sixth Plan promotion of the rubber products industry has been made more selective. A number of products including latex gloves have been removed from the list of promoted products. The cess has been removed and tariff protection has been reduced.

The main land mark for industrial policy in Malaysia was the Fifth Plan. The Plan conceived as a the instrument to kick-start the economy after the recession of 1984/85 focused on growth through mobilising investment.

A key policy measure was the Promotion of Investments Act (1986) which offered substantial investment incentives in the form of tax concessions granted under the Income Tax Act, 1967.

This measure coincided with a decision by Government to exempt domestic sales of natural rubber from the cess of 20 sens/kg levied on rubber exports. The result was to give domestic manufacturers a 6-12% raw material cost advantage over industries sourcing rubber on international markets. In addition, in recognition of the correlation of natural and synthetic rubber use, Government removed the duty on synthetic rubber. Energy costs which in Malaysia were higher than international levels were subsidized.

These policy measures when allied to Malaysia's excellent infrastructure and stable economic and political climate were the cause of substantial inflow of foreign investment. In latex products, investment had become internationally mobile and manufacturers in high cost countries were looking for a low cost manufacturing base. The presence of low priced, locally available latex in a country with an attractive investment climate represented a major spur to locating in Malaysia.

Under the stimulus of these policies the GIRG sector also expanded. Investment by both foreign and domestic investors helped the industry grow and exports benefited from the lower cost of natural rubber. But, the sector did not experience the major influx of foreign investors witnessed in latex products. This reflects the lack of internationalisation of manufacturing in the GIRG sector rather than any weaknesses in policy.

In the early 1990s, with the Sixth Plan, policies towards the rubber products industry have changed. As a resource based industry it continues to receive priority industry status. But policy has become more selective.

Products such as latex gloves, car mats and garden hose have been removed from the list of promoted products. Manufacturers of these products are no longer eligible for tax and other incentives. The export cess is no longer levied on rubber exports and the price of natural rubber in Malaysia is now cheaper only to the export of transportation and transaction costs. Energy costs are no longer subsidised.

Duties on many rubber products have been reduced substantially and the government has placed rubber products on the fast track of the Common Effective Preferential Tariff (CEPT) scheme for the ASEAN Free Trade Area (AFTA).

The changes are a response to two key factors:

i.) it is recognised by Government that in some products Malaysia has already developed into a substantial supplier to world markets and there would be little benefit from continued promotion and support of these products.

ii.) the focus and objectives of government policy have changed and with it the type of promotional and support measures government considers appropriate.

As a result of the past decade of outstanding growth the agenda for Malaysian's manufacturing industry has changed. The emphasis has shifted from rapid growth of output and exports to consolidation and strengthening of the manufacturing base through deepening and broadening and improving inter-sector linkages.

With this agenda in mind, Government has become more selective with regard to the industries and products it promotes. And, the emphasis of industrial support is changing from fiscal incentives to support in upgrading skills and the productivity of labour, improving technology and strengthening the industrial base through promoting small companies.

The changes in policies introduced recently do not reflect a change in attitude or commitment towards the rubber product industry. They are a reflection of the industry's success in the past and the changing economic environment in the country.

Current Incentives

The main incentives and support measures available currently are set out below:

- Investment Incentives

Under the Promotion of Investments Act, 1986 companies given *Pioneer Status* are granted a 70% exemption from income tax (currently 34%) which is deductible against statutory income for a period of 5 years. Government can consider giving 100% exemption on a case-by-case bases provided the project established by the company is high tech, entails heavy capital investment and generates strong intersectoral linkages.

An alternative to Pioneer status is *Investment Tax Allowance* which provides for an allowance of 60% of qualifying expenditure on plant, machinery and buildings made within 5 years of approval against 70% of its statutory income. Any allowance not utilised can be carried forward until it is utilised. This may be a preferable incentive for companies undertaking large qualifying expenditures on long gestation investments.

Eligibility for Pioneer Status and Investment Tax Allowance is confined to companies manufacturing or proposing to manufacture a promoted product or undertake a promoted activity. With the exception of mats, garden hose and latex examination gloves, all GIRG products are promoted.

Reinvestment allowance is applicable to all manufacturing companies and consists of an allowance against statutory income of 40% of capital expenditure incurred prior to 31 December 1995 on plant, machinery and factory buildings for the purposes of expansion and/or modernisation of production facilities. This is an attractive allowance for companies who do not qualify for Pioneer Status or Investment Tax Allowance.

■ Export Incentives

Malaysian exporters are eligible for exemption of duty on imported raw materials and components which are not manufactured locally or where they are manufactured locally, are not competitive in price or quality. Imported machinery and equipment used directly in the manufacturing process can be considered for duty exemption.

There are, in addition, a series of other incentives to encourage exports:

- the export Credit Refinancing (ECR) scheme provides short term credit at preferential interest rates
- double deduction of export credit insurance premiums
- double deduction of expenses incurred in the promotion of exports. This covers expenses such as advertising and public relations overseas, export market research, free samples, participation in exhibitions, overseas travel and the maintenance of overseas offices
- double deductions on freight charges paid by exporters based in Sabah and Sarawak
- industrial building allowance in respect of building used as warehouses for storing goods for export consisting of an initial 10% of cost and 2% per annum thereafter.

■ Incentives for Research Development

To encourage research and development the Government has provided a range of tax incentives as follows:

- tax exemption for 5 years for new technology based firms;
- expenditure incurred for research approved by the Ministry of Finance is eligible for double deduction. Other research expenditure can be deducted against income;
- buildings used for approved research receive the industrial building allowance;
- plant and machinery used for research are eligible for capital allowances and exempt from duty and sales tax;
- double deduction is allowed for cash contributions to research institutions;
- companies established for the purpose of carrying out R&D can receive tax exemption for 5 years and can carry forward losses beyond the tax exempt period.

■ Incentives for Training

To encourage the upgrading of skills and to improve productivity, Government has provided the following assistance to Malaysian companies:

- companies employing less than 50 workers are eligible for double deduction of expenses incurred on approved training. The entitlement is automatic if training is conducted at approved institutions

- companies employing more than 50 workers can avail themselves of assistance from the Human Resource Development Fund (HRDF) which provides contributions to the cost of training. Companies have to contribute 1% of the wages of employees to HRDF

- industrial building allowance is available for buildings used for training

■ Assistance for Technology/Product upgrading

The Industrial Technical Assistance Fund (ITAF) operated by Bank Pembangunan and the Standards and Industrial Research Institute of Malaysia (SIRIM) provides matching grants for product testing, standard certification, consultancy assistance and by exception for the testing and calibration of machinery. It also provides assistance in achieving ISO 9000.

■ Additional Incentives and Support for Small Businesses

Small and medium scale manufacturing companies with shareholders funds of less than MS500,000 and at least 75% Malaysian equity are eligible for Pioneer Status if they manufacture promoted products, full exemption from customers duty on raw materials, components or machinery if not available locally and reimbursement allowance at 50% instead of 40%. Government has also designed special programmes to support small businesses. A department has been established within the Ministry of Trade & Industry (MTI) specially to help foster and support the development of small and medium sized industries (SMIs) which helps design programmes and works with other agencies to implement them.

The department has earmarked six products for special emphasis in SMI development, including plastic and rubber products. The others are automotive, transport equipment, machinery, moulds and dyes and wood products.

The department is newly formed but has initiated three types of SMI assistance:

i.) the development of industrial estates with incubator units for SMI's

ii.) a vendor development programme whereby large companies are incentivised to help develop SMI vendors

iii.) the provision of SMI development loan finance assistance through development finance institutions

The industrial estates are at a conceptual stage, the vendor development programme has been launched and loan finance schemes using both Malaysian government and donor assistance are in place.

The Malaysian Industrial Development Fund (MIDF) is the main development finance institution involved in providing finance to SMI's. MIDF currently operates four schemes for providing loan finance to SMI's as shown in figure 32:

Loan Schemes for SMI's

Scheme	Criteria	Expenditure covered	% Financing	Interest Rate
ASEA/JAPAN Development Fund	Paid-up capital less than M$ 5 million, 51% Malaysian equity	Project Machinery Factory	75%	6.5% p.a. reducing balance for some loans
SMI Promotion Programme - Japan	Paid-up capital less than M$ 5 million, 51% Malaysian equity	Project Machinery Factory	75% up to M$ 5 million	7.0% p.a. reducing balance for some loans
New Entreprenuers Fund	Shareholders funds of less than M$ 2.5 million, 100% Bumiputera equity	Project Machinery Factory	85%	5% p.a. reducing balance for some loans
Modernisation & Automation Scheme	Shareholders funds below M$ 2.5 million, 70% Malaysian equity	Machinery	75%	4 [illegible].a.

figure 32

The loans provided under the scheme are on favourable terms to loans provided by both commercial banks and development finance institutions. For instance, loans provided by MIDF outside these schemes would carry interest at rates between 9-9.5% per annum and commercial banks lending terms would be a few percentage points higher.

MIDF is able also to provide equity finance but this is by exception. Other sources of equity finance, mainly targeted at Bumiputeras are also available.

Protection

Whilst tariff protection has been reduced for tyres and on some latex products industrial rubber goods continue to benefit from substantial protection. Most consumer goods have traditionally not had much tariff protection.

The majority of industrial rubber products are subject to import tariffs of over 30%. But in the case of "other products of vulcanised rubber" - SITC code 629.999.990 - the import duty is 5% of c.i.f. value and it is this category that [illegible] for the majority of imports. Tariffs on the main industrial goods are shown in figure 33.

Import Tariffs on Industrial Rubber Goods	
Product	Duty Payable (% of c.i.f. value)
Floor tiles	35%
Flooring materials (incl. mats)	-
Structural bearings, rail pad, precured tread, water stop	35% or $1.20 with
Tubes, pipes, hoses	40%
V-belts	30% or $2.50 with
Flat transmission belting	40%
Belting of width exceeding 20cm	40%
Gaskets, washers, pipe seals	5%
Auto-components	30%
Other ancillaries	5%

figure 33

The nominal rate of protection shown in figure 33, is for most products close to the effective protection. Inputs used to manufacture these products are priced either at world levels (natural rubber), duty exempt (synthetic rubber) or subject to low rates of duty of 2% (chemicals and accelerators). Carbon black and zinc oxide are subject to high tariffs, 30% in the case of zinc oxide and 15% in the case of carbon black, but as noted earlier, they account for a small proportion of total raw material cost.

The exception to effective protection being almost the same as the nominal rate is belting and reinforced hose and other products using synthetic industrial textiles. Industrial textiles are subject to an import duty of 15% and account for a high proportion of the raw material cost of these products. The effective rate of protection is much lower than the nominal rates shown above.

Imports of consumer goods such as erasers, rubber toys including balloons, water sport equipment are subject to either 5% or no duty. In the case of consumer rubber goods, in 1989 import duties were reduced substantially on items such as water sport equipment and inflatable rubber boats.

On items subject to 5% import tariffs, the rate of effective protection is very low, when account is taken of higher input costs of some raw materials in Malaysia. Items which are not subject to import duty could be considered to have negative effective protection, though not to any great extent.
A recent and potentially important change in the trade regime affecting rubber goods is the Common Effective Preferential Tariff (CEPT) Scheme which came into force in January 1993. The aim of CEPT is to create an ASEAN Free Trade Area within fifteen years through progressive reductions in tariffs on goods imported from other ASEAN countries.

The process of tariff reduction will be to proceed on either a fast track or a normal programme. Rubber products are included in the fast track of tariff reduction, the aim of which is to reduce tariffs to between 0-5% within seven years.

Evaluation of Current Policy Framework

The incentives available to the rubber products industry in Malaysia are attractive to both foreign and domestic investors. There are major tax incentives for investment in the GIRG industry, to upgrade technology and to carry out R&D and training.

Malaysia's package of incentives remains comparable to that offered by her ASEAN neighbours and superior to countries at similar levels of development such as the countries of Eastern Europe.

It could be argued that the removal of the price advantage on natural rubber in 1990 has coincided with a reduction in the number of new entrants into the industry. The number of new projects approved by MIDA in the rubber products has fallen in the 1990s.

But the removal of this incentive does not put Malaysia at a disadvantage. The peak of approvals in the rubber industry was 1988 showing that the number of approvals was falling even whilst the incentive remained in place. Moreover, with rubber prices at their current levels it is unlikely that Government could re-impose a cess.

Tariff protection appears generally well targeted. The highest rate of nominal protection are for pipes, hose and tubing and belting in which the country runs a trade deficit. But, to provide effective protection for these products removal of the tariff on industrial textiles may be advantageous. No doubt the tariff protection is in place to promote the growth of industrial textiles and MIDA and MTI will need to review the desirability of removing the tariff or allowing belt and hose manufacturers tariff exemption.

It could be argued that higher protection for other articles of vulcanised rubber, the largest single imported item could help the industry substitute domestic products for imports. But, it should be noted that it is this category which forms also the main item of export. Hence no infant industry type argument could be advanced for protection.

The issue of tariff protection is not of prime importance to the rubber products industry and GIRG sector. The GIRG sector is already a very open industry with very high proportions of its output exported. Given the small domestic market its future depends on developing exports and this emphasises the need for international competitiveness. If the industry is able to become internationally competitive it will not need tariff protection.

Even CEPT which is potentially an important development is unlikely to make a major impact in the short run on the industry. Imports of rubber goods from ASEAN countries have in the past been subject to significantly lower levels of duty than products from outside the region under the Preferential Trade Agreement (PTA). Yet, with the exception of Singapore, ASEAN countries do not form either major sources of imports or destinations of exports.

The impact of CEPT may, however, be stronger in the long term. If AFTA develops as envisaged ASEAN and non-ASEAN foreign investors may chose to take a pan-ASEAN view of the manufacturing decision preferring to choose one location to supply the whole of the region. This may impact adversely upon the Malaysian industry as it is not as low cost a manufacturing centre as its neighbours.

Whilst the incentives available to the rubber products industry and GIRG sector appear in outline to be attractive, our survey and research revealed two major weaknesses:

i.) many of the small and medium sized are not applying for investment incentives and some do not benefit either from export incentives;

ii.) the rate of take-up of R&D, training and loan finance are low.

The problem of take-up of incentives is due to a combination of:

i.) distrust of authority. Small businesses are concerned about tax implications of information they may be forced to disclose in applying for incentives;

ii.) a perception of bureaucratic processes and excessive form filling;

iii.) in some cases, ignorance of the assistance available.

Of these three, the fear of authority is probably the most important. MIDA is the organisation responsible for administering the incentive package. And, though the organisation has done much to make its procedures and forms user friendly, it has not been able to persuade small and medium sized enterprises that it does not hold a fiscal brief and hence concerns over tax positions should not influence their eligibility for incentives.

Malaysian businesses are willing to invest in new factories and plant and equipment. The poor take up of R&D, training and lost cost finance apart from revealing a distrust of authority, reflect also a perception of long delays in accessiblity. Changes could be made to improve accessibility.

IX Market Prospects

This section outlines market prospects for GIRG products in both domestic and export markets. It highlights changes that will affect the characteristics of the market for GIRG products.

Domestic Markets

Prospects for growth of demand in the domestic market are favourable. Markets for GIRG products have been increasing faster than GDP in the recent past, and this trend will continue over the short and medium term - covering 5-7 years.

But over the longer term - 7-12 years, demand growth is likely to slow and markets become mature. In this phase, demand is likely to be closely correlated with GDP.

Over the short and medium term, demand growth will be led by IRG. Although consumer markets will also grow rapidly, their growth will be from a low base. The domestic market for masterbatch is likely to grow also but at a much lower rate than IRG or consumer products.

■ IRG

The demand for IRG products is expected over the short and medium term to increase faster than the OPP II projection of GDP growth of 7% p.a. It is likely also to grow faster than the projected growth of manufacturing of 10.5% p.a.

Key end-use sectors for IRG products are expected to increase output faster than the average for the manufacturing sector and this will result in a rapid increase in demand. Further, as the industrial base widens, new end-uses for industrial rubber goods will emerge.

The main engine of growth in the short and medium terms will be the automotive sector. According to specialists in MIDA and sources in the automotive industry, the sector is poised for very rapid expansion as a result of:

- The output of cars for sale in the domestic market is likely to double over the next 5 years from the current levels of approximately 120,000 units to close to 250,000 units and could be higher if annual vehicle testing is introduced;
- Sales of Malaysian built cars in export markets should increase substantially over current levels;
- output of commercial vehicles should increase in line with GDP;
- motorcycle output is likely also to increase in the short term, but growth is expected to come to a halt when market maturity is reached in the next 3-5 years.

Domestic car output is likely to increase substantially when the second car project commences the manufacture of a Small Daihatsu designed car in 1994. The project is expected to manufacture 30,000 vehicles per annum initially and gradually increase sales to its manufacturing capacity of 60,000.

Car exports to date, have been limited by the Proton Saga being exclusively right hand drive. Exports are hence mainly to the UK. But Proton's new model is expected to be produced also in a left hand drive version opening up potentially a large new market.

In addition to the automotive sector other sectors which are likely also to be major sources of growth are construction and machinery.

The construction sector has grown at double digit rates over the past few years and growth shows no sign of slackening. Projects such as the new international airport are expected to keep the construction sector buoyant over the next five years.

Demand from the machinery sector is likely to grow as a result of two factors:

i.) the population of machinery in the country has been increasing rapidly over the past few years as a result of a very rapid increase in machinery imports. This will create a growing demand for replacement parts.

ii.) Government is keen to develop the manufacture of machinery within the country and is actively promoting both foreign and domestic investment. As domestic machinery manufacturers develop it will create new demand for rubber products from machinery manufacturers.

The value of machinery imported into Malaysia has doubled in the past three years from M$ 8.6 billion to over M$ 16 billion. Whilst imports of all types of machinery imports have increased, key rubber using machinery such as construction machinery and printing machinery have shown strong growth.

The size of the domestic market for some types of machinery is now believed to be sufficient to justify domestic manufacture. The list of machinery considered suitable for manufacture in Malaysia includes off-road vehicles for the construction industry, material handling equipment including conveyors, printing machinery, and food processing machinery some of which are significant users of rubber products.

Whilst automotive, construction and machinery will be the dominant sources of growth, the electrical and electronic sectors will also continue to grow. And, although not as important an end-use for rubber products as automotive or machinery, the growth of the oil and natural gas sector in Malaysia will open up new markets for IRG.

But over the longer term growth will slow down. As the domestic market for cars approaches maturity, the high rate of growth of construction slows and new end uses are exploited so IRG growth will slacken.

The rapid growth likely to occur over the short and medium term will lead to changes in the market for rubber goods. Two major changes to be anticipated are:

i.) IRG markets will become more technically demanding and sales to OEMs will increase

ii.) growth will lead to a proportionately greater use of synthetic rubber than at present.

Although continued growth of sectors such as construction, electrical appliances and automotive will cause demand for comparatively low value products to remain buoyant, much of the emerging new uses for IRG will require comparatively greater technical sophistication. End-uses such as construction vehicles, machinery, conveyors and oil and gas require greater technical sophistication.

In addition, the proportion of sales to OEMs will increase not only in the automotive sector but also as domestic manufacture develops in machinery. OEMs demand higher specification products than the replacement market.

It is a feature of higher specification products which meet technically demanding applications that their use of synthetic rubbers is far higher than products sold for less demanding uses. In products such as hoses sold for the automotive sector the content of natural rubber is low and for applications demanding oil resistance, natural rubber is not suitable. Conveyors also use a lower proportion of natural rubber and for oil and flame retardant uses, or food grade belts, the natural rubber content is very low.

Over time the proportion of synthetic rubber used in the IRG sector will increase towards the high levels prevailing in highly industrialised countries. But, given Malaysia's position as an NR producer and the current strong bias to NR products it will take many years for the proportion of NR in rubber consumption to approach 50% from the current 15% and it may not ever get higher than the former figure.

- Consumer Goods

Demand prospects for consumer goods sold on the domestic market are also favourable. Consumer expenditure is projected under OPP II to grow at a rate of 12% p.a. and with higher incomes and leisure time, expenditure in consumer rubber goods should increase rapidly.

The highest growth is likely to be in sports goods - swimming aids, rubber balls, inflatables - where a combination of changing life-styles as a result of greater leisure time coupled with higher incomes should help boost demand. But other consumer goods such as stationery and household goods should also experience an increase in demand.

But, these markets will grow from a very small base and although growth will be high in percentage terms, in volume terms demand will not increase substantially.

And, because population is small, these markets would tend over a period of time to saturation. Over the longer term growth will slow, to levels not far above the rate of growth of population.

The relative openness of these markets in terms of world trade will mean that demand in Malaysia will become driven by changes in product trends in international markets.

■ Rubber Masterbatch

The domestic market for masterbatch will grow as a result of higher output from small businesses. But it will grow from a small base and will not develop into a large market.

Small and informal IRG producers have, as a result of lower overheads and fixed costs increasingly displaced medium and large businesses in the manufacture of low value products. It is the small and informal sector which is the main source of demand for masterbatch. This trend will continue in the future.

As a result domestic demand for masterbatch will increase. But whilst such businesses are numerous their rubber consumption is low. Growth will not result in a substantial increase in volume of demand.

Export Markets

The high export propensity of the GIRG sector means its prospects will depend also on opportunities for export growth. We consider below Malaysia's current position and prospects in three main world markets - W.Europe, USA and Japan.

We examine also prospects for exports to Taiwan and Korea, two main GIRG producers in the strategically important Asia-Pacific region.

We begin with profiling size and trends in each market and then set out end-use sectors, segmentation, sales channels and key success factors which are common to these markets.

It should be noted that market data on GIRG are not readily available and where available, inconsistent in terms of definitions used and often out of date. This reflects the fragmented nature of the markets for GIRG products.

We have therefore had to undertake substantial data collection in an attempt to provide indicators of magnitude. But we cannot claim data presented are comprehensive or consistent.

■ **Western Europe**

Market Size

As noted in our First Interim Report, W. Europe is the largest single world market for non-tyre rubber products, valued at just over US $ 20 billion. It accounts for just over 31% of the world market for non-tyre products of US $ 65 billion (figure 34 below).

World Markets - Non tyre products 1992

	Value US$ billion	Percent %
USA	9.5	14.6
Japan (1)	5.5	8.5
W. Europe	20.3	31.2
Others	29.7	46.0
World	65.0	

Source: Various Trade Journals *figure 34*
Note: (1) Estimate based on rubber consumption.

Western Europe is a major manufacturer of non-tyre products and a net exporter. Its overall output and trade position is as shown in figure 35 below:

Western Europe - Non-tyre products
Output and External Trade - 1992

	Value US$ billion	Volume '000 tonnes of finished products
Production (1)	22.5	2,000
plus Imports (2)	4.5	750
less Exports (2)	(6.5)	(900)
Apparent Consumption	20.5	1,850

Notes: (1) approximate figures based on industry estimates
(2) estimates based on EC data
Sources: Industry estimates, Eurostat, consultants estimates

figure 35

Production

The breakdown of European output by product group is broadly as follows (figure 37).

W. European non-tyre output, 1992

Hoses and tubing	
- reinforced	225
- other	75
	300
Belting	
- conveyor	110
- other (v and fan belts)	40
	150
Floor covering	200
Other rubber products	1,200

Source: Estimates based on IRSG Key Rubber Indicators 1993 and other industry sources.

figure 37

The largest volume of output is in the category 'other rubber products.' The main types of products included in this category are formed articles (mouldings) and profiles, a range of gaskets, washers and seals as well as crepe and foam rubber, glues, solutions and dispersions and rubberised cloth. The three largest product categories are formed articles, profiles and gaskets, washers and seals.

The main manufacturing countries are Germany, France, Italy, the UK and Benelux. A breakdown of output in each country is shown in the figure facing. Over the past four years, taken together, output in these five countries has declined marginally.

The two main producers of hose and tubing are Germany (56.2 thousand tonnes) and Italy (52.1 thousand tonnes). In both countries output in 1992 was substantially higher in volume terms than in 1988. In Germany output was up 21% and in Italy 10%. But as a result of a 44% decline in UK output, overall output in 1992 from the five was marginally (1%), lower than in 1992. In 1988, the UK was the largest hose and tubing manufacturer of the five countries.

Belting output in the five countries increased from 1988 to a peak in 1990, but declined thereafter due to recession. Overall, between 1988 and 1992, belting output of the five has fallen by 5% in volume terms.

Germany and France are the main belting manufacturers and conveyor belting the main type of belting produced.

The output of crepe and foam rubber in the four countries in 1992 (excluding the UK for which recent data are not available) was 26% higher in 1992 than 1988 levels. The UK and France are the largest manufacturers. The latest UK output figure available is for 1989.

Over the past decade, the output of hygienic and pharmaceutical articles has fallen in most W.European countries. This is due mainly to the transfer of glove and condom production to the Far East and especially Malaysia. Between 1988 and 1992 output declined by 7%.

The manufacture of floor covering has also fallen from 1988 levels in France, Italy and the UK. But German output has nearly doubled resulting in an increase in output from these four countries of 24%. Figures for Benelux are not available. Germany is now by far the largest manufacturer, in West Europe.

Rubberised cloth output has fallen in the UK and France but has held up well in Germany and Italy. Overall, output in the five countries fell by 12% between 1988 and 1992. Germany is the largest manufacturer with output of nearly 13 thousand tonnes.

The output of glues, solutions and dispersions has also fallen from 1988 levels with large falls in Benelux, Germany and France. UK output had been on a declining trend prior to 1989, the latest year for which figures are available. Italian output nearly halved between 1988 and 1991, the latest year for which figures are available.

Germany stands out as a manufacturer of ebonite products. Output has increased by 24% since 1988.

Volumes of other rubber product output have also fallen marginally over the 1988-92 period. With increases in Germany and France and Benelux not able to offset large falls in Italy and the UK. Growth points include the manufacture of profiles, formed articles and other rubber products in Germany and profiles and formed articles in France.

Overall, volumes are lower than 1988 levels, but there is growth of output in Germany and France.

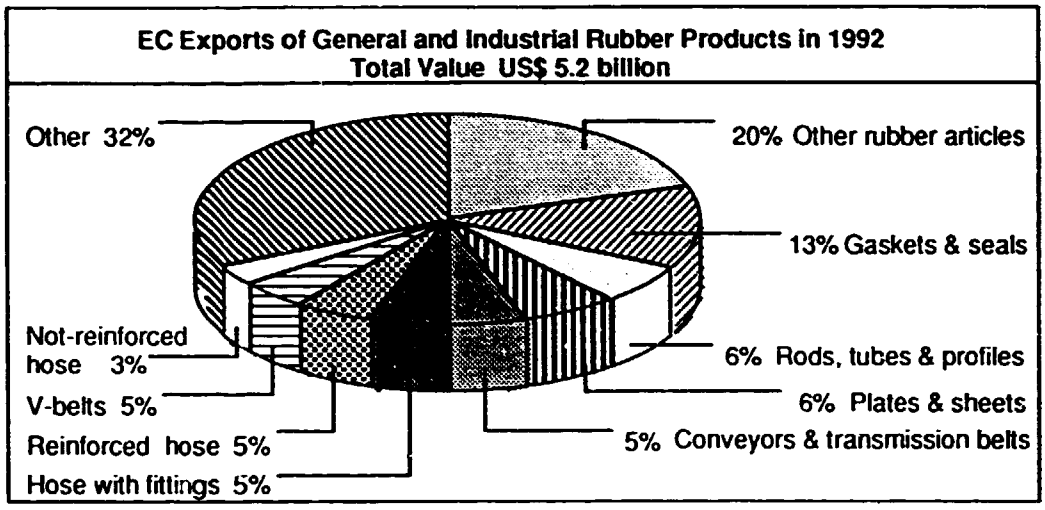
Trade

In W. Europe, whilst output has been falling at a relatively modest rate, trade in non-tyre products has increased rapidly. Hard data on trade are available readily only for the EC but as the twelve countries of the EC account for over two-thirds of W.European trade, these figures reflect the broad picture for W.Europe.

Over the 1988-92 period, on average, EC exports have increased in volume terms by 15.2% p.a. and imports, 9.2% p.a.

The main features of export performance have been the growth in exports within the EC. As European Union leads to a more integrated European economy, so the greater is EC trade. Overall, less than one-third of EC exports are to countries outside the EC but exports to countries outside the EC have also increased in volume terms.

The main products exported in value terms by EC countries are shown in figure 38.



Source: Eurostat

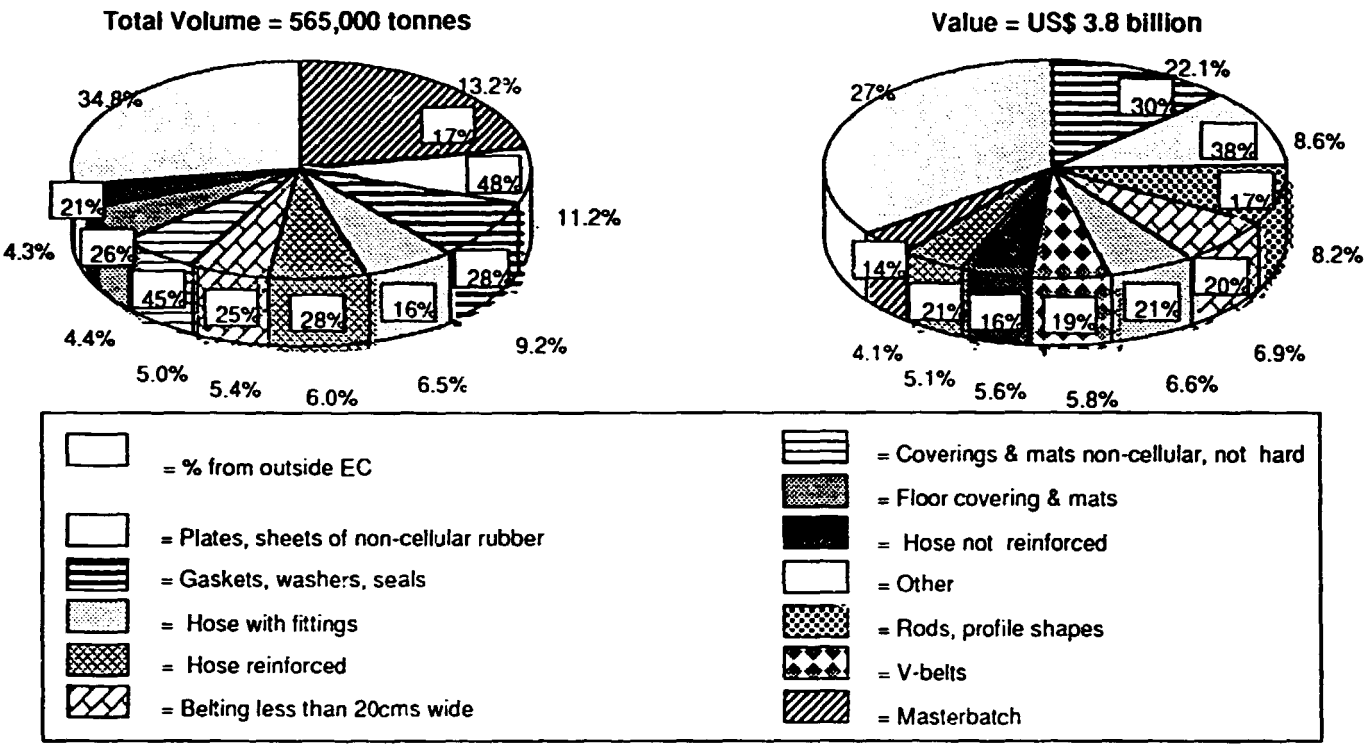
figure 38

Imports have also grown rapidly, largely as a result of intra-EC trade increasing. But imports from outside the EC have also grown substantially. In the large majority of cases the proportion of imports from outside the EC has fallen marginally but total volumes are up substantially. So the volume of imports from outside the EC has increased.

In volume terms, the main EC imports are comparatively low value products such as masterbatch, plates and sheets and floor covering. But substantial volumes of gaskets and washers, hose and tubing and belting are also imported. In value terms, the main products imported are gaskets, washers and seals, hose and belting.

Figure 39 below presents both values and volumes of the main items imported into the EC in 1992 and shows the proportion of imports from outside the EC.

Main Products Imported into the EC - 1992



Source: Eurostat

figure 39

Imports are concentrated in product terms. The top nine products account for over 65% of total volumes and over 70% of total value. The proportion of products imported from outside the EC is particularly high for gaskets, washers and seals and plates and sheets of non-cellular rubber.

Although the main sources of imports are within the EC, imports from outside the EC represent a large market. For instance the value of gaskets imported from outside the EC exceeded US $ 250 million in 1992.

The pattern of sourcing from outside the EC (by value) of all the main products imported is broadly similar. The main sources are other highly industrialised countries such as the USA, Japan or neighbouring W.European countries such as Sweden and Austria followed by newly industrialised countries such as Korea, Taiwan, Brazil and Mexico. Low cost countries are not major sources of supply.

Malaysia is a significant source of supply for three main imported items, plates and sheets, rods and profile shapes and masterbatch. These are comparatively lower value products. In all instances, Malaysia's share of EC imports is less than 1%. Figure 40 overleaf presents market shares of the main sources of imports from outside the EC in 1992.

Non-EC Sources of Main Imports - 1992

Categories	Country of Origin - In Percent (%)						
	outside EEC %	Japan %	USA %	Austria %	Sweden %	Malaysia %	Other %
Gaskets, washers, seals	30	5.8	6.8	3.7	3.9		
Plates, sheets non-cellular	38	7.9				1.0	0.4 - China
							0.2 - Taiwan
Rods, profile shapes	17	0.9				6.3	0.1 - Taiwan
Belting less than 20cm	20	6.4	6.4				1.5 Brazil
							1.4 Switzerland
Hose with fittings	21	3.9	10.3				1.3 Mexico
							0.6 Turkey
V-Belts	19	6.3					1.1 South Korea
Hose not reinforced	16	3.3	3.2		3.3		1.1 Thailand
Hose reinforced	21	2.2	4.1	5.4			2.4 Turkey
Masterbatch	15		3.2	3.4	5.5	0.7	

Source: Eurostat

figure 40

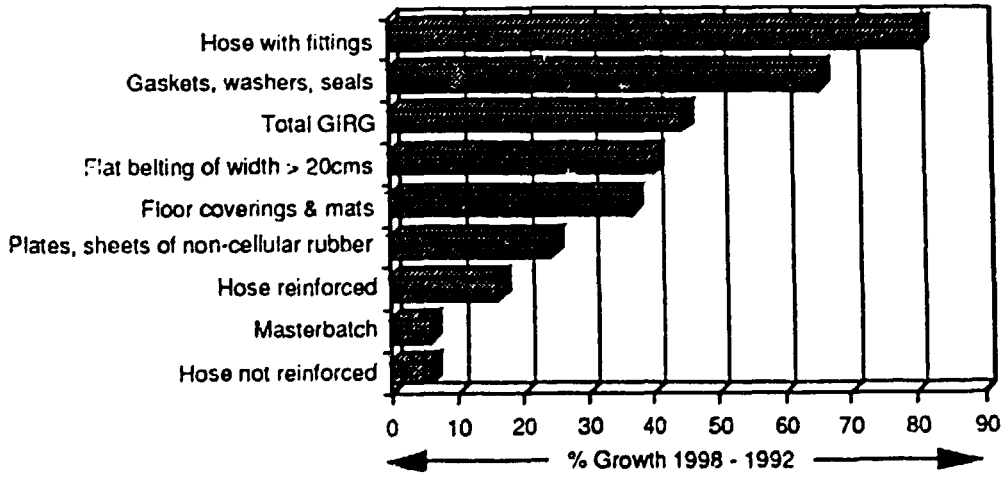
Clearly, in many products supply is concentrated. The top four-five suppliers account for a high proportion of supply from outside the EC. But, there are notable exceptions in gaskets, washers and seals, plate and sheets and in rods and profile shapes where a very large number of countries have small shares of imports.

Malaysia's ASEAN rivals, Thailand and Indonesia, do not figure as prominently as Malaysia. This suggests that the Malaysian industry has a better market position than its closest ASEAN rivals. Against more industrialised rubber product manufacturers, however, Malaysia is a comparatively small supplier.

It is worth noting that the unit value of imports from the highly industrialised countries is higher than the unit value of imports from newly industrialised countries. This suggests distinct market segmentation which is examined further below.

In the main imported items, the main growth in volumes has been in profile shapes, in hose and tubing and in gaskets, washers and seals as shown in figure 41. The lowest growth has been in masterbatch.

Growth of Main Imports into the EEC 1988-1992 (volumes in %)



Note: Imports of rods and profile shapes have declined in volume terms.
Source: Eurostat

It is noticeable that in the products with the highest overall growth of imports, the proportion of imports from outside the EC has held up well, suggesting a growth in both intra and extra-EC trade. Figure 42 below sets out changes in the proportion of imports sourced from outside the EC for the main growth products.

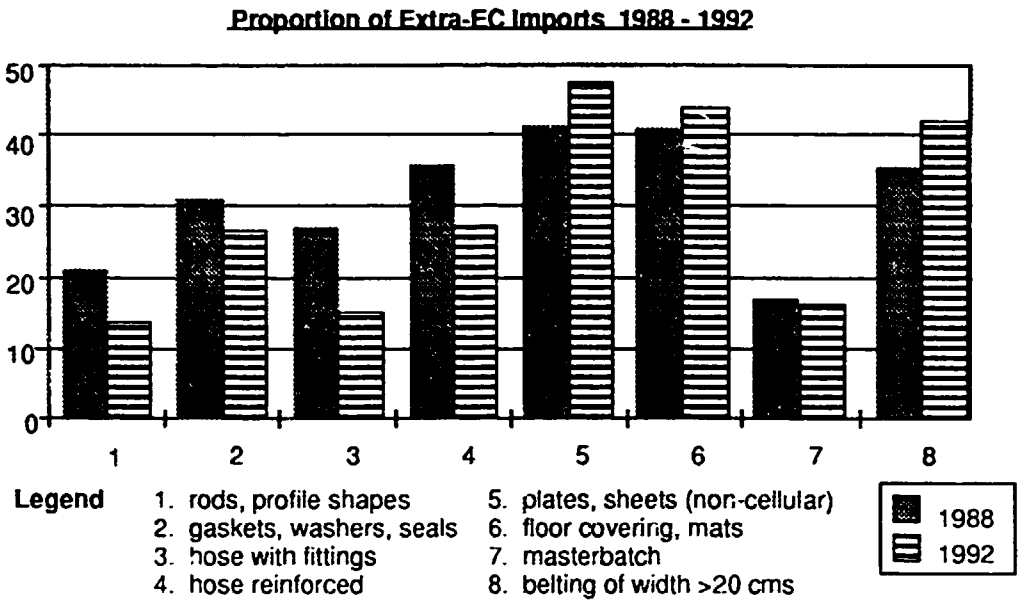


figure 42

mports have increased fastest for products the output of which is either also rising in W.Europe (profile shapes, floor covering) or is at least not declining fast. The market for these products appears to be growing and causing imports to increase. Domestic output is in general only being replaced in some segments of the market.

The exception to this is the UK which has suffered a large loss in output and which is also experiencing a large increase in imports. The UK is clearly likely to prove an easier market for exports from countries such as Malaysia than other European countries.

In addition to the industrial products noted above, nearly 30 thousand tonnes of consumer rubber products are also imported into the EC with value of nearly US $ 300 million. The majority of these products are imported from outside the EC.

The production of consumer rubber products has increased in Europe, particularly in Italy. Import volumes were increasing up to 1990 but have fallen since then, possibly as a result of recession.

Market Trends

In the face of economic recession, upto 1992, the W. European market for non-tyre rubber products held up well. The size of the market appears to have fallen from peak levels in 1990, but recovered in 1992.

The main cause of this relatively favourable performance is the strength of the European automotive industry, which is the main end-use sector for non-tyre rubber products. After a fall in output in 1991, European car output recovered in 1992.

W. European output of non-tyre rubber products has declined over the past five years, but only marginally. Though import penetration has increased, exports have also grown, enabling manufacturers to cushion the effect of the loss of parts of their domestic market.

The main products exported and imported (in value terms) are broadly similar. Gaskets, washers and seals, profiles and plates and sheets are the main categories of imports and exports.

Moreover, the main sources of imports into the European market are other industrialised countries such as Japan and USA. This suggests that individual company capability to supply rather than sector cost advantages is the main determinant of the pattern of trade.

In 1993 economic conditions remained difficult in W. Europe. Depressed demand in Germany affected trading conditions in many W. European countries.

Looking ahead, the prospects are of a gradual recovery, but one which progressively gathers pace. Growth of 2-3% p.a. should be possible from 1995 onwards with the expansion of the EC to Eastern Europe and increased world trade perhaps enabling faster growth in the latter part of the decade.

With improved economic conditions, the market for non-tyre rubber products, which is linked closely to GDP, should also grow appreciably. Imports should also continue to grow at a rapid rate.

Imports from outside the EC are likely to grow faster than they have over the 1988-92 period. In the past, imports have been mainly sourced from other industrialised countries with little or no factor cost advantage. But there is growing evidence that the capabilities of countries such as Korea and Taiwan have improved considerably in the recent past and these countries have significant factor cost advantage over W. Europe.

Eastern Europe, is beginning also to overcome the effects of disruption caused by its transition to a market economy. Recent investments by W. European companies should strengthen considerably the capabilities of East European companies and these countries have factor costs lower than Korea or Taiwan.

For Malaysia, the growth of imports into W. Europe should present a major opportunity for export growth, not only in volume but more importantly in value terms. Currently, Malaysia's main presence is in comparatively low value product category markets such as masterbatch and plates/sheets.

If Malaysian capability to supply higher value product categories such as hose with fittings could be improved, it may not only develop presence in the main product segments of the W. European market (in value terms) but also substantially increase the unit value of exports.

■ USA

Market Size

The US market for non-tyre products was valued in 1992 at US $ 9.5 billion. Unlike the EC, the US is a net importer of non-tyre products as shown in figure 43 overleaf.

US Market for Non-tyre Rubber Products - 1992

Product Category	Output	Plus Imports	Less Exports	Apparent Consumption (sales)
Hoses & Tubing	1490	184	(244)	1,430
V-Belts	632	60	(62)	630
Flat Belting	461	90	(46)	505
Fabricated Products	6,519	1,088	(707)	6,900
Total	9,102	1,422	(1,059)	9,465

Sources: RMA, Industry estimates

figure 43

In value terms, the US market has not increased appreciably since 1988. The market is gradually recovering from the recession of 1990 and 1991.

Sales in 1992 are estimated to be 1.8% higher than 1991 levels. The highest growth was in v-belts (5%) and flat belting (3%) but the large fabricated products market grew by only 1.5%.

Output

Much of the increase in US sales of non-tyre products in 1992, was met by imports. Domestic output remained broadly stable between 1991 and 1992 - US$ 9,137 million in 1991 compared with US$ 9,102 million in 1992.

In 1992, the value of output of hose and tubing increased by 5.2% over 1991 levels, indicating growth in real terms as price escalation was low. Output of v-belts also rose 5.2% in 1992 over the proceeding year. Flat belting recorded a 2.9% increase in output in 1992.

But the output of fabricated products, which account for 72% of total non-tyre output, fell nearly 6% in 1992, despite the increase in total sales. This resulted in overall non-tyre output recording a small fall in 1992 over 1991 levels.

Trade

The US has run a trade deficit in non-tyre products for many years. During the recession, the trade deficit fell. In the face of lower demand, imports did not increase. Exports, however, increased due to the value of the dollar.

With the economy emerging out of recession, evidence from 1992 suggests that the trade deficit is set to worsen again. The trade deficit in 1991 is estimated at US$ 164 million. The figure for 1992 is estimated at US$ 363 million.

Exports continued to grow in 1992 over 1991 levels. Overall, exports were up 5.6% with large increases in exports of hose and tubing (11%), v-belts (9%) and flat belting (10%). But the growth of fabricated product exports, the largest product category, was a comparatively low 3%.

Imports, on the other hand, were up over 22% over 1991 levels with a 34% increase in imports of fabricated products, the largest import category, and 7% increases in both v-belts and flat belting. Imports of hose and tubing were however down 14%.

In 1992, the US had a trade surplus on hose and tubing and a small surplus in v-belts. But in flat belting and especially fabricated products it ran a large trade deficit.

Imports

The main types of hose and tubing imported into the USA are reinforced hose (42%) and hose with fittings (37%) with the balance 20% made up of unreinforced hose. Flat belting accounts for 60% of total imports with v-belts making up the remainder.

In the largest import category, fabricated products which accounted for nearly 77% of total imports, the main products imported were gaskets, washers and seals. The value of imports of these products was in excess US$ 205 million and they accounted for nearly 20% of total imports of fabricated products.

Other products which contributed significantly to the import of other fabricated products were 'other articles of unhardened rubber' (US$166 million), basketballs (US$77 million) and equipment for watersports (US$58 million)

Accurate data on countries of origin of imports are difficult to compile for the USA due to the reporting formats used. Nevertheless, examining export data of the main rubber product manufacturing countries provides indicators of the main sources of supply.

The main sources of hoses imported into the US are Japan which accounts for nearly half the value of hose imports and the EC which contributes just under 20% of hose imports. Japan is particularly important as a source of unreinforced and reinforced hose without fittings. The EC is an important supplier of hose with fittings.

The remainder of the market is supplied by a large number of other countries, each holding a small share of the market .

The supply of belting is, compared with hoses, far more fragmented. W. Europe, Japan, Korea and Taiwan are the most important suppliers.

Japan, Korea and Taiwan are the main sources of gaskets, washers and seals, followed by the EC. These are also the main suppliers of 'other articles of unhardened rubber'. Sources of supply for both these import categories are fragmented, with many countries supplying product.

The main sources of imports of basketballs is Taiwan followed by Korea. Taiwan supplies nearly US $ 25 million of basketballs to the USA. It is also the main supplier of water sport equipment to the USA with exports of over US $ 24 million.

Market Trends

The US market for non-tyre products is expected to grow at 6-7% in value terms over the next five years. This represents real growth of between 3-4% p.a.

Growth is likely to be highest in mechanical products such as gaskets, washers and seals and other moulded and extruded industrial products. Demand for hose and belting is expected to grow less rapidly (figure 44).

Growth Prospects for US IRG Market
1991 - 1996

Product	Value US$ million 1991	1996	Growth % p.a.
Hose	1295	1540	3.5
Belting	910	1145	4.7
Mechanical goods	4905	7200	8.0
Total IRG	**7110**	**9885**	**6.8**
Price Index	100	116.5	3.1

figure 44

Much of the growth is expected to be met by imports. Imports are likely to represent growing competition to domestic manufacturers. The combination of a strong dollar making domestic manufactures less competitive against imports and strong market growth should allow imports to grow by close to double digit levels.

It is expected that with the formation of NAFTA, Mexico is likely to emerge as a major source of imports. US companies, unable to compete against lower cost countries, are expected to locate in Mexico.

Nevertheless, imports from countries such as Korea and Taiwan and the ASEAN countries should also increase substantially.

Malaysia is, as yet, not a major source of imports into the USA for any product category. But nor are its main ASEAN rivals, Thailand and Indonesia. The USA thus represents a major opportunity for the growth of Malaysian exports.

■ **Japan**

Market Size

Firm estimates of the Japanese market for non-tyre rubber products are not available. IRSG figures show that Japan's rubber consumption for non-tyre products was just over 700 thousand tonnes in 1992. This level of consumption suggests that the value of output of non-tyre products would be in the region of US$ 6-7 billion. Japan is a major net exporter of rubber products. In 1992 it exported US$ 1.35 billion worth of non-tyre rubber products and imported only US$ 0.35 billion. Thus apparent consumption in Japan is likely to be US$ 1 billion less than output, at between US$ 5-6 billion.

Output

Roughly half of Japan's total rubber consumption is in the rubber products industry with the balance going to other industries. Our best estimate, based on the above, is that the value of output in the non-tyre rubber products industry is in the region of US$ 3-4 billion.

Japanese output of non-tyre rubber products (excluding footwear) is shown in figure 14. As in other industrialised countries the highest proportion of output (67%) is in the category 'other rubber products' which includes a range of mouldings, profiles and gaskets, washers and seals. Figure 45 shows only the output of the rubber products industry and thus excludes the output of rubber products manufactured by other industries.

Japan's Output of Non-Tyre Rubber Products - 1992

Product		Volume of Output ('000 tonnes) - %	
Hose and tubing		30.5	(10)
- of which automotive	19.3		
Belting		31.5	(10)
- of which • conveyor	18.9		
• V-belts	7.5		
• cug belts	3.5		
Crepe & foam rubber		27.6	(9)
Hygenic & pharameutical		5.1	(2)
rubberised cloth		3.4	(1)
Sports goods, & toys		7.6	(2)
Other rubber goods		210.6	(67)
- of which • vibration dampers	44.2		
• fenders	3.3		
• roller covering	5.8		
• sheets	14.9		
• linings	1.6		
• packing material	32.0		
• sponge products	27.5		
• other	81.3		
Total		**316.3**	

Sources. IRSG Key Rubber Indicators, 1993
Other industry estimates.

figure 45

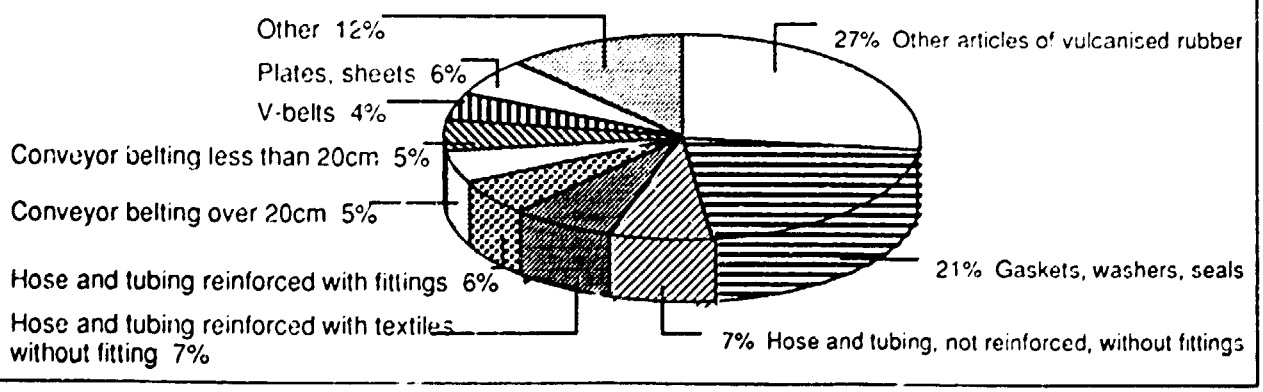
Output fell 5% between 1991 and 1992 and a further 5% fall is expected in 1993 as a result of the Japanese recession.

Trade

A very high proportion of the non-rubber products industry's output is exported. In 1992, the country exported nearly 93 thousand tonnes of industrial rubber products with a value of US$ 1,335 million. In addition, it exported US$ 12 million worth of adhesive tape and US$ 45 million of other rubberised fabrics.

The main industrial rubber products exported from Japan (in value terms) are shown in figure 46 below:

Japan's Main Exports of Industrial Rubber Products - 1992



Source: Japan Export Statistics

figure 46

The main groups of products exported from Japan are other articles of rubber (27%), gaskets, washers and seals (21%), hose and tubing (21%) and belting (17%).

The main destinations of Japan's export of industrial rubber products are the USA (21%) and the EC (13%). Japanese exports to Malaysia were worth around US$ 50 million in 1992, consisting mainly of other rubber products, gaskets, washers and seals, hose and tubing and plates and sheets.

Overall, between 1988 and 1992 Japanese exports have been growing in volume terms at 6.3% p.a. The main growth has been in other rubber articles, exports of which have increased 61% between 1988 and 1992.

Japan imports just over 33 thousand tonnes of industrial products with a value of nearly US$ 250 million. In addition, it imports over US$ 100 million worth of consumer products, but it should be noted that this figure includes items such as golf balls which may have little rubber content and water sport equipment only some of which is made of rubber.

The main groups of industrial rubber products imported into Japan by volume and value is shown in figure 47.

Japan - Main Imports of Industrial Rubber Products - 1992

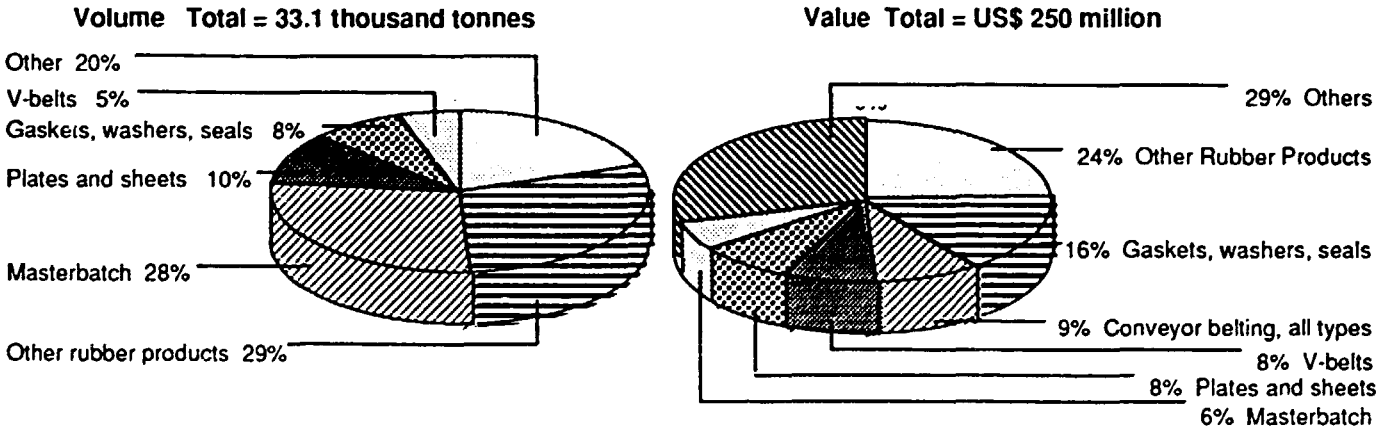


figure 47

In addition, Japan imported US$ 35 million worth of golf balls, US$ 30 million worth of inflatable rubber products, US$ 18 million worth of water sports equipment, and US$ 9 million of adhesive tape.

In comparison with the EC or USA, the market for imported rubber products in Japan is much smaller. But it is growing very rapidly.

Between 1988-92, Japanese imports of industrial rubber products have grown in volume terms by an average 18.8% p .. The most striking growth has been in the import of plates and sheets and automotive rubber parts. Between 1988 and 1992 volumes of plates and sheets and automotive rubber parts imported into Japan have increased over fifteen and six fold respectively .

Automotive rubber parts accounted for over 32% of the total volume of 'other rubber products' imported into Japan in 1992 and over 34% of their value. In addition to these two products, imports of gaskets, washers, seals, car mats, hose and tubing reinforced with textiles, hose and tubing with fitting and masterbatch have more than doubled in volume terms over the 1988-92 period.

In value terms, the main source of industrial rubber products imported into Japan are the USA and EEC followed by Korea and Taiwan and the ASEAN countries led by Singapore. In volume terms, the picture is broadly similar but Korea, Taiwan and the ASEAN countries have a higher proportion of imports.

In the important 'other rubber products' category, (excluding automotive rubber parts), Malaysia is the largest source in volume terms with a 40% share of the market, ahead of Korea (13%) Taiwan (12%) and China (9%), the USA (7%) and EC (5%).

But in value terms, USA is the largest source of imports with 25% of the market for imports, followed by Malaysia (21%), EC (15%), Taiwan (13%) and Korea (10%). This reflects the higher unit value of imports from industrialised countries such as the USA and the EC. In comparison with imports from industrialising countries such as Korea and Taiwan the unit value of Malaysia's exports is lower also.

In automotive rubber parts Taiwan is the largest supplier to Japan in both value and volume terms, accounting for 45% of volume and 27% of value of imports. Other important sources are the EC (mainly Germany) Korea, Malaysia and the USA. Malaysia accounts for 13% of the volume of imports and 12% of value and is a significant supplier.

The main sources of imports of gaskets, washers and seals in value terms are the USA (26%), EC (24%), Korea (16%), Thailand (8%) and Malaysia (8%). Although Malaysian's share of imports of gaskets by value is lower than Thailand's, the unit value of Malaysian exports is much higher.

Malaysia is the dominant supplier of car mats and other hygienic and pharmaceutical products (excluding gloves) dominating both the value and volume of imports.

Malaysia is an important source of Japanese imports of masterbatch and plates, sheets and strips but its importance is greater in volume rather than value terms. It supplies 12% of masterbatch imports by volume but only 9% by value. The unit value of imports from Malaysia is lower than imports from Korea and the EC (mainly France).

Malaysia accounts for 16% of the volume of Japanese imports of plates and strip (vulcanised) but only 5% of their value. Countries of the EC (49%), USA (27%) and Thailand (11%) have a higher share of the value of imports and the unit value of their imports is higher.

Malaysia is not an important supplier of belting which accounts for 17% of Japan's imports (by value). Belting is mainly imported from USA and Switzerland.

Market Trends

The Japanese economy experienced sharp recession in 1992 and 1993. Prospects in 1994 are for a small recovery which may gather pace in later years. But overall, prospects for growth over the next five years are of a modest 2-3% p.a.

Even with a slow recovery, imports should continue to grow rapidly. The main cause of their growth is the high value of the yen which makes domestic manufacturers uncompetitive. It is likely that the high rates of growth of imports recorded between 1988 and 1992 could not only be maintained but could be exceeded in the future when recovery combines with a high yen to cause strong demand for cheaper imports.

Prospects for Malaysian exports to Japan are favourable. The country has estabiished a significant share of Japan's main imported products. The volume of imports of products supplied by Malaysia has been rising fast and is likely to continue to grow rapidly in the future.

Up to now the unit value of Malaysian exports to Japan has been significantly lower than exports from industrialised countries such as the USA and the EC countries and Korea and Taiwan. If Malaysian exports can penetrate the markets for higher value products supplied by these countries, the value of Malaysian exports to Japan could rise very rapidly, through a combination of volume growth and an increase in unit values.

■ Korea

Market size

No firm estimate of the value of Korean non-tyre output are available. IRSG estimated Korean non-tyre rubber consumption to be 243 thousand tonnes in 1992, of which 25 thousand was in the form of latex. Hence, consumption by the GIRG industry is likely to be in the region of 220 thousand tonnes.

Based on this estimate of rubber consumption, the value of output of the Korean GIRG industry is likely to be in the region of US$ 1.5 -2.0 billion. But of this roughly half would be in the form of bicycle and motor cycle tubes and tyres (included as GRG) and footwear. The value of GIRG excluding these products is likely to be US$ 800 million to US$ 1 billion. The country is a small net importer of GIRG, with a trade deficit of US$ 50 million in industrial and add a surplus of US$ 20 million in consumer goods. Thus an estimate of the Korean GIRG market at between US$ 0.8 - 1.0 billion appears reasonable.

The Korean market appears to have grown rapidly during the 1980s at over double digit levels. But in recent years, growth appears to be slowing down to a more modest 6-7% p.a.

Output & Trade

Data on the breakdown of output by product category are not up to date or presented consistently. The comments below reflect the views of informed sources and available data.

Korea is not a large manufacturer of hose and tubing. It runs a large trade deficit in hose and tubing importing US$ 49 million and exporting less than US$ 4 million. The main types of hose and tubing imported is reinforced hose with fittings (US$ 35 million) followed by reinforced hose without fittings (US$ 10 million), particularly hose reinforced with metal.

The main source of hose and tubing imports are Japan and the USA. Malaysia is not an import source of imports but nor are other ASEAN countries.

Korea is a major manufacturer of belting. Output of belting (v-belts and conveyor belting) is estimated by IRSG in 1992 at 3,349 million ply (each ply = 61cm x 30.3cm). Belting output, however is falling from a peak of 4,811 million ply in 1988.

In 1992, the country had a major trade surplus in v-belting. It exported over US$ 18 million of v-belting against imports of US$ 5 million.

Korea imports and exports flat belting (transmission and conveyor belting) worth US$ 21 million. Despite its strong presence in, for instance, the US and EC markets, the country also imports substantial quantities of flat belting from Japan, the USA and in the case of transmission belting, the Peoples Republic of China.

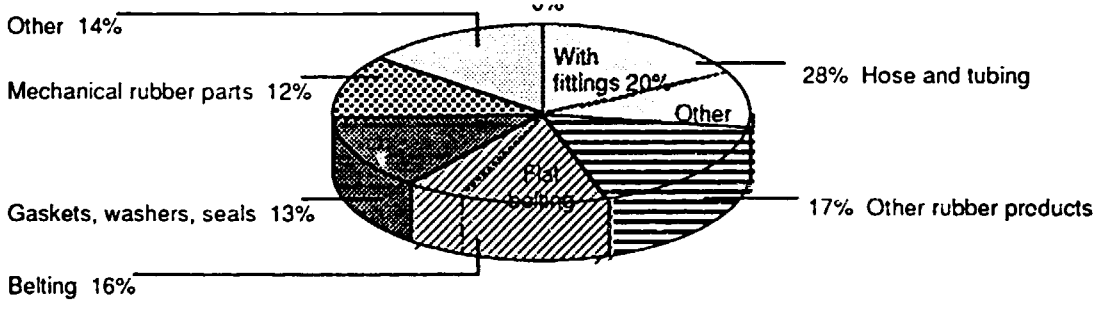
Korea imports US$ 22 million worth of gaskets, washers and seals but exports only US$ 13 million worth. It also runs a trade deficit in rubber parts for mechanical uses importing close to US$ 21 million whilst exporting US$ 1.5 million and in other rubber parts where imports in 1992 were worth US$ 30 million and exports, US$ 13 million.

The main source of gaskets, washers and seals, mechanical rubber parts and other rubber products are Japan, the USA and Germany. Malaysia is not a major supplier of either of the three groups of products. Of the ASEAN countries, Indonesia is a significant supplier of mechanical rubber parts.

As figure 48 below shows that the main industrial products imported into Korea are hose and tubing, other rubber products, gaskets washers and seals and mechanical rubber parts.

Korea - Imports of Industrial Rubber Goods - 1992

Total = US$ 175 million



Source: Korean Trade Statistics

figure 48

In contrast to a position as a net importer of industrial products, Korea is a net exporter of consumer rubber products such as basket and volley balls, tennis balls and other inflatable balls. It exported US$ 28 million worth of balls and US$ 2.5 million of adhesive tapes in 1992.

Prospects

The Korean economy is forecast to grow over the next 5 years at between 5-6 p.a. Consumption of GIRG should therefore, grow at around this rate.

As domestic consumption increase, imports are likely to grow fast for the following reasons:

i) already in the 1988-92 period, imports increased at an average 11% p.a

ii) the fastest growth in imports has been in products such as belting which are traditionally an area of strength of the Korean industry. This suggests a loss of competitiveness on the part of the Korean industry;

iii.) there is growing evidence of Korean rubber manufacturers relocating to China, to counter higher domestic labour costs. Imports into Korea will grow as a result.

Fast growth of imports should present a significant opportunity for Malaysian exports. Imports of industrial rubber products are already close to US$ 175 million. Korea is likely therefore to develop into a significant importer of rubber products.

Currently, the country's main source of imports are the highly industrialised countries of Japan, USA and Germany. Neither Malaysia nor its competitor ASEAN countries have a significant position in these markets.

Provided Malaysia can improve the capability of its GIRG industry, it has the potential to displace the higher cost suppliers which currently dominate Korean imports. But it should be noted that the relocation of Korean manufacturers to mainland China will represent substantial competition in the future.

■ Taiwan

Market size

There are no firm estimates available of the size of the Taiwanese market for GIRG. As is the case with Korea, our order of magnitude can, however, be derived from estimates of rubber consumption and trade data.

IRSG estimates Taiwanese non-tyre rubber consumption at close to 220 thousand tonnes of which roughly 30 thousand is in the form of latex. Rubber consumption for GIRG in Taiwan is thus in the region of 190 thousand tonnes.

Based on the above, output of non-tyre, non-latex rubber goods is likely to amount to around US$ 1.5 billion. Of this a significant proportion, is likely to comprise bicycle and motor cycle tubes and tyres and footwear which are included under general rubber goods. The output GIRG excluding footwear and tubes and tyres is likely to amount to between US$ 500 million and US$ 800 million.

Taiwan is a net exporter of GIRG products, roughly balanced in its trade in industrial products but with a US$ 80 million supply in exports of consumer rubber products. Hence the Taiwanese market for GIRG as defined for this study is likely to be worth between US$ 400-700 million.

Output & Trade

As is the case with Korea, no consistent breakdown of output is available. But it is possible to comment generally on the country's GIRG industry and its competitiveness as demonstrated by international trade.

Taiwan manufactures significant quantities of hose and tubing. In 1992, output of pipe and tubing amounted to nearly 44 million metres. In 1988, the latest year for which figures are available, hose output was 65.5 million metres. Output of hose and tubing appear on a downward trend from peak levels in the late 1980s.

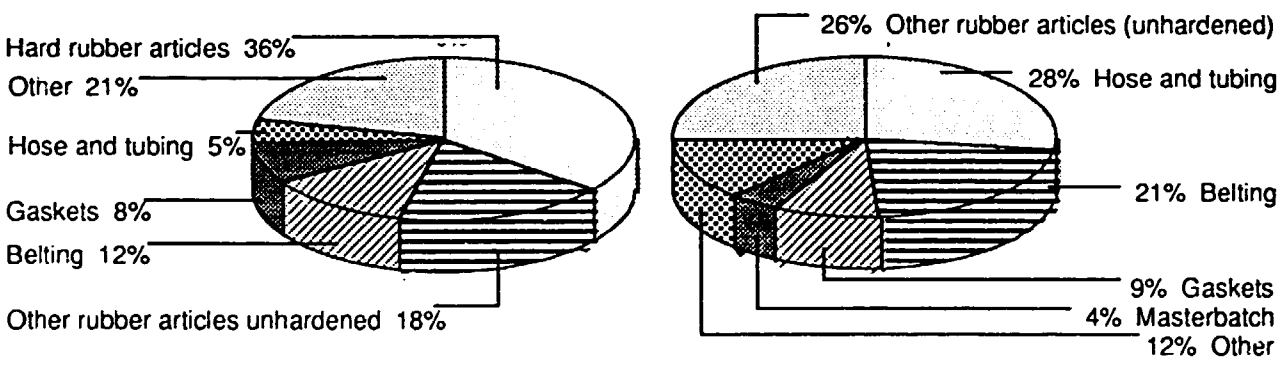
The country is, however, a net importer of hose and tubing, importing in 1992, nearly US$ 46 million worth of hose and tubing but exporting only US$ 7 million. The main import is of hose and tubing with fittings. The main countries of origin of hose and tubing imports are Japan and Italy. Malaysia and the other ASEAN countries are small suppliers.

Taiwan is also a net importer of belting, both v-belts and flat belting. It exports US$ 5 million worth of v-belts and imports US$ 9 million. The figure for flat belting is US$ 11.6 million worth of exports and US$ 22 million of imports. Japan is the main source of belting imports.

Taiwan is also a net importer of gaskets and seals, principally from Japan and 'other rubber articles' from Japan, Thailand, USA and Germany. But it is a net exporter of floor coverings and mats, erasers, and inflatable articles and runs a very large trade surplus in articles of hard rubber. It exports hard rubber articles to USA, Japan and Hong Kong. Exports of hard rubber articles were close to US$ 55 million in 1992.

Figure 49 below profiles Taiwanese imports and exports of industrial rubber products:

Taiwan 's Trade in Industrial Rubber Products - 1992



Source: Taiwanese Trade Statistics - 1992

figure 49

Taiwan is particularly strong in the manufacture and export of consumer rubber products. In 1992 it exported close to US$ 100 million worth of consumer rubber products, including US$ 44 million of equipment for water sports and US$ 24 million worth of basket balls. Its main export destination is the USA followed by Japan and the EC countries.

Market Trends

Taiwan's continued high rate of economic growth (5-6% p.a.) should lead to continued growth of demand for rubber products. And over the next five years, the structure of Taiwan's trade with the rest of the world should change, offering significant opportunities for exporters.

Over the 1989-92 period, Taiwan's exports have shown little volume growth. Exports of hose and tubing, belting and gaskets have declined in volume terms with hard rubber articles the only product category to show notable growth.

But over the same period, imports have increased in volume term nearly fourfold. There have been substantial increases in the volumes of other rubber articles, gaskets and hose and tubing imported into the country.

This pattern of slow export growth but accelerating volumes of imports has changed Taiwan from a major net exporter into a country which enjoys a trade surplus only in consumer rubber products. In the future, culmination of this trend will cause the country to become a net importer of rubber products. And the country will rely on imported products to meet a growing proportion of its demand for rubber products.

It should be noted, however, that Taiwanese companies have started to move offshore, looking for countries with cheaper factor costs. China is emerging as an important country of location and the country may start to rely on it, for much of its imports.

Malaysia and the other ASEAN countries have to date not made major inroads into the Taiwanese market. But, imports from ASEAN countries are growing fast. Thailand, in particular, is emerging as an important supplier, particularly of 'other rubber products'.

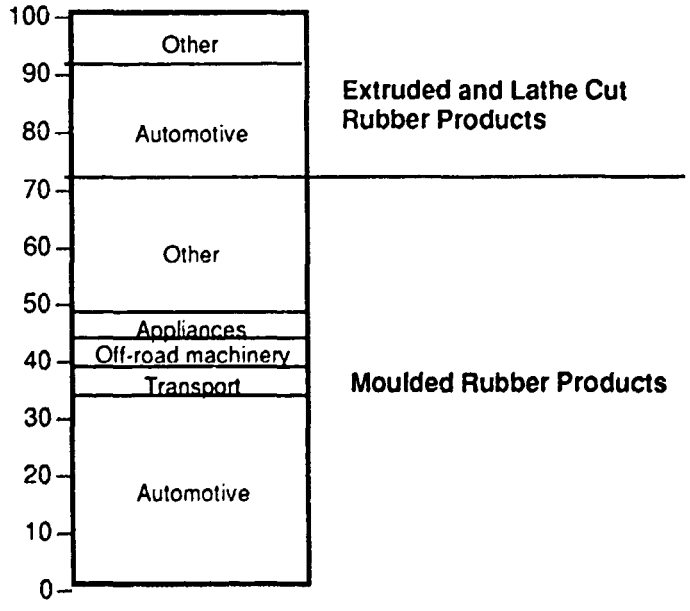
Taiwan has the potential to become a major market for Malaysia. It could benefit from the growth of imports and attempt also to displace high cost supply from Japan.

However, Malaysia will have to compete against emerging competition from lower cost countries such as China, particularly if Taiwanese rubber product manufacturers locate there.

■ End-use Sectors

In the important world markets of the EC, USA and Japan, the main end-use for industrial rubber products is automotive. For instance, in the USA, sales of mechanical rubber goods account for nearly 70% of total industrial rubber product sales. Over half (53%) of the sales of mechanical goods are to the automotive industry as shown in figure 50 below.

USA - Sale of Mechanical Rubber Goods - By End-Use



Source: US Industrial Statistics

figure 50

Apart from automotive, mechanical rubber goods are used in a large number of other end-use sectors, each of which on its own accounts for a small proportion of total sales. The largest of these small, other end-uses, is transport (non-automotive), off-road machinery, household appliances and oil and gas machinery.

The importance of the automotive sector in the consumption of rubber products varies with the state of development of the car industry. In the main countries of the EC - Germany, France, Italy and the UK - and in Japan and Korea the automotive industry is well developed and the importance of the automotive end-use is likely to be as high as it is in the US.

The automotive sector is also an important consumer of non-mechanical rubber goods - belting and hose. But for these products general industrial uses accounts for a significantly higher proportion of total use than automotive.

In consumer rubber products, the main use is as sports foods and toys, with equipment for water sports, balls of various kinds and balloons particularly significant. Use of rubber in household articles such as floor covering and bedding is now less important in value terms than sports goods and toys. In volume terms though, floor covering remains a very large end-use.

The market for consumer rubber products is much smaller than industrial rubber products. Nevertheless as Taiwan's experience shows, it is possible to develop significant (US$ 100 million) levels of exports of these products, as international markets are large.

■ Segmentation

The use of industrial rubber products is divided between the two main market segments, original equipment (OE) and replacement. In most industrialised countries the OE segment is by far the larger consumer of rubber products generally, though its importance various with products and end-uses.

In the case of rubber goods sold to the automotive sector in countries such as the USA, the main rubber consuming countries of the EC, Japan and Korea which have substantial automotive industries, the OE segment would be larger than the replacement segment in the proportion 70:30. Whilst all new cars require rubber products, replacement demand is limited by the longevity of many rubber products and the comparatively short lives of automobiles.

A similar dominance of OE over replacement would hold also for other important end-uses such as other transport equipment, appliances and industrial and off-road machinery.

In belting though, the replacement segment is likely to be larger than the OE. Whilst use of v-belts as timing belts and in new machine tools is extensive, it is likely to be less than for replacement use in general power transmission. V-belts have a comparatively short product-life and are regarded as consumables. The market for flat conveyor belting is also largely in the replacement segment, because they also have a comparatively short product-life.

Purchase criteria vary between the OE and replacement segment. The OE segment tends to be more demanding than the replacement, focusing on the specification and performance of the product and integrity of supply - a consistently high level of quality and timeliness of delivery.

For many rubber products, the replacement segment is further divided into two sub-segments - a branded and an unbranded segment. In the former, brand recognition built on product quality and specification plays an important role along with price. In the latter, price is the main purchase criteria.

Figure 51 from our first Interim Report shows purchase criteria and size of each segment. It highlights the greater size but demanding nature of the OE segment.

Profile of IRG Markets in Highly Industrialised Countries

Segment	Main Purchase Criteria	Size
OEM - high value	Technical Specification Product Performance Product Integrity	Large
Replacement - branded	Technical Specification Quality Terms of Trade	Medium - Small
Replacement - unbranded	Price Specification	Small

figure 51

■ Success Factors and Sales Channels

Success in each segment depends on a varying set of factors. Suppliers have to be prepared to adapt their marketing proposition to meet the key factors for success in the segment they are targeting.

In the OE segment, the main precondition for success is to establish an on-going relationship with OEMs, to assure them of the integrity of the product and the supplier. This takes the form of selling the product on its technical merits and the supplier in terms of capability.

The marketing effort required to develop new customers in the OE segment is almost always substantial and suppliers must be willing to make a sustained commitment to developing the OEM into a customer. Product adaptation, repeated product trials and independent certification are often called for.

In the branded part of the replacement segment, product reputation is what counts. Building a brand reputation takes time and expenditure and good quality product made to high technical specifications are prerequisites.

The replacement market is saved by intermediaries - agents, distributors and catalogue houses. The market is fragmented and intermediaries serve an important role in accessing end-users for manufacturers. Intermediaries will typically buy from only a few branded suppliers, selecting them either on the size of market share and/or terms of trade they offer.

Suppliers of branded goods have to attract the attention of intermediaries able to access the largest numbers or largest end-users. Bulk discount, quick delivery and small order sizes are used to differentiate their market offering from other suppliers.

In the unbranded segment of the replacement market, intermediaries are mainly concerned with price. Product quality has to be acceptable and delivery times reasonable but success depends mainly on providing intermediaries with a product of acceptable quality at a competitive price.

As a result, price formation varies between each segment. An example of this is the US market for conveyor belting (RMA grade 2). Imports from Korea and other industrialising countries fetch a price of between US$ 0.17 to US$ 0.19 per foot width, inch (f.w.i). On the other hand US branded products sold for replacement fetch a price between US$ 0.22-0.24 (f.w.i) a difference of between 25% to 30%. Price to an OEM manufacturing handling systems would be about the same as in the branded replacement segment.

The example above holds in Europe and applies to most rubber products. Of course, it is not always possible to get accurate price comparison as price varies with product specifications.

■ **Implications for Malaysian Exports**

Clearly, in relation to current levels of Malaysian exports (approximately US$ 100 million) world markets are large. Despite rapid growth, Malaysia remains a very small supplier of industrial and consumer rubber products to important world markets. With imports into these markets set to rise rapidly, Malaysian exports have the potential to grow fast, both as a result of volume growth and through increasing market share.

It is a feature of all the markets examined that the main source of imports are currently highly industrialised countries. But in all markets, supply from lower cost industrialising countries is increasing.
Malaysia should be well placed to benefit from these trends. Exploiting these opportunities will, however, require improving the capability of Malaysian industry to supply demanding product markets. It is the greater capability of the industry of industrialised countries that have insulated them up to now from competition from lower cost continues.

The trend to sourcing from lower cost countries is an opportunity but represents also potentially new competition. Countries such as China and other ASEAN countries with lower cost bases than Malaysia could emerge as significant competitors. To differentiate itself from them, Malaysia must develop capability to manufacture superior products.

It is clear also that to open up large segments of the market, particularly the OE segment, products made to high specification and good manufacturing capability are prerequisites. These are the large attractive markets that can offer the Malaysian industry significant and sustained levels of exports.

It is important to note that countries such as Taiwan and Korea which enjoyed substantial success in exporting rubber products during the 1980s are finding it difficult to maintain their market position in the 1990s. In the price sensitive segments their exports served, market positions are vulnerable to lower priced competition. If Malaysia is to avoid their fate. Her exporters will need to build more sustainable positions in less price sensitive segments. In addition to technical capability, this will require also sustained marketing effort over lengthy period. This may not prove possible for many Malaysian's firms as they are small.

Hence, enabling export success to occur requires government intervention in upgrading capability and supporting export market development activities.

Prospects
&
Strategy

X Opportunities & Threats

This section outlines the main opportunities and threats facing Malaysia's GIRG sector. The strategy for the sector's future development will need to address ways of exploiting opportunities whilst countering threats.

Opportunities

Over the coming decade, the Malaysian GIRG industry will have the opportunity to become a major supplier to the Asia Pacific region and hence to become a force in the world industry. The opportunity provided by increased internationalisation of trade and growing mobility of capital will not be easy to exploit. The industry will face intense competition from both more developed and lower labour cost countries but the potential rewards for success are high.

In addition, opportunities for the GIRG sector stem from favourable prospects in both domestic and export markets. If the Malaysian industry can adapt its market offering - products, price competitiveness, distribution channels and customer service - to exploit the growth of demand, it should be able to expand rapidly.

The industry may also explore the manufacture of a set of products which it currently has limited capability in. These products are likely to find outlets in both domestic and export markets and their manufacture may prove attractive in the future.

- Domestic market

Growth of demand in the domestic market for existing products is as noted earlier likely to be rapid providing major opportunities for the GIRG sector. In addition there are likely to be two other main types of opportunity in the domestic market:

i.) adapting products to increase value added and meet emerging needs in the market;

ii.) import substitution.

In the case of new types of demands emerging from the market, the industry will need to adapt existing products to meet the higher technical sophistication for which the market is looking and thus ensure that demand is met from domestic rather than import sources. Examples of such adaption are hoses for the oil and natural gas industry and high performance seals and rings for both machinery and the oil industries.

Such product adaption is not beyond the capability of the GIRG industry in Malaysia. It requires use of synthetic rubber but no major changes to process technology. The result will be a substantial increase in value added.

Perhaps the greater potential for expansion lies in import substitution. The very high level of import penetration in the GIRG sector - nearly 100% of output according to official estimates and nearly 50% according to our estimates of output - affords a major opportunity for the industry.

The main imported items which should form the focus for import substitution are pipes and hoses, belting especially conveyors, seals and rings and a category termed "other articles of unhardened vulcanised rubber". The value of imports into Malaysia in 1992 of these items is shown in figure 52.

Value of main imports of GRG 1992	
Product	Value ($ million)
Pipes, hoses, tubing	37.5
Belting	40.5
Seals, Rings	21.9
Other articles	84.6

figure 52

■ Export Markets

The main opportunities for growth of export markets arise out of the increasing internationalisation of trade in rubber products and the growth of supply from low cost countries. As the cost base of industrialised countries has risen, they have turned to lower cost countries for the supply of firstly simple technology, low value added products and increasingly of technical higher value products where product technology has become established internationally.

- Asia Pacific Region

In the context of greater internationalisation of trade and mobility of capital, the strategic opportunity for the Malaysian industry is to become a leading supplier of rubber products to the Asia Pacific region.

Malaysia has extensive trading relationships with the main countries of the region and can supply the region both economically and in the short lead times which international trade has started to demand.

The Asia Pacific region will become the leading region of world industrial activity and contains a large and increasingly affluent population. If the Malaysian industry can realise this objective it will be able to become a major force in the world GIRG industry.

Up to now the main cunsuming countries of the region - Japan, Korea and Taiwan, have had low import propensities and were themselves large exporters. But as noted in section IX above, this situation is changing. Imports are increasing faster than exports and in some products where they were strong net exporters, the countries have become net importers.

To date, the main sources of imports to these countries have been higher cost countries. But this situation is changing. These countries have experienced high increases in manufacturing costs and low costs sources of imports are beginning to become significant.

These trends represent a substantial opportunity for countries which combine a lower cost base with a relatively high GIRG capability. Malaysia is well palced to exploit these trends.

Malaysia's main advantage over other country's of the region is that its industry already supplies Japanese OEMs located in Malaysia both in the automotive and electrical and electronic industries. It can hope to use this track record to overcome concerns over integrity of supply. And the Malaysian GIRG industry has developed markets also in Korea and Taiwan.

Because these markets are difficult Malaysia's trading relationships and the higher level of developme..t of its GIRG industry will be assets against competitors. However, the Malaysian industry will face major challenges of improving product specifications and quality, marketing, customer service and delivery.

The Malaysian industry would substantially improve its own capabiltiy through attracting manufacturers from countries such as Japan, Korea and Taiwan to locate in Malaysia or form alliances with Malaysian manufacturers.

If the Malaysian industry can develop its market offering to compete against entrenched domestic suppliers either itself or in alliance with international companies, it has an opportunity to build strong strategic position in the region's industry.

- Other Countries

There are also opportunities in other international markets. The USA is the single largest consuming country and Western Europe second only to the Far East as a rubber consuming region. These markets do not offer the prospects for growth that the Asia Pacific region does but their import propensity is higher and increasing. Opportunities in these markets stem from:

i.) geographical diversification of markets;

ii.) the penetration of higher value, main stream segments of the market;

iii.) improved distribution channels to increase market coverage, enhance customer service and capture higher value within Malaysia.

Although Malaysia's GIRG products are exported worldwide, in each product category, a very high proportion of sales are to a few countries. This is partially a function of the nationalities of foreign investors in GIRG industry and partially of Malaysia's trading relationships.

In most products it is possible to identify a range of other country markets to which it should be possible to develop sizeable levels of exports. What is required is a systematic plan to target and penetrate other priority markets.

Currently, with notable exceptions such as rubber lining, erasers, swim caps and swim aids and rubber bands, made by foreign companies, Malaysian exports serve the less demanding, lower value segments of the market. They have yet to penetrate main stream segments of the market where product integrity and reputation play an important part in the purchase criteria and OE segments where technical specification and product integrity are more important than price.

Our evaluation of the capabilities of Malaysian companies suggests that with some assistance, a large number of them could develop the capability to supply these segments. The large number of companies which have bought quality control equipment and which are planning to introduce ISO 9000 are evidence of commitment to upgrade quality. Successful penetration of these markets would result in a substantial increase in exports.

Distribution channels currently used by Malaysian companies to export rely heavily on the networks of foreign joint-venture partners and on intermediaries. With few exceptions, Malaysian exporters lack the market knowledge to plan, establish and mange a distribution network that provides effective market coverage, can deliver the customer service required to penetrate higher value market segments and which is cost effective.

By addressing the shortcoming of their distribution networks, Malaysian companies can hope to both improve their export sales and improve the profitability of exports.

■ New Products

Whilst the GIRG sector is capable of producing most products, it has to date developed limited capabilities in conveyor belts and for three other products listed below:

- inflatable rubber products
- adhesive tapes
- closed cell sponge

Conveyors have been dealt with under import substitution.

Inflatable rubber products to the value of MS 5.5 million are imported into Malaysia. This is not by itself sufficient to warrant the establishment of a new manufacturing operation.

But demand for these products is increasing in Malaysia and worldwide. The process can be used to manufacture a wide range of products such as life rafts, motorcrafts, beach items such as lilos, swim pools and reserve water storage facilities as well as high quality rainwear.

There are no technological reasons why inflatable products should not be manufactured in Malaysia. The basic process is the manufacture of coated fabric using a calender. The fabric is then cut to shape and cured in a steam autoclave. Investment costs are high with the calender alone costing MS 3.8 million to MS 7.5 million.

In the Malaysian industry though a number of companies claim capability, the manufacture of adhesive tape is limited. A significant value of tapes is imported (MS 1.3 million) and the value is increasing. In 1988, the value of tapes imported was only MS 0.3 million.

By itself the value of imports is not sufficient to warrant an additional facility but it suggests that there is scope for a large increase in output for the domestic market. And there is also a growing market for industrial and medical tape in export markets. It should be noted also that the figures above probably do not take account of medical tape imported into the country with bandages and a part of other medical supplies.

The process of manufacture of these tapes involves calendering adhesives on to a base material but the calenders are much smaller than for inflatable rubber products. In addition, to the purchase of calenders, the process involves a large number of machines to convert wdie rolls into narrow rolls.

The manufacture of closed cell sponge for the manufacture of cut-out gaskets, seals, auto seals for doors and boots, and sub-aqua suits has also not been developed in Malaysia. These products tend to require resistence to fuids including oil and high temperature and the material used is synthetic rubber rather than NR.

Demand for such products is growing within Malaysia and in export markets. They tend to be high value products. Manufacture is either by moulding or continuous extrusion. The latter requires substantial investment.

In the case of all these product areas, what is requried is evaluation of the propects of manufacture firstly at pre-feasibility and if the results are encouraging, at feasibility levels.

Threats

The main threats to the future growth of the GIRG sector are the emergence of competition from lower cost countries, the potential loss of competitiveness of the Malaysian industry and the emergence of trade blocks and alliances that would shut out the Malaysian industry from major world markets.

These threats are potentially extremely serious. It is possible to envisage a scenario in which the industry as a result of its own loss of competitiveness and competition from low cost competitors loses domestic and export markets which are price determined. At the same time it fails to penetrate or is shut out of higher value domestic and export markets.

- Low-Cost Competition

Low cost competition is emerging from Malaysia's ASEAN neighbours particularly Thailand and Indonesia whose industries are also expanding rapidly and from China and India where labour costs are a fraction of Malaysia's.

Thailand and Indonesia share Malaysia's advantage of being major international rubber manufacturers but their larger labour force and comparatively lower level of economic development means that labour is both more plentiful and cheaper than in Malaysia. Indonesia, in particular, is advantaged on these grounds and offers a market substantially greater than Malaysia's so that it's manufacturers can develop scale without having to export.

To date, only the Thai industry has approached the level of technical and corporate capability of Malaysia's. The Thai industry is particularly capable in automotive products where a longer period of domestic sourcing has created a highly competent industry. But in many other products the indusry lags behind Malaysia's.

Other ASEAN industries and those of China and India are also as yet poorly developed in comparison with Malaysia's. But the threat is that they may catch up fast because of rapid growth, particularly if they attract inward investment.

China and India have rapidly growing rubber industries and their wages rates are less than a quarter of Malaysia's. China poses a particular threat. Major western and Japanese rubber manufacturers have started to invest in the country. This may result in product with specification and quality equivalent to international standards being supplied at a lower cost than Malaysian products.

- Loss of Competitiveness

At the same time as low cost competition is emerging, the Malaysian industry is in danger of losing its current competitiveness and ability to expand output. Labour costs in Malaysia are poised for rapid increase as the labour market tightens. And, with profits remaining high, Malaysian enterprises have yet to start to tackle the problem of low labour productivity caused by overmanning and poor organisation of production.

Although attempts are being made to upgrade products, improve quality and penetrate higher value markets it is not certain that they will succeed. Without an increase in value added, higher labour costs will result in strong deterioration in profitability and threaten the viability of the industry.

Moreover, the sheer scarcity of labour may well serve to check any expansion. Government has allowed the import of labour on contract. But most Malaysian GIRG manufacturers cannot source a well trained workforce from abroad and the costs of continually training a new workforce every few years would discourage industry expansion.

- Trade Blocks & Alliances

Equally important to the GIRG sector is the threat of powerful trade blocks forming in the main centres of the world. These trade blocks are a grouping of major industrialised, rubber product consuming countries with low cost suppliers located nearby in whose industries manufacturers from industrialised countries have invested.

The trade blocks would result from a combination of:

- political factors such as those which have driven the EEC to lower tariffs on goods from the central European countries of Poland, the former Czechoslovakia and Hungary and the USA to form the North American Free Trade Area (NAFTA),

- the current mobility of capital in the rubber product industry and its search for strategic alliances.

It is possible to envisage the EEC market being supplied by a combination of intra-EEC supply and low cost supply from EEC manufacturers based in central and Eastern Europe. Also, the USA market being supplied by a combination of US domestic manufacturers and US manufacturers based in Mexico.

Whilst in other industries such scenarios remain possible, evidence in the rubber product industry suggests that they are already being realised. In balloons for instance, the USA is increasingly being supplied by US owned plants located in Mexico. The process of privatisation in Poland, former Czechoslovakia and Hungary is resulting in EEC manufacturers acquiring manufacturing bases in these countries.

It is a feature of the rubber product industry currently that competition from low cost countries, concerns over environmental standards and a trend towards globalisation of the industry are causing international capital mobility. US companies have looked to Mexico, European's towards Eastern Europe and there is evidence that Japanese, Korean and Taiwanese and Amercian and European companies are looking to China and the ASEAN countries.

Internationally mobile capital is looking for either green-field development, acquisition or strategic alliances. There is evidence of alliances being formed between manufacturers in the highly industrialised nations and between these manufacturers and suppliers in low cost countries.

Examples of the former are the recent links between Nok, the largest seal maker in Japan and Freudenberg to jointly exploit markets in Europe, a joint-venture between Avon and S&H to make air conditioning hose, and Avon & Clevile to make suspension parts, and also, a number of acquisitions and alliances formed recently between US and UK and French manufacturers to supply the French auto industry.

Examples of the alliance between manufacturers in highly industrialised and low cost countries are the recent joint-venture between Semperit and a Czechoslovakian manufacturer and the alliance between Trelleborg and the Indian belt manufacturers Hilton. Also, the recent interest shown by European manufacturers in rubber product manufacturers being privatised in Poland and Hungary.

Perhaps of greatest concern to the Malaysian industry is the emergence of strategic alliances from which it may be excluded in the Asia-Pacific region. If Japanese, Korean and Taiwanese manufacturers locate manufacturing operations or develop strategic alliances with competitor countries - say China or Indonesia - it could lead to the loss of its major strategic opportunity of becoming the major supplier to the Asia Pacific region, the loss of its current export markets and eventually threaten domestic markets.

Evaluation of Opportunities and Threats

In the short to medium term, the opportunities available to the Malaysian industry are clear and immediate and the industry is likely to grow rapidly. The threats to growth, although potent, are not likely to impinge upon the industry's short term growth.

Over the longer term the threats to the industry are serious. It is losing competitiveness at the time, new, low cost competition is emerging. Higher labour costs in Malaysia coupled with greater competence in competitor countries could threaten the viability of the Malaysian industry. And, patterns of trade are forming which could shut it out of export markets.

Both these threats are not overwhelming and can be overcome. There is ample scope for improving labour productivity to counter increases in wage rates and it is well within the scope of the industry to increase value added by upgrading products and improving quality and hence afford higher labour costs. Evidence suggests that the industry has taken important steps in this direction already.

And, if the current mobility of capital is a threat when coupled with the emergence of new trade blocks, it can be turned into an opportunity. If a way could be found to attract mobile capital to Malaysia or form strategic alliances with manufacturers in the industrialised countries, Malaysia may develop a significant advantage over its rivals as it has achieved in latex gloves.

The key to developing strategic alliances and attracting international mobile capital will lie in finding a counter to the advantage of lower labour cost and plentiful labour supply that countries such as Indonesia and China can offer. In this respect, the relatively advanced development of Malaysia and her GIRG industry may well prove important.

Perhaps the greatest threat to the GIRG sector will be complacency. Cushioned by current high profits, the industry may not rise to the challenges of the future and fail to capitalise on its opportunities. It may choose to ignore the potential threat that it faces until the competition starts to affect their current markets. By then it may be too late to respond to the threat that is emerging.

XII Strategy

Strategic Perspectives

The GIRG sector has favourable prospects in the short to medium term. But it faces threats from emerging competitors, higher labour costs and changes in trading relationships which in the longer term may result in a loss of some of its domestic and export markets.

The most likely scenario for the sector's future growth, is one of rapid expansion in the short-term, followed by a slow down and perhaps even contraction in the long-run.

This is by no means an unfavourable scenario. It is the normal 'S' shaped curve for an industry's development (figure 53). By the end of such a growth scenario, the per capita consumption of rubber in the GIRG sector would be high by international standards.

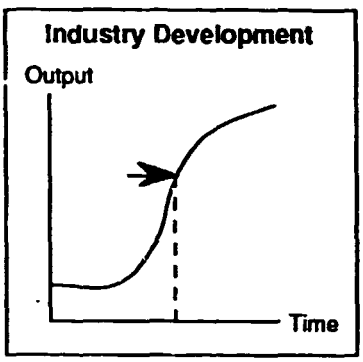


figure 53

But Malaysia has the opportunity to build a strategic position as a major supplier of GIRG products to the Asia-Pacific region, which in due course will become the major industrial region of the world and to become a substantial supplier also to other important world markets. Against this opportunity, the likely scenario for the development of the GIRG sector represents substantial under performance.

If the Malaysian GIRG industry can take advantage of this opportunity, it will help achieve Government's aim of deepening and broadening the industrial base and the integration of the economy. Though the amount of rubber consumed in the GIRG sector is not likely to represent a substantial proportion of rubber production in Malaysia, growth of output will also lead to an increase in domestic NR consumption

But the opportunity has a narrow time frame. The opportunity is due to transient factors such as the current mobility of capital. Unless actions are taken soon the opportunity will have been missed and trade blocks emerge that shut out the Malaysian industry.

The strategy for the GIRG sector has therefore to comprise a set of decisive measures that will rapidly change the course and speed of the industry's development. The measures proposed will have to be designed to make a significant difference to the competitiveness of the industry.

Successful strategies from our experience address not only the issue of which markets to focus on, but at the same time address the fundamental issue of how to outcompete rivals. It is through addressing the issue of how to outcompete rivals that industries and their businesses can hope to address their own weaknesses and to build upon their strengths.

Market Focus

■ Domestic Market

In the domestic market for industrial rubber goods the main sectors on which the industry will need to focus are automotive, machinery particularly construction, printing and food processing machinery, electrical and electronic appliances and oil and natural gas. These sector will not only provide rapid growth in demand but also opportunities to increase value added and earn the types of returns which will be necessary to cope with rising wage costs.

The construction sector will continue to be an important market but on the whole will not provide the opportunities for added value products that are required for the future growth and profitability of the industry.

The segments of each market on which future emphasis should be placed vary with each sector, as follows:

- Automotive - the emphasis should be on supplying the OE market, particularly products that continue to be imported including hoses, transmission belts and engine mountings;

- Machinery - in the first place, it will be the replacement market that will offer the most attractive opportunities and it will also enable IRG manufacturers to put before new machinery manufacturers a well tried product;

- Electrical and Electronic appliances - the focus should be on rubber components used by OE's for critical application which continue to be imported.

- Oil and gas - firstly the replacement market but eventually OE supply may be possible.

The industry should also undertake with the active cooperation of MIDA, a systematic analysis of import substitution. Opportunities, particularly in hoses supplied with fittings, in conveyor belting and in the very large amount of imports in the "other articles" rubber category. The latter may require help in identifying products within the other rubber articles category either through the Department of Statistics or by commissioning a small survey.

The aim of the industry should be to move progressively into higher value products through product and quality up-grading. Imports of high value products should be the main focus for import substitution.

■ Export Markets

The focus for export development of IRG should be the advanced countries of the Asia Pacific Region and Japan, Korea, Singapore and Taiwan in particular. As a second order of priority, markets in the US and EEC which are opening up through price pressure should be targeted along with ASEAN markets.

The aim in export markets would be to build upon the position Malaysian IRG products have established in low value, price sensitive segments of the market to penetrate higher value, more demanding segments. These represent the bulk of the market and provided Malaysian manufacturers can compete on product specification and integrity, will permit both expansion in total exports and margins.

Malaysian IRG exporters should focus on OEMs. This will open up large segments of the market, help them move up-market but perhaps more importantly place them at the forefront of product development. Suppliers of IRG to OEMs in Malaysia's automotive and electrical and electronic appliance sectors are well placed to attempt to penetrate OEMs in other countries by using their track record with such customers as a reference for the quality of their products and integrity of supply.

In consumer goods the focus should be on developing exports to western countries and particularly markets in Western Europe and North America and to the developed countries of the Far East - Japan, Korea, Singapore and Taiwan.

There are major opportunities in increasing exports of water sport equipment, rubber toys and balloons. The process of export development would consist of a combination of improving market shares in country's where market share is currently low and in the case of some products, in penetrating larger, higher value segments of the market.

In swimming caps, the main opportunity to increase export volumes is in improving market share of Malaysian products in Japan and countries of Western Europe such as Spain and France. In swimming aids , there is an opportunity to increase sales to most of Western Europe as well as Japan and other advanced countries of the Far East.

But in markets such as inflatable balls geographical diversification must be accompanied by opening up higher value segments in existing markets. Currently, inflatable balls are sold in the low value, unbranded segments of the market.

The focus for rubber masterbatch exports should be the four industrialised countries of Asia-Pacific region - Japan, Korea, Singapore and Taiwan and the large rubber product manufacturing countries of the USA, Germany, Italy, France and the UK. It is in these markets where demand for rubber masterbatch requiring high technical skills will be greatest.

There are in addition three product groups for development in the country. Inflatable rubber products and adhesive tape and closed cell sponge. These three product groups straddle industrial and consumer markets and their development is aimed at both domestic and export markets.

Out-competing Rivals

The key to winning the competitive struggle is to meet customer requirements more effectively than rivals. In turn, this requires addressing the main factors that determine the ability of an industry to manufacture competitive products and to market them effectively.

The strategy we propose consists of sets of measures to achieve two objectives:

i.) accelerate the development of Malaysian industry so that it establishes strong positions in markets before emerging competition becomes stronger by enhancing the competitiveness of existing Malaysian manufacturers and improving their ability to market their products effectively;

ii.) attract international investors with the manufacturing know how and marketing positions to strenghten the GIRG sector to locate in Malaysia or form strategic alliances with Malaysian manufacturers.

Together these two sets of measures will address structural and competitive weaknesses and support the industry in exploiting the major opportunity available. They will also serve to counter the threats of emerging competition and the formation of trading blocks that will shut-out Malaysian industry.

■ Accelerating Development

The aim of this set of measures is to build on the relatively advanced capability of the Malaysian industry compared with lower cost rivals in order to build entrenched positions in domestic and export markets. Lower cost competition will then find it more difficult to compete against the Malaysian industry.

The main threats to Malaysia's competitiveness come from a combination of the following factors:

- products manufactured by lower cost competitors are beginning to catch up with Malaysian products on specifications and quality. If this trend continues they will be able to outcompete Malaysian products by matching their specification and quality at a lower price;

- in IRG products and some consumer products Malaysian products have not been able to penetrate higher value segments of the market. With labour costs rising rapidly in Malaysia, the GIRG sector needs to capture higher value markets.

The Malaysian industry can meet these threats in two ways:

i.) in the short term by improving efficiency of manufacture, it can for some time yet, continue to compete on price with lower cost countries;

ii.) in the longer term by improving quality, upgrading product specification and improving quality systems it can begin to penetrate higher value segments where price is not as important as in lower value segments.

- Cost Competitiveness

Our survey revealed that there is ample scope for cost reductions in most Malaysian firms. The main thrust of cost reduction measures would be raw material and labour costs, as follows:

- raw material costs could be reduced through a combination of cost effective compounding and reduction in wastage levels;

- labour costs could be reduced by improving labour productivity.

As raw materials account for between 55-75% of the direct cost of rubber products small savings in percent terms of raw material costs would make a major difference to competitiveness. For example a 10% reduction in raw material costs where they account for 60% of total direct cost would compensate for say a 50% increase in labour costs as the latter account typically for only 10-15% of direct costs.

Our survey showed very high levels of wastage throughout the industry. Savings of over 50% of current levels are possible which would result in a 5-6% reduction in direct costs.

In addition, cost effective compounding could also contribute to reducing raw material costs. An example of how compound formulation can contribute to competitiveness is rubber mats. Success in this low value added product has traditionally been believed to depend on labour costs. But with rubber compound accounting for 60-65% of direct costs, experience in Malaysia has proved that skill in compounding counts for far more than labour rates. Malaysian companies have continued to win on price against competitors despite higher labour costs.

Manning levels in Malaysia are often more than twice the levels in the west and could be reduced substantially. Much could be achieved through better work practices and organisation of production, particularly movement of raw materials and work in progress. Over time, investment in automation to minimise handling would also be productive though only in some areas.

- Increasing Value Added

The process of improving product quality has already begun in Malaysia. The large spend recently on items of quality control such as rheometers and the interest shown in ISO 9000 are examples of this. What is required is to add to quality control and assurance, measures to upgrade the specification and performance of products, by improving existing products and attempting the manufacture of new products which represent higher value addition.

Examples of product up-grading are the manufacture of hoses for the oil and gas industry or the manufacture of hoses with fittings. But, in each product area there are a set of related products which serve higher value markets which the industry does not currently manufacture.

For instance, whilst the Malaysian industry manufactures a wide array of O-rings and seals, it has not as yet been able to produce an O-ring without a dimple or an indent which would ensure a complete seal. The value of an O-ring that can serve as a seal is several fold that of an ordinary O-ring though its cost of production is only marginally higher.

In the normal course of events, the industry would be forced to improve efficiency and move to higher value products as competition emerges. Manufacturers who failed to take such measures in the face of low cost competition would perish. The danger the Malaysian industry runs in leaving the response to market forces is that with domestic demand increasing and profitability high manufacturers may not have the incentive to respond until emerging competitors start to make major inroads into the market. And, by the time they respond, as a result of new trading relationships having been formed, they may find it difficult to dislodge suppliers in higher value segments.

- Policy Measures

To accelerate the industry's response to emerging competition and rising costs, government has at its disposal two sets of measures:

i.) increase the competitive pressure on the industry though:

- lower import tariffs and hence make imports cheaper;
- encourage small businesses so that they can increase competitive intensity;
- encourage new entrants into the industry.

ii.) incentivise or support Malaysian businesses to undertake the required measures.

We believe that for government policy to be effective it will have to utilise both types of measures. We recognise, however, that the extent to which government can act decisively to increase competition is limited.

Tariffs have already started to be reduced and are low for the main import item (5%). Where they are high as is the case with conveyors and hoses, a compelling case can be made for infant industry protection. With rubber products in the fast track of CEPT, Government has also taken a major step to reduce tariffs.

And it could be argued that government has already put in place programmes to support small businesses and encourage new entrants into the industry through investment incentives. Our view is that tariff reductions should continue progressively, but little would be achieved by accelerating the process. Indeed in the case of products using industrial textiles there is a case for increasing effective protection by lowering import duty.

But there is a case for ensuring that incentives and support to the industry and particularly small businesses are made more effective.

In general, the incentives available for investment, exporting, upgrading technology and diversification and modernising plant and equipment are generous. But many incentives are not taken up by the large number of small and informal enterprises. And, the infrastructure support available to the industry particularly in the form of product development and trouble shooting are not effective.

Addressing the problem of the take up of incentives is largely a question of changing industry's attitude towards authority. In this regard involving MRPMA in providing advice to small businesses on the incentives available and how to obtain them should help to break through the initial distrust of authority. MRPMA claim it does not have the resources to expend on such educational programmes, so joint undertakings between MIDA and MRPMA may be necessary.

- Technological Support

But whilst incentives are a useful way of encouraging the industry to invest and export, major gains in competitiveness require access to technological support in the form of consulting expertise in improving efficiency, developing new compounds and products and trouble shooting. Given the small size of most businesses in the GIRG sector and the rapid pace of change in the industry, such support is even more important in Malaysia than it is in other GIRG industries.

There are two problems which need to be addressed in improving infrastructure support:

i.) the expertise and resources available to the providers of the support will need to be increased;

ii.) ITAF has to be made more accessible to the industry.

The institution with the best facilities available is RRIM. But that institution has other roles to play besides support of the rubber goods industry, has limited resources at its disposal for supporting the rubber product industry and consequently there are limitations in the services and expertise it provides.

We believe that a separation of the activities of RRIM which are concerned with serving the rubber product industry is advisable. These activities should be put into a body which is both responsible to and largely funded by the rubber product industry.

Government contribution to the costs of support services should continue through the ITAF scheme. But processing ITAF applications and initial approval should be done at the new off-shoot of RRIM, with final approval continuing to rest with SIRIM. This will make ITAF far more accessible to the industry and improve its uptake.

- Small Businesses

Small businesses have an important role to play in the development of the GIRG industry:

- though the focus for development will be higher value products the will always be a demand for low cost products.. The low overheads of small businesses make them the most cost-competitive businesses in the sector. They will be able to withstand emerging cost competition better than medium and large businesses;

- they represent flexibility in the sector in their ability to respond quickly to market forces and strength in the form of a large number of businesses, so that individual business failure do not undermine productive capacity significantly;

- they provide the competitive intensity which ensures that there is a continuous impetus towards higher efficiency and value addition.

But small businesses also have weaknesses. Their main weaknesses is that they are not able to undertake compound, product or process development activities.

The new institution created out of RRIM should be incentivised by government with respect to working with small and informal sector businesses. It should receive government sub-vention on each small and informal sector business registered as members and for which it provides services.

- Market Development Support

In addition to improved technical support our survey revealed the need for support in another major discipline, marketing. As a result of enterprises in the GIRG industry being small in world terms their knowledge of markets and particularly export markets and access to marketing expertise was poor.

To help the GIRG industry to exploit opportunities in export markets we believe that initiating a programme of marketing support to GIRG businesses will be important. The programme should cover both domestic and export market as follows:

- **Domestic market** - What is required is to strengthen MRPMA's market intelligence and information dissemination role. The aim should be to build a set of market profiles for each end-use sector and consumer product group indicating trends, market characteristics, distribution channels, and major customers.

- **Export markets** - MATRADE should launch an export market development scheme which would assist individual companies with export market development in priority markets. The scheme should require recipients to contribute to the costs of market research and market development activities.

In the case of the domestic market, there is considerable expertise in Malaysia on IRG and consumer markets and this should be harnessed to carry out market surveys and establish a data base at MRPMA. The data base should include a survey of imports in the other articles of rubber, SITC 629.990, category.

In the case of the export markets, what is required is a scheme such as the one currently in operation for exports of industrial goods from India and which is now being introduced into Poland and other countries of central and Eastern Europe. These schemes provide consultancy assistance for export development. The assistance provided includes the development of a market entry or market development strategy, help with initiating customer contact and follow-up assistance with implementation. They can be made cost effective by buying services in bulk, retaining the expertise of sector specialists and focussing on export sales rather than market planning.

Companies in receipt of such services contribute between 25-50% of the consultancy cost. It is possible to vary the level of assistance based on the size of the company.

If such a scheme cannot be implemented than the alternative of commissioning work to provide profiles of the main markets should be undertaken with the resulting reports distributed widely to the industry.

- Attracting Foreign Interest

Whilst providing incentives and support to the industry will be able to accelerate the development of the industry, if the industry is to take advantage of the strategic opportunity available and become a major supplier to the Asia Pacific region, then Malaysia must succeed in attracting foreign investment. With a small number of years available before major competition emerges, measures to accelerate the development of existing manufacturers may not constitute sufficiently decisive intervention.

The current mobility of capital in the rubber product industry and search for strategic alliances is a major opportunity for the Malaysian industry. But equaly it poses the threat that if investors move to or develop alliancies with competitor countries, the Malaysian industry may find itself at a major competitive disadvantage even if its industry develops rapidly.

It should be recongised tnat in attracting investment from leading international rubber goods manufacturers, Malaysia is not well placed. Many ASEAN countries offer a comparable incentive package to investors, have a lower cost base and offer plentiful labour and larger domestic markets than Malaysia. And, their economic performance is also strong. Already many manufacturers from the more industrialised countries have been tempted to Indonesia and Thailand.

But the Malaysian industry could offer an incentive to foreign industry that its competitors may not be willing or able to match. And, through this hope to attract investors at the expense of competitor industries.

If the Malaysian industry could be persuaded to offer joint ventures and strategic alliances to manufacturers looking to locate in low cost countries or form alliances with lower cost suppliers, it may be sufficient to attract a substantial number of investors to Malaysia. Offering joint-ventures to manufacturers from highly industrialised countries may represent a significant advantage in attracting investors.

Investors are concerned to reduce the risks, time and costs of investment. The Malaysian industry would be offering a ready made vehicle for investment which could reduce the risk, time and expense of establishing green-field operations in a country with which the investor is not familiar.

If Malaysian firms with competent and capable manufacturing operations were to seek joint-venture partners and alliances, the relatively advanced stage of development of the Malaysian industry could also be a source of advantage in attracting investors. With the exception of some parts of the Thai industry, other competitor countries would not match the Malaysian industry in terms of products, expertise and equipment.

With the attraction of forming joint-ventures and alliances, Malaysia's relatively well developed infrastructure, economic and political stability and the presence of large numbers of multinationls may also count for the decision to locate in Malaysia.

If Malaysia is able to attract leading manufacters of rubber products, joint-ventures could help to improve the competitiveness of Malaysia rubber products and to help market them internationally. Such ventures could be the vehicle for providing the know-how to up-grade products and to diversify into higher value products.

The countries which should be targeted for attracting investors are Japan, Korea and Taiwan and the USA followed by Germany, Italy and the UK. The manufacturers from the three highly developed Far East nations are obvious candidates but US and European manufacturers may also be interested in coming to Malaysia to position themselves in the Asia Pacific market.

The key to the success of this strategy lies in mobilising Malaysian industry. It is vital to the success of this strand of strategy that sufficient numbers of competent and competitive Malaysian manufacturers are willing to form strategic alliances with foreign manufacturers.

In mobilising the industry, in addition to presenting a persuasive case for the potential benefits of the strategy it may be useful also to point to the success of the MARDEC group which has established a number of world class operations through joint-ventures and alliances.

Mobilisation of investors is an activity that MIDA is well placed to carry out for the industry. They have a strong track record of investor mobilisation and a network of offices worldwide.

Action Plan

XII Summary of Action Plan

Introduction

Much of the responsibility for implementing the strategy outlined in section XI rests with industry. In the Malaysian context, Government's role should be enabling, bringing about changes to policies, the institutional framework and initiating programmes that would pump-prime initiatives that the industry itself recognises it must undertake.

Such a role is in keeping with the Government's wider policy framework and the methods it has chosen to bring about industrial development. It recognises also the considerable progress that the industrial and general rubber goods industry has made in recent years and its willingness and ability to invest in its future.

In this respect, the first steps to enable industry to respond to opportunities and counter threats have already been taken by MIDA and MRRDB. By disseminating, through the workshop held in September 1993, our findings on prospects, opportunities and threats to industry, MIDA and MRRDB have started the process of alerting industry to the challenges ahead.

The response of Malaysian businesses present at the September seminar highlights the importance of the dissemination of such information and the key actions which will enable them to respond effectively to opportunities and threats. A large proportion of the businesses present sought technical and marketing assistance from the consulting team through the company clinics MIDA organised. A number also requested assistance in identifying potential foreign partners for alliances and joint-ventures.

Overview

The Action Plan we have developed will provide on a long-term basis the means for Malaysian businesses to respond to opportunities and threats and thus enable them to implement the strategy proposed. It consists of three major programmes which will bring about decisive changes in the industry's ability to compete as well as a set of other recommendations which will help incentivise and/or pump-prime industry to move in the direction required. In broad summary the Action Plan is as follows:

Major Programmes

Technology Centre

Strengthen the technical support available to the industrial and general rubber goods industry by creating, with the help of the RRIM, an institution able to provide comprehensive technical development services to the rubber product industry. The institution would provide problem solving and product/process development and technology transfer services to Malaysian manufacturers which would enable them to improve efficiency, upgrade products and take advantage of opportunities to manufacture new, higher value products.

As part of its support to the rubber products industry, - including parts of the industry not covered by our study - the Government would contribute to establishment and initial operating costs thus incentivising Malaysian manufacturers to improve efficiency and products. Over a period of 3 years, Government support would gradually be reduced and the institution transformed from an self-accounting entity within RRIM to an independent product development association.

As the technology centre is likely to take time to establish, in the short-term commission consultants to provide problem solving and technology transfer services.

Export Market Development

To launch an export market development programme which would enable Malaysian manufacturers to strengthen their position in existing markets, capture higher value markets and/or diversify geographically.

The programme, to be launched through the Malaysian External Trade Centre (MATRADE), would provide consultancy assistance for export development in priority markets at subsidised rates.

Alliances, Joint Ventures and Investor Promotion

Assist Malaysian manufacturers identify foreign partners for alliances and joint ventures and promote interest amongst leading world industrial and general rubber goods manufacturers to locate in Malaysia.

The programme, to be launched by MIDA, would have both a company specific element in identifying suitable foreign partners as well as a general investor promotion component.

Other Recommendations

Underdeveloped Product Areas

Closed cell sponge and oil related products represent a natural diversification for the Malaysian industry. These are high value products, the markets for which are growing in Malaysia and within the Asia-Pacific region. The short-term technical support programme for industry should include advice to Malaysian manufacturers on the technology of manufacture.

For calendered sheet and products of calendered sheet and adhesive tape, although Malaysian and neighbouring country markets are growing, investment requirements are high and here are doubts over viability. We recommend commissioning feasibility studies.

The feasibility studies would be carried out by specialist consultants under MIDA's guidance and direction.

Import Substitution

Launch a programme to identify and exploit import substitution opportunities. This would call for detailed analysis of the over M$250 million of industrial and consumer rubber goods currently imported into Malaysia, the dissemination of information to industry on opportunities identified and the launch of vendor development programmes to ensure competitive products are manufactured locally to meet customer requirements.

The work on identifying opportunities would be carried out by consultants commissioned by MIDA, disseminating information would be carried out by MIDA with the help of MRPMA and RRIM, whereas the vendor development component should be incorporated in the Ministry of International Trade and Industry's (MITI) vendor development programme for small and medium sized businesses.

Policies and Incentives

MIDA to prepare a position paper on reducing tariffs on inputs with high tariff protection - industrial textiles and carbon black. MIDA with MRPMA to examine wider dissemination of information on incentives to increase up-take particularly amongst small businesses..

The Action Plan is designed to overcome the limitations imposed upon Malaysian manufacturers by their small size and the relatively recent development of the industry. The small size of most Malaysian industrial and general rubber goods manufacturers, whilst providing the advantages of lower overheads and structural resilience to downturns, limits their ability to support in-house technical development and undertake export development. The relatively recent development of the industry means that in the vital area of product and process technology Malaysian manufacturers need to catch up with their older established rivals in more industrialised countries.

With the implementation of the Action Plan, Malaysian manufacturers should begin to catch up with their more advanced rivals and so exploit more fully their relative factor cost advantages. At the same time, it should enable them to remain ahead in terms of corporate capability of their rivals in countries with lower factor cost - particularly manufacturers in Malaysia's main competitors, Thailand and Indonesia.

Timing

The speed with which these actions can be implemented differs widely. Work on identifying foreign partners for alliances and joint-ventures and investor promotion, the commissioning of consultants to provide short-term technical support, analysing import substitution opportunities and launching vendor development programmes, feasibility studies on underdeveloped product areas and examining tariffs and improving access to incentives can be started immediately with a view to implementation within nine months.

But in the case of two of the major programmes, whilst early actions are required to commence the process of creating the new Technology Centre and to put in place the structure and delivery mechanisms of the export market development programme, actual implementation is likely to take

Figure 1 - Timing of Key Steps in the Action Plan

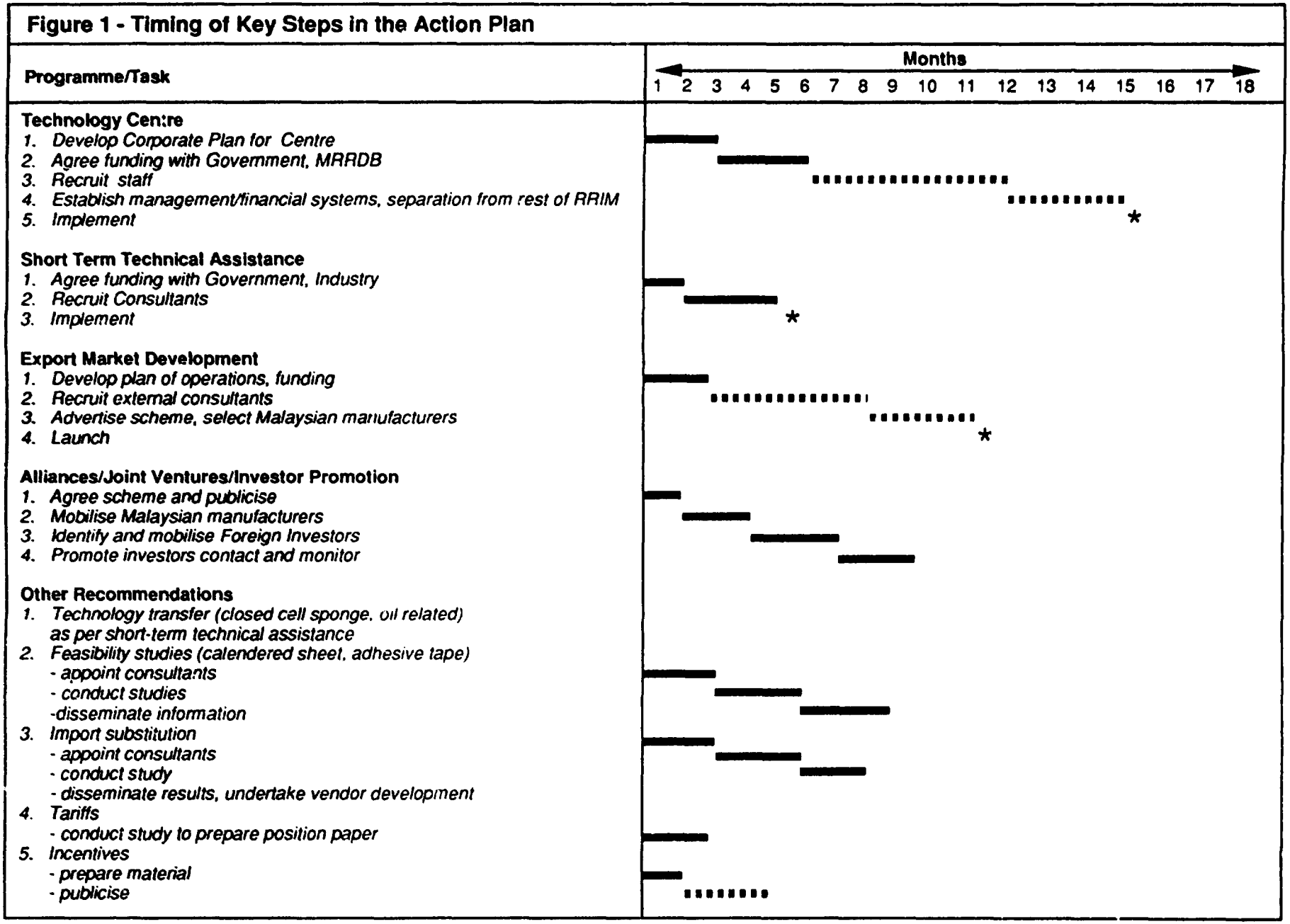


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Figure 1 - Timing of Key Steps in the Action Plan

Programme/Task	Months 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
Technology Centre	
1. *Develop Corporate Plan for Centre*	
2. *Agree funding with Government, MRRDB*	
3. *Recruit staff*	
4. *Establish management/financial systems, separation from rest of RRIM*	
5. *Implement*	
Short Term Technical Assistance	
1. *Agree funding with Government, Industry*	
2. *Recruit Consultants*	
3. *Implement*	
Export Market Development	
1. *Develop plan of operations, funding*	
2. *Recruit external consultants*	
3. *Advertise scheme, select Malaysian manufacturers*	
4. *Launch*	
Alliances/Joint Ventures/Investor Promotion	
1. *Agree scheme and publicise*	
2. *Mobilise Malaysian manufacturers*	
3. *Identify and mobilise Foreign Investors*	
4. *Promote investors contact and monitor*	
Other Recommendations	
1. *Technology transfer (closed cell sponge, oil related) as per short-term technical assistance*	
2. *Feasibility studies (calendered sheet, adhesive tape)*	
- *appoint consultants*	
- *conduct studies*	
-*disseminate information*	
3. *Import substitution*	
- *appoint consultants*	
- *conduct study*	
- *disseminate results, undertake vendor development*	
4. *Tariffs*	
- *conduct study to prepare position paper*	
5. *Incentives*	
- *prepare material*	
- *publicise*	

longer. We estimate that the export development programme is unlikely to be implemented in a period of less than twelve months whereas the new Technology Centre is likely to take upwards of 16 months to establish.

The timing of the key steps required to implement the Action Pian are shown schematically in figure 54 facing.

Costs

The major items of cost are the creation of the new Technology Centre, short-term technical assistance, the export market development programme and the commissioning of feasibility and import substitution studies. The other recommendations can be considered part of the ongoing functions of the work of MIDA, MITI and MRPMA as follows:

MIDA	-	identification of foreign partners/investor promotion, analysis of tariffs on imports, improving access to incentives.
MITI	-	vendor development programme for small and medium size industries (SMIs).
MRPMA	-	dissemination of information on incentives and opportunities.

Figure 55 below sets out our estimates of the costs of establishing and operating the new Technology Centre, providing short-term technical assistance, the export market development programme and to commission feasibility and import substitution studies. The figure only presents cost to Government. It should be noted that industry is expected to contribute to the Technology Centre, to short-term technical assistance and the Export Market Development Programme.

The principle which has guided us in allocating costs between Government and industry is that Government as enabler should bear the costs of establishing new institutions and programmes. But when they have been established, it is up to industry as the main beneficiary to progressively pay for their running costs.

The costs set out in figure 55, for the Export Market Development Programme and Technology Centre cover 3 years. After that these programmes are expected to become self supporting. In the case of the technical support institution, support from Government continues beyond this period but this is mainly indirect assistance, given in the form of the Industrial Technical Assistance Fund (ITAF) which is available to all Malaysian industries and hence is not considered a cost of the Action Plan.

Cost of Action Plan	
1. Technology Centre	
- capital cost	130
- operating costs over 3 years	550
	680
2. Short-term Technical Assistance	100
3. Export Market Development	
- establishment cost	150
- operating costs over 3 years	2,325
	2,475
4. Feasibility studies @ M$100k each	200
5. Import Substitution Study	50
Total	**3,505**

figure 55

The contribution required from Government is MS3.5 million. This is a comparatively modest sums because much of the infrastructure required is already in place. RRIM has already purchased much of the equipment required to run the Technology Centre and MATRADE is about to obtain the manpower and administrative infrastructure required to operate the export market development programme.

Cost/Benefit Evaluation

To measure the benefits from implementing the Action Plan we have projected the expected path of growth of the industry, with and without the measures proposed. These projections are by their nature, uncertain as they are based on assumptions of future economic growth and industry capability which may not be realised.

Nevertheless, they seek to illustrate the way the Action Plan is likely to impact upon the growth of the industry and the type of incremental gains possible from its implementation. We have focused on its likely impact on three key measures of performance - output, rubber consumption and exports.

The main impact of the Action Plan would be to increase output and hence rubber consumption through a combination of higher exports, sales to the domestic market and lower imports. But the value of output is expected to show a greater proportionate increase than rubber consumption. The Plan is designed to increase value added and its effect is likely to raise the value of output per tonne of rubber consumed.

Employment is not likely to be affected greatly. Increased levels of output are not likely to result in higher levels of employment because of gains in labour productivity.

Based on our estimates, without the Action Plan output is expected to increase by about 8.5% to the year 2002 reaching a value of MS810 million. This is a lower rate of growth than achieved by the industry during the 1980-92 period and reflects the growing maturity of the Malaysian industry. With the Action Plan, growth is likely to be higher by 10%.

Without the Action Plan, exports are likely to reach a value of MS440 million by 2002. Export growth is expected to continue at a high rate of 10% per annum but then slow, as competition in world markets intensifies. With the Action Plan they are likely to be higher by 11%

Rubber consumption is expected to increase from the current level of nearly 45 thousand tonnes to 88 thousand tonnes by 1992, average growth of nearly 7% p.a.. Rubber consumption would be 8% higher with the Action Plan with much of the growth coming in the form of higher SR consumption.

The Plan is likely to make a significant contribution to the growth of the industry. But even with the Plan it is likely that industrial and general rubber goods industry will remain smaller than the latex and tyre industries and roughly half the size of Taiwan's non-latex GRG industry.

It should be noted that the assumptions on which incremental gains have been calculated are relatively modest. Much higher benefits could be realised.

The purpose of our projections has been to show the cost effectiveness to Government of the measures proposed. Returns to each measure, with the most pessimistic assumptions of success, are nevertheless high.

If we were to use more optimistic scenario's of success then the Plan could result in making Malaysia into a major force in the market for industrial and general rubber goods in the Asia Pacific Region. Industry output could well exceed MS1 billion by 2002 and rubber consumption 110 thousand tonnes.

We have been asked to comment whether in our view the effort and costs associated with the Action Plan are justified in the Malaysian context. Whilst we are in no position to evaluate the relative merits of the Action Plan against competing calls from other sectors of industry we can make two observations, both of which support the case for implementing the Action Plan:

XIII Technology Support

Rationale

A key finding of the diagnostic we carried out of the Malaysian industrial and general rubber goods industry was that as a result of small size and/or relatively recent exposure to the manufacture of technically demanding products, many manufacturers required access to external technological support. And, whilst the MRRDB through the RRIM had attempted to provide for this need, lack of resources had prevented it from providing the full range of services required.

In addition, despite Government subsidising the use of consultancy services through ITAF, the provision of services by private sector consultants remained confined to a few individuals. Our research showed that it was not the cost but the lack of suitable services which was the main impediment to accessing adequate technological support.

In the context of the future development of the industrial and general rubber goods industry access to effective technological support will be of strategic importance. Over the next decade, the industry must increase value added to cope with rising labour and other factor costs and this will require improving the specification and performance of its products and becoming more efficient. Moreover, growth areas of demand will be for higher specification and more technically demanding products. If the industry is to rise to these challenges, it will require access to high quality technology support.

These remarks should not take away from the achievements of the Malaysian industry in developing capability. It is important to recall that there are some 30 manufacturing companies in Malaysia which have been classed as ranging from world class to good domestic producers of industrial and consumer rubber products. However the products in which they succeed are - with few exceptions - relatively simple and predominantly based on natural rubber.

Whilst such firms are undoubtedly well able to continue to develop within their existing product range, most of them lack the technology resources/skills necessary to exploit some of the higher added value business which already exists and, which can be expected to develop further with the growth of the Malaysian economy and with greater penetration of export markets.

Therefore the extent to which the local industry will be able to respond to domestic demand and to expand its overseas sales will depend on its ability to overcome a number of technological constraints. Some of these are long established and will need to be addressed by an intensive short term programme of training and consultancy. However continuous development growth is likely to be inhibited unless the industry has access to a sound, technological resource dedicated to its needs.

Moreover, although technology is not changing dramatically, the manner in which the industry works internationally to fulfil customer needs is undergoing fundamental change. Malaysian businesses will need to keep pace with these changes.

Visitors attending a major international Rubber Industry exhibition after an absence of some years would perceive little which would surprise them. Indeed at first sight they would conclude that little had changed. State of the art today is little different from that of recent times.

On the material side they would certainly find new variants of synthetic elastomers and would see some upward movement in the performance characteristics of natural rubber. They would note the extent to which Thermoplastic Elastomers have eroded some of the market for thermosetting rubbers - but not to the extent that had once been expected.

Their tour of the machinery halls would certainly reveal a significant upgrading of the controls on rubber processing machinery. They would note also some interesting technical developments particularly in injection moulding. They would however conclude that there were no revolutionary changes in any of the branches of the rubber industry.

Visitors would however be much more impressed by the manner in which the industry has evolved in the past ten years. They would note the following characteristics of the modern general rubber goods industry.

- The closeness of interaction between the three strands of the GIRG industry - the polymer supplier, the converter and the end-user. The latter in particular now has a much closer understanding of rubber and is able to participate much more closely in the design of the products and the specifications of the elastomer and in the characteristics of the compound.

- The progressive drive in all key end use sectors for quality and consistency - and the extent to which the rubber product industry is responding. Led by automotive manufacturers, introduction of their own quality standards, other users are increasingly demanding their suppliers to work at least to ISO 9000.

- A slow, but perceptibly accelerating movement towards tighter manufacturing procedures. World class producers are now using Statistical Process Control and other systems to ensure consistent quality and tight economic control.

- The increasing role played by automation and material handling as an aid to competitiveness, wherever scale and types of operation permit.

- The need to take account of environmental issues raised by Governments, pressure groups Companies' manufacturing operations are constrained by legislation such as the Environment Protection Acts in the UK. More recently, they find themselves under pressure from their customers to demonstrate that they have live Environmental Management Policies and new standards - similar to ISO 9000 - have been developed. Increasingly end users will seek to minimise their use of materials which cannot readily be recycled - a factor which may add renewed stimulus to the use of Thermoplastic Elastomers.

At the end of his tour of the industry, the visitor would conclude that competitiveness in the world's rubber product industry is now much more dependent on doing all things well and a constant awareness of small changes rather than on the quest for major changes in technology.

The Malaysian rubber product industry will clearly need to follow these trends. Indeed most of the world class companies identified in the First Interim Report are already moving in that direction.

However, as we show elsewhere in that report there is a general lack of awareness of these developments amongst many firms in Malaysia. Some may take the view they are of little relevance to them if they merely serve the domestic market. This is not the case.

Many domestic customers for industrial rubber products are exporters and they will certainly be moving ever closer to practices in developed countries. They will expect their suppliers to do likewise.

The maintenance of any form of competitive edge will also hinge on the ability to exploit best practice and cost reductions through automation. The creation of an awareness of this, the provision of appropriate training and the development of assistance programmes for implementation is required to help Malaysian industry to improve its competitiveness.

This perceived need has given rise to the recommendation that some form of initiative be undertaken to enhance the technological support to the industry. In this section we consider :

- The problems within the Malaysian rubber product industry and the consequent strategic requirements and short term needs of the industry;
- The types of institution that could be created, their organisation, staffing, other resource requirements and financial implications;
- A more regional approach - involving the possible development of an ASEAN centre for rubber technology.

We conclude with recommendations for future actions.

The Situation in Malaysia

Problems and Implications

Essentially we have identified the following problems in many Malaysian rubber product companies:

i.) A lack of experience in synthetic rubber;
ii.) Insufficient knowledge/experience of processing technology;
iii.) A general lack of capability for product development and process innovation;
iv.) Insufficient technologists with factory experience.

These issues are examined in the following paragraphs in the context of the symptoms and their implications for future development of the industry.

A lack of experience in synthetic rubber

- Symptoms

- *Currently some 85 % of rubber consumption is in the form of natural rubber; by contrast in developed countries NR accounts for significantly less that 50% of rubber consumed for industrial rubber products.*

- *Synthetic materials are relatively new to Malaysia since it is only within the past 6 years or so that such polymers have begun to be used in any significant quantities.*

- *A very significant proportion of the enquiries arising during the clinics run by Rapra as part of this project were concerned with very basic questions concerning the properties and processability of synthetic rubbers.*

- Implications

- *The level of enquiries about synthetic rubbers suggests that there is a demand for products based on these materials which companies are having difficulty in fulfilling.*

- *Without this experience and background it will continue to be difficult for rubber product companies to enter some of the more advanced markets we indicated in our First Interim Report.*

Insufficient knowledge/experience of processing technology

- Symptoms

- *A high level of scrap and waste*
- *High manning levels*
- *General levels of plant inefficiencies*
- *Concentration on simple processes and technologies.*

- Implications

- *Higher than necessary costs*
- *Difficulties in introduction of new technologies*

A general lack of capability for product development and process innovation

- Symptoms

- *Few companies have any form of development laboratory*
- *Little evidence of any innovation even amongst good domestic and threshold companies*

- Implications

- *Restriction on ability to respond to demand for greater variety of products arising out of increase of end use sectors*
- *Greater imports of - especially - higher added value products.*

Insufficient Technologists with Factory Experience

- Symptoms

- *General lack of professional people*
- *Readiness to poach technologists from organisations such as RRIM*

- Implications

- *Difficulty in achieving innovation of product and process*
- *Problems of finding suitable people for new businesses.*

Requirements of Malaysian Industry

As already noted the continuous growth and development of the industrial and general rubber goods industry will call for a structured form of technological support. The character of the requirement depends on both the technologies used and the nature of the market which different components of the industry serve. In the following figure we consider and attempt to rank in terms of likely uses of technology support the various sub-sectors within the Malaysian industrial and general rubber goods industry.

Future Requirements of Rubber Industry Sectors Under Study		
Rank	**Type of Activity**	**Requirement for Technological Support**
High	GIRG - industrial rubber goods - components and new products serving OEMs and other demanding industrial users	This is the sector which can reasonably expect to have greatest level of innovative activity and would be likely to place the most frequent demand on central technical support. As the diversity of industrial activity increases so will the need to participate in product innovation and to ensure that efficient processes are used to convert the most appropriate materials for a given use. The requirement will be for a wide range of skills including: • rubber engineering • rubber chemistry and materials • process/production engineering
Modest	Masterbatch and Compounds	With increasing use of synthetic rubbers companies involved in this area are likely to be increasingly concerned with: • rubber chemistry and materials • process/production engineering
Low	IRG products serving construction and replacement segments.	There is less innovative activity in this area. Products tend to be standardised, there is a much lower level of synthetic rubber usage. Companies in this sector are more likely therefore to require assistance in simple compound development and very occasional problem solving. Whilst it is possible that there could be a small, but sporadic requirement for rubber engineering support the predominant requirement is likely to be for: • rubber chemistry and materials and • to a lesser extent process/production engineering.
Low	Consumer goods	As in the case of the construction industry there is only a modest level of technological innovation. New products are more the result of new product (aesthetic) design than the result of fundamental changes of technology . Also, this sub-sector has the highest presence of foreign companies which provides it with technological support from outside Malaysia. The requirement for technological support is therefore more likely to be concentrated around the manufacturing process and compound development. The requirement is therefore likely to be focussed around: • rubber chemistry and materials • process/production engineering

Note: In all of the above cases there may be a commensurate requirement for experimental work, testing and analysis. *figure 56*

In addition to providing for the requirements of the industrial and general rubber goods industry itself, consideration of the requirement for technology support has to take account of the potential needs of other parts of the rubber product industry and the end-users themselves, who may want assistance in developing new product specifications and in designing product to meet new applications. These are examined in figure 57.

Future Requirements of End Users and other Rubber Product Industries		
Rank	**Type of Activity**	**Requirement for Technological Support**
Modest/ Rising	The End Use Sector	A significant portion - some 60% of the consultancy effort undertaken by Rapra Technology's rubber consultants is in assisting industrial end-users in product development and failure diagnosis. The gradual widening of the diversity of end uses in Malaysia is likely to stimulate some demand for similar services. The requirement will be for: • rubber engineering • rubber chemistry and materials Resources for testing will be an increasing necessity.
Low	The OE Tyre Industry	This is the most advanced sector of the industry. The sector is setting up its own technology centre and is therefore unlikely to require any additional technological support.
Low	The Retread Industry	Experience suggests that the predominant part of this sector uses basic technology with little if any requirement for technology support. Increasing standards and safety requirements will give rise to higher levels of quality control and a central testing facility is likely to be required.
Low	Rubber Footwear	This is not an innovative sector of the industry and it's requirement for technology support is likely to be the occasional need for assistance with compound development. The requirement in this sector will therefore be for support in: • rubber chemistry and materials • process technology
Low	Materials Suppliers	From time to time synthetic materials suppliers do require some technical support - usually in the area of compound development. In the current and anticipated absence of any synthetic rubber production in Malaysia this requirement is likely to be only minimal. However, the availability of a rubber product technology centre might stimulate a small demand for assistance from SR manufacturers supplying into the country.

figure 57

A notable omission from the above list is the latex industry. The technology used by that branch of the rubber industry is not closely related to that used for solid rubber goods. And much of the latex industry is in any case not likely to require much technical assistance either because the technology used is stable or because firms will have access to the resources of foreign parents. We have therefore not provided for demand for technology support from that part of the industry.

Role and Services

The requirements outlined above can be summarised under four activity headings:

- Problem Solving

- *On site trouble shooting - undertaken by a consultant visiting the company on one or more occasion during which the causes are diagnosed and on the spot advice is given to the technologists. This is the simplest form of activity and is usually associated with some aspects of the company's production process/compound.*
- *The above plus laboratory investigations involving testing and analysis.*

- Product/process development

- *On site or office discussions during which the scope of the development is identified and consultancy is offered.*
- *Prototype development and evaluation may take place either in the consultants' facilities or on the company's own equipment.*

- Technology transfer

- *Passive and pro-active provision of information on developments in materials and process technology through in-house and outsourced publications - requiring access to data bases and other sources*
- *Pro-active work on a multiclient basis addressing specific technological issues on a pre-competitive basis.*
- *Symposia, seminars and courses conducted by in-house or visiting experts.*

Meeting Malaysian Requirements

To meet the industry's requirements and to provide the range of services outlined above call for the following skills and resources:

- Skills

  It will have been noted that the individual areas of demand involve a requirement for one or more of the following skills:

  i.) process/production engineering;
  ii.) rubber engineering/product development;
  iii.) rubber chemistry and materials.

  This is based on Rapra Technology's experience. Whilst an initial training in polymer technology is sound basis for all three types of consultancy - relevant industrial and specialised experience is very important - especially in the areas of process and rubber engineering. In addition the centre would need skills in information/data handling. Ideally therefore a technology centre dedicated to the service of the rubber product industry should be able to offer all four capabilities - almost certainly at degree level.

It would be rare - especially in a relatively new industry to find any single individual with expertise in more than one of these areas . A fully staffed centre would therefore need one each of these bringing the ideal manning level to four.

- Resources

  It will also have been noted that these skills require easy and prompt access to:

  i.) facilities for compounding and processing of rubber with technicians to operate them;
  ii.) testing and analytical laboratories with appropriate staffing of technologists;
  iii.) information resources - libraries, data and knowledge bases.

The Options

In determining the shape of the technology support institution appropriate for the Malaysian rubber product industry, the first consideration is the types of skills and resources it would have in-house and those it would access from external sources. An important distinction in this respect can be drawn between institutions *with* and *without* their own hardware resources - compounding and processing facilities and testing and analysis laboratories - resulting in three options:

- **Option I - *The One Stop Shop***

  This option provides for an independent consultancy resource with capabilities in all major skill areas with access to information sources. But the institution would not have its own hardware facilities and would have to contract out or buy in services which require the use of hardware. The institution would be able to provide a comprehensive range of expertise and services to its customers - hence serving as a One Stop Shop - even if it has to buy in some services.

- **Option II - *A Technology Centre Attached to RRIM (GIRG Tec)***

  The centre would comprise the four man consultancy team outlined above under One Stop Shop, and would access hardware resources from the rest of the organisation. Clearly, the RRIM with its existing technology centre and extensive hardware facilities would be the ideal organisation to develop a full fledged technology centre. All that would be required is to reinforce the capabilities of RRIM's existing Technical Consultancy and Advisory Unit.

- **Option III - *An Independent Technology Centre***

  This would comprise the four man consultancy team described above but would also have its own hardware facilities in-house and the technicians required to operate them. The centre would be independent of any other agency.

Each of the options represents trade-offs in the range of services provided in-house, and has varying cost and funding implications. These are described in the sections below.

Operational Implications

Each of the three options would have different operational characteristics. We examine below the operational characteristics of each.

■ **One Stop Shop (relying on other centres in Malaysia and elsewhere for all services)**

- Consultancy Team

  It is Rapra's opinion that, given the diversity of the problems likely to confront any provider of technology support the consultancy team should comprise one Manager plus three professional people with appropriate clerical support.

  The choice of the right professionals with the right balance of skills would be very important and it is very probable that appointees would require training. A key characteristic of such consultants is a strong motivation to deal with a diversity of technical problems.

  Rapra's experience - and indeed that of other Research and Technical Organisations - suggests that such people are likely not only to offer a better quality of service but, provided there is a steady flow of interesting work, are not predisposed to be interested in working on routine problems within individual companies -(thereby overcoming one of the industry's anxieties about the mobility from centres of excellence to competitors). Notwithstanding such motivation salaries and benefits would need to approach those paid by industry.

The structure of the team is shown below. The Managing Consultant would clearly be active and could specialise in one or other of the areas.

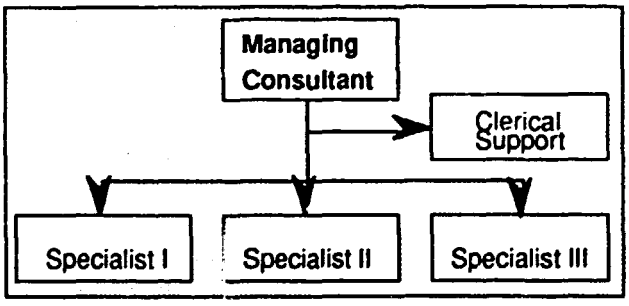

figure 58

- Location

  The team would spend much of its time either on client's sites or with supporting organisations. It could theoretically operate from any location - however there are sound technological and project management reasons for the team to be located in proximity to a provider of hardware based support.

- Resources
  In addition to the normal facilities of a free standing office, the unit would require excellent telecommunication and data management equipment. The need for mobility would also call for the centre to have its own transport resources.

- Running Requirements
  It would need to subscribe to a large number of data bases and staff would need to be able to attend international conferences. It would need to establish commercial links with providers of hardware based support so that they have access to a responsive, cost-effective service.

■ **GIRG Tec - Attached to RRIM**

The basic resource - a consultancy team - would be similar to that described under the One Stop Shop option. The team would be located at RRIM and would represent a strengthened form of the existing Technical Consultancy and Advisory Unit. The resources in terms of telecommunication and data management equipment would be as per the One Stop Shop and the centre would also require access to data bases and for its staff to attend international conferences.

The main difference to the One Stop Shop would be that it would have access to RRIM's hardware resources. To ensure that it receives prompt and efficient service from RRIM the centre would have to negotiate internal prices for the provision of RRIM services and the level of priority it's work would have over other RRIM projects and services. If suitable arrangements can be made for accessing RRIM's hardware services, in operational terms this is an attractive option for the following reasons:

- *a direct link would exist between the laboratories and the consultants -thereby facilitating project management;*

- *consultants not engaged on project work would be able to participate in the R&D activities of RRIM which would benefit from growing experience with synthetic rubber and the end use sectors;*

- *the option would be the easiest to implement.*

To be effective however and to overcome some of industries concerns about the use of the RRIM - (real or imaginary) it would be necessary to:

- *set up the Consultancy as an entirely independent Profit Centre with its own targets. It should have independence of resources and freedom to allocate resources as it thought fit. The GIRG industry must be represented on its management.*

- *address the need to accommodate industrial level salaries/rewards;*

- *ensure that the day to day needs of the rubber product industry always take priority over any RRIM project work.*

■ **Independent Centre (with minimum technical resources)**

- Consultancy Team

The basic structure of the team in the One Stop Shop would remain. It would however need to be supplemented by two technicians to work in the laboratory as shown in figure 69:

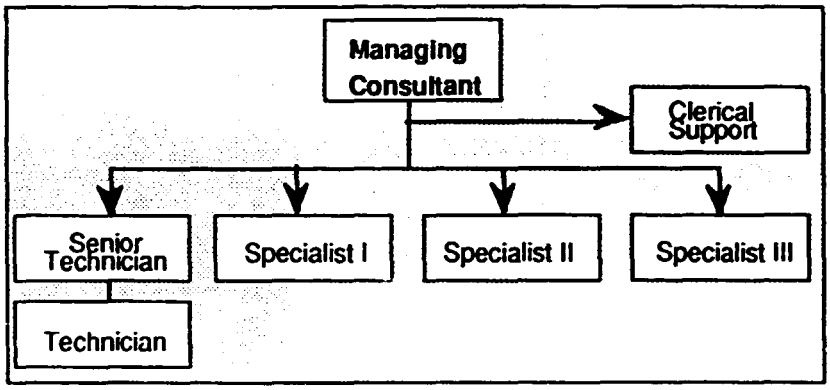

figure 59

- Laboratory

In Rapra's opinion the minimum equipment to which consultants would require ready access would comprise:

Mixing plant - *a small Banbury plus a two roll mill;*
A press - *preferably two or more daylight plus simple tools;*
Testing Equipment - *rheometer, balances, tensometer and hand held hardness tester;*

The total installed cost of this would be of the order of M$1 million.

- Location and Other Resources

These would be similar to those indicated for a One Stop Shop.

Operational Costs

We have assumed that the Consultancy team would build up as shown in the following table:

Build Up of Consultancy Team	Year 1	Year 2	Year 3
Consultant Years	2.5	3.5	4
Available Resource *	310	440	500

figure 60

** This assumes 250 effective working days a year allowing for weekends, national holidays, leave and sickness and that some 50% of the time available is used for consultancy work.*

On this basis we estimate that the establishment and operational costs (excluding expenses associated with the conduct of individual projects) would be as shown in figures 61 and 62, overleaf:

Establishment and Operational Costs for One Stop Shop - M$ '000					
	Year				
	1	2	3	4	5
Capital Costs					
Equipment	50	10	10	10	10
Cars	80	-	-	-	-
Sub-total	130	10	10	10	10
Operational Costs					
Staff					
Managing Consultant	120	120	120	120	120
Consultants	200	280	320	320	320
Clerical	30	30	30	30	30
Sub-total	350	430	470	470	470
Other expenses					
Cars	20	20	20	20	20
Rent, local taxes, telecommunications	100	100	100	100	100
Sundry: policy travel, subscriptions etc	80	80	80	80	80
Total Cost	680	640	680	680	680

figure 61

These are broad brush estimates which no doubt could be revised with further study. The principle we have used in determining salaries for the consultants, is to allow the institution to either source individuals of the highest calibre in Malaysia or a mix of local and international recruitement. The salary levels shown would be sufficient for instance to hire one or two expatriates along with Malaysian staff.

We estimate that the operation of the GIRG Tec under the aegis of the RRIM would be at a similar level - although some savings would possibly arise in the area of rent etc if the centre was located at RRIM. However the costs of setting up an entirely new centre with its own equipment would be significantly higher (figure 62 overleaf).

Establishment and Operational Costs for Independent Centre - M$ '000					
	Year				
	1	2	3	4	5
Capital Costs					
Equipment	1000	10	10	10	10
Cars	80	-	-	-	-
Sub-total	1080	10	10	10	10
Operational Costs					
Staff					
Managing Consultant	120	120	120	120	120
Consultants	250	280	320	320	320
Clerical	30	30	30	30	30
2 Technicians - one in 1st year	40	80	80	80	80
Sub-total	390	510	550	550	550
Other expenses					
Cars	20	20	20	20	20
Rent, local taxes, telecommunications	100	100	100	100	100
Sundry: policy travel, subscriptions etc	80	80	80	80	80
Total Cost	1670	720	760	760	760

figure 62

Meeting The Cost - Industrial Usage

Whichever option is selected the costs of operating the unit will be high. Significant start up costs would be involved and whilst the build up of the resource can be phased to some degree it must be able to offer a comprehensive service within a relatively short time if it is to achieve any level of credibility.

The fundamental question therefore is whether this form of activity could eventually become economically viable in its own right. - ie whether industry would be willing to pay the full economic rate for the operation of a resource of this type. Clearly the higher the utilisation the lower the unit costs. To be viable therefore the unit will need to be well utilised.

There are essentially six sources of potential income from industry:

i.) Problem solving for individual companies;

ii.) Prototype development;

iii.) The generation of information products and/or dissemination of such products generated by other sources;

iv.) Technology Transfer through symposia, seminars and courses;

v.) Multiclient projects.

In principle therefore there is a good diversity of business to go for. However it is essential to recognise the overall customer base is relatively small - in the sections on industry's requirements we have identified a diversity of companies which might *at some time or other* use one or other of the consultancy facilities. In the sections below we have attempted to quantify the amount of services industry as a whole is likely to buy from a technology support institution.

Problem Solving

On the basis of Rapra experience we have built up the following utilisation profile based on the current structure of the industry:

Potential Consultancy Utilisation of a Technology Centre in 1994/95

Source Sector	Nº of Firms	Projects/ firm/year	Days/ Project	Total estimated requirement	
				Consultancy	Laboratory
GIRG Industrial OEM	20-30	0.67	5	50-80	15-20
Masterbatch & Compounds	26	0.5	3	10	30
GIRG Industrial - Sundry	40-30	0.5	3	15-10	45-35
Consumer Sector	34	0.25	3	5	20
End-Use Sector	10	0.5	5	40	10
Materials Suppliers				5	10
Others				10	20
Total				135-160	150-145

figure 63

These figures suggest that a newly formed centre could - given good marketing - build up quite quickly to a utilisation of approximately 135 consultant days. Recalling that we have allowed for a resource of 2 to 2.5 consultants in the first year of operation this would amount to a consultancy work load of approximately 1 day per week for each consultant. There is therefore a perceived gap of at least 1 to 1.5 consultant days per week or a total of 150 days per annum. This would need to be addressed with other activities - see below.

It is noteworthy that on this model there is a quite rapid build up of utilisation of laboratory services. It is reasonable however to assume that the work will build up rapidly for three reasons:

i.) The general need to upgrade and develop new products by the sector serving demanding industrial customers/products.

ii.) The growth of the industry itself is likely to give rise to an increased volume of work - although growth in volume is not as important an indicator as the level of technology being used and to some extent the number of companies active in the area.

iii.) A growing and more diversified industrial sector will generate enquiries and requests for assistance.

The following model of the situation in say 5 years time is thought to be not unreasonable.

Potential Consultancy Utilisation of a Technology Centre in 1998/99					
Source Sector	Nº of Firms	Projects/ firm/year	Days/ Project	Total estimated requirement	
				Consultancy	Laboratory
GIRG Industrial OEM	30-40	1.0	5	120-160	30-40
Masterbatch & Compounds	26	0.5	3	10	30
GIRG Industrial - Sundry	40-30	0.5	3	15-10	45-35
Consumer Sector	40	0.25	3	10	20
End-Use Sector	20	1.0	5	80	20
Materials Suppliers				10	20
Others				10	20
Total				**255-290**	**185-185**

figure 64

This would represent a virtual doubling of the requirement for consultancy but a somewhat lower increase in the volume of laboratory work. Clearly these are only indicative numbers but they suggest that the overall work load per consultant - of whom there would be 4 by then would have risen to about 1.5 days per week. The demand for laboratory work will have risen rather more slowly. Nevertheless there is a still a high under-utilisation of a, by above definition, highly professional team and other sources of income will be needed.

Other Sources of Income

There is little doubt that on an ongoing basis there will be scope for the conduct of seminars, the preparation of reports etc. It is not unreasonable to assume therefore that the make-up of activities could evolve as follows:

	Year 1	Year 5
Additional Activities	25	50
Conduct of Special Courses and Seminars	50	75
Preparation of special reports for sale to industry ie.	0	25
Conduct of precompetitive multiclient project (We assume two projects each calling for 50 days work divided 25:75 between the centre's consultants and support development work from laboratories).		
Total additional income generating activities (Consultant days)	**75**	**150**

figure 65

Clearly it is difficult to gauge fully the extent to which Companies will be willing to purchase these additional services. Rapra experience suggests that perceived need is a greater controlling factor than is price. Success in this area will depend very heavily on marketing of the benefits of each individual product - especially those which involve any form active involvement of companies ' own staff.

Total Potential Use by Industry

Taking the two sets of income together we can envisage the unit being able to generate some 200 days of work for consultants in the first year or so - building up to some 400 to 450 days by the fifth year. On that basis this would support approximately 1.5 consultant years in year 1 rising to just over 3 consultants years by year 5.

Given the structural requirements described above for building up a four man team over a three year period there would be shortfall of use of some 50% in the early years and perhaps as much as 25% in the latter years. This would have two effects:

i.) *Under-utilisation of skilled consultants would mean difficulty in retaining the quality people described above;*

ii.) *high unit costs for consultancy.*

Operating Income

In setting fees for its services, the institution would have to balance the need to *recover costs* with *affordability*. With underutilisation of staff, the danger is that any attempt to cover costs fully would result in a level of fees that would make its service unaffordable to its target clientele and hence result in a lower level of utilisation than estimated above.

In the case of the *One Stop Shop* and the *Technology Centre* attached to RRIM, the main revenue income would be from consultancy services and additional income generating activities such as conducting seminars and preparing multi-client reports. The demand for laboratory services would be contracted out to other institutions or to other parts of the organisation. Hence, net revenue from this source would be low.

In the case of the *Independent Technology Centre*, income would be derived also from laboratory services. The independent technology centre would provide these in-house using its own staff and hardware resources.

Of the three types of income earning services, the highest fees would be from consultancy services for problems solving, followed by other income generating activities and laboratory services. Experience shows that fees earned through consultancy are higher than from arranging seminars and courses and considerably higher than for laboratory services.

Determining the level of fees that the industry would consider affordable is difficult. Estimating what the industry would be willing to pay for the services of a new, or substantially improved technology resources would require market testing. In figure 66 overleaf we set out the effects on cost recovery of various levels of fees to illustrate financial viability of the 3 types of technology support institution.

Levels of Fees and Cost Recovery - Year 1

One Stop Shop & Centre attached to RRIM

Costs	M$'000
Amortisation of Equipment (over 5 years)	25
Operating Costs	550
Total	575

Revenue

Case 1	M$'000
Consultancy services	
135 days @ M$2,000/day	270
Other Income	
75 days at M$1,000/day	75
	345

Case 2	M$'000
Consultancy services	
135 days @ M$3,500/day	470
Other Income	
75 days @ M$1,500/day	110
	580

Independent Technology Centre

Costs	M$'000
Amortisation of Equipment (over 5 years for cars, 10 years for machinery)	136
Operating Costs	590
Total	726

Revenue

Case 1	M$'000
Consultancy services	
135 days @ M$2,000/day	270
Other Income	
75 days @ M$1,000/day	75
Laboratory services	
155 days @ M$500/day	75
	420

Case 2	M$'000
Consultancy services	
135 days @ M$3,500/day	470
Other Income	
75 days @ M$1,500/day	110
Laboratory Services	
155 days @ M$1,000 day	155
	735

figure 66

It is clear from the above that with consultancy services charged at a rate of M$2,000 /day, other income earning days contributing M$1,000/day and laboratory services producing M$500/day neither option covers its operating costs. This level of fees would we believe, be affordable to industry if ITAF's 50% contribution could be accessed, but is insufficient for cost recovery.

On the other hand, achieving full cost recovery requires that in the case of the One Stop Shop and the GIRG Tec attached to RRIM that fees for professional services are raised to M$3,500/day, and from seminars and courses M$1,500/day is realised.

A fee of M$3,500/day is clearly excessive even by European standards. Allowing for 50% ITAF contribution, this level of fees would mean that each 5 day project would cost Malaysian companies over M$10,000 inclusive of laboratory costs. Moreover, it is highly unlikely that arranging courses and seminars could net the M$1,500/day assumed for case 2. For instance, taking 15 days to

arrange a seminar which 30 participants attend and pay MS500 each, is likely to net MS1,000/day when expenses are taken into account. Our experience would suggest that many companies would find paying MS1,500/day excessive.

To achieve full cost recovery, a similar level of consultancy fees (MS3,500) would have to be charged by the independent technology centre and the consultants would also have to net MS1,500/day in other income generating activities. But in addition, the centre would also have to raise laboratory fees to MS1,000/day.

In our view, the figures above illustrate that despite the gradual build up of consultancy staff, all three options are likely to fail to recover operating costs in the early years of their operation. Government would not only have to contribute funds through ITAF but may also need to provide a direct subvention to the institution either in the form of a capital grant and/or contribution to operating costs.

As demand for consultancy services increases, the situation should improve. By year 5, demand for consultancy services would have increased to over 255 days. And although staffing levels would have increased, the fees required to achieve full cost recovery would have fallen from MS3,500/day to MS2,000/day for the three options whereas the sum required to be raised from other income generating activities would fall to MS1,000/day and laboratory services to MS500/day.

With ITAF support in place, the sum charged to the user for consultancy services - 50% of MS2,000/day - would be affordable. And, the recovery required from other income generation activities is also more reasonable. But, of course, it is uncertain whether the government would continue with ITAF funding indefinitely.

Hence, it may be summarised that in the early years there can be little doubt that neither of the three options is likely to achieve full cost recovery. The poor utilisation of the resources available makes this inevitable.

In later years, when demand for technology support is expected to increase, the financial viability of each option should improve and with ITAF funding in place they could become financially self-sufficient. But without ITAF funding, doubts may continue to exist over whether the fee structures required for full cost recovery would be affordable to users.

- **Potential Structures for Malaysia**

Having reviewed available options and their operational cost and financial implications, there are in essence three types of organisations that could be set up to provide technology support:

i.) A technology centre attached to RRIM (GIRG Tec) continuing as a government agency funded by annual subsidy;
ii.) A joint industry/government initiative to establish a product development association;
iii.) A totally industry sponsored activity to encourage the development of a One Stop Shop.

These are considered below.

■ **GIRG Tec - Attached to RRIIM**

This is in essence an extension of the current situation . The requirement for this had already been acknowledged as early as 1976 when a *Technical Centre* was set up within the RRIM to support the, then, 50 or so rubber processing companies and encourage them to move into new products and use RRIM testing facilities.

The service was free to rubber product manufacturers until the mid 1980s. By this time, the rubber product sector was growing rapidly and it was absorbing increasing quantities of natural rubber. In 1990 therefore a new activity the *Technical Consultancy and Advisory Unit* was set up within RRIM to support the growth of the domestic industry.

The initial staffing targets have not been met and there is a strong reliance on RRIM personnel to provide the necessary advice and assistance. For historical reasons there is mismatch between the technological skills required for this work and those available within RRIM - excellent though they are within their specialisations.

This mismatch is most pronounced in the areas where we perceive most significant growth production/ process engineering and service to the end use sector - although the traditional demands of Malaysian GIRG sector for compound testing can probably continue to be met from the RRIM - even in areas such as SR compounds. Nonetheless it would however be entirely feasible for the RRIM to continue - at least in the short term - to be the base for the new Technology Centre provided that:

- A specific team is set up with the primary dedication of serving the developing markets described above.
- The team selected from the highly trained and experienced individuals receives intensive training in this type of work and continues a programme of skill development.
- A highly pro-active marketing effort is maintained by the new unit - especially targeted at the end use sectors.
- The team develops the services described above.
- The centre is as constituted as a profit centre so that its costs and revenues can be clearly identified.

In addition, to involve industry closely in the work of the Centre we would suggest that a management committee be set up for the Centre and industry representatives invited on to it. Participation by industry in the management of the centre may help dispel the negative views held by some sections of the rubber product industry of the benefits from RRIM's services.

The way the centre could set up charging for its services is shown below.

Direct Problem Solving Consultancy	• Free day of consultancy to define problem and prepare programme of work; • 50% of professional fees paid by the Company plus expenses, remainder by ITAF
Publications and Seminars	• 50% subsidies for general technology transfer projects including the costs of external sourcing eg data bases, other publications etc.
Multicilent Projects	• Pro bono industry as a whole 100% funding • For specific interests of groups of companies 50% contribution from industry - which could include in-kind contributions (where work undertaken by the company towards the project is valued)

figure 67

The existing culture within the RRIM is capable of accommodating this form of activity. The importance of this should not be underestimated. Research oriented scientists and technologists are not normally predisposed towards pro-active promotion of their activities - however well they may react to enquiries and problems.

No doubt the centre would require Government subvention in the early years. But such subventions should be clearly earmarked and kept separate from Government's overall contribution to RRIM.

In order to ensure a reasonable confidence in the activity it would be necessary for Government to commit itself to the support of this form of agency for a period of 3 years - with a review of this commitment in the 3rd year.

■ Product Development Association

An option which provides for greater involvement of industry and hence could be considered more attuned to the needs of industry as it sees them, would be to form a product development association.

In the Malaysian context, it should be noted that the industry through MRPMA, has asked that RRIM's technical centre be privatised or at least made independent of RRIM. It is the view of the industry's representatives that separation of the centre from RRIM and its subsequent control by industry would make it more responsive to industry's needs and allow industry to contribute the resources required to develop the centre into a comprehensive technology support institution.

Industry has informed us that currently it has reservations about the confidentiality of the services RRIM is able to provide because it's staff are relatively poorly paid and hence easily poached. Hence it is clear that the issue of the status of the institution and the type of organisation it becomes are contentious issues.

In the event that it is determined to involve industry in developing the technology support institution but where Government continues to play a role, the principle of a Research Association which was used very effectively within the United Kingdom could be relevant. This would entail:

> *A body, the Rubber Products Development Association, which companies would join paying an annual subscription commensurate with the scale of their involvement in the manufacture or use of rubber products. The subscriptions would be used to:*

a.) to support the basic infrastructure of the organisation - administration, the build up of information and training of consultants and the preparation of pro bono for members technology transfer products.

b.) as a credit balance against which individual companies could draw in terms of services and the purchase of other products. (Clearly any use beyond the level of the credit balance would of course be charged at costs approaching those charged to non-members)

(This is the current method of operation within Rapra Technology where 50% of subscriptions go into the credit balance.)

The Association would offer the full range of services under One Stop Shop. It would not however, have it's own hardware resources. Industry is unlikely to raise sufficient funds to cover the M$1 million required for capital equipment. Government is unlikely to consider the grant of such a sum so long as RRIM is willing to provide its services and facilities on a subcontract basis.

The advantage of this approach lies in the fact that there would be a very early measure of industry's interest. Failure by sufficient businesses within the industry to join such an institution would reveal a lack of serious commitment to developing a technology support institution. Government could thus terminate the venture early.

Even with high level of industry involvement our analysis suggests that the demand for support services is not sufficiently high to make the organisation self financing at least in the early years. The Association would require Government subvention with a commitment for at least 3 years of support.

The board of the organisation, which could be registered as a non-profit making organisation would represent a mix of government agencies and the industry with industry providing a majority of board members. As long as Government funds the organisation, it is only correct that it has a voice in policy making and supervising the organisation.

- **Totally Independent Consultancy/Technology Centre**

As against a product development association which represents a combination of government and industry, it is possible instead to establish institutions completely independent of Government. In principle it should be possible to do so through two routes:

i.) encouraging the private sector to set up the facilities required;

ii.) setting up with Government help a new institution which is controlled by representatives of industry.

Despite the fact that ITAF is in place, very few private sector consultancies have emerged with the capability of providing the type of services outlined above under One Stop Shop. Without Government providing direct subsidy, our analysis shows that it would be many years before such an organisation emerged.

No doubt a number of individuals would, as they do today, continue to provide consultancy expertise to the industry. But, a sub-optimal level of support would continue to be provided. Although Government could in principle provide a direct subisdy to a private organisation to incentive it to develop a more comprehensive service, such a practice is not likely to occur. Government runs the risk of being accused of giving preferential treatment to a company and putting money in the pockets of individual businessmen.

Hence, if a newly private venture is likely to develop it is likely to be in the form of an initiative led by representatives of the industry, such as the MRPMA. We can envisage two ways that this could occur:

i.) privatisation of a government agency;

ii.) the creation of a new organisation.

As noted earlier, MRPMA has called for privatisation of RRIM's Technical Centre. We see two main difficulties in this proposal:

i.) as part and parcel of RRIM with its wide brief for the development of Malaysia's rubber industry as a whole, the issue of whether the Technical Centre could be separated from RRIM requires far wider analysis than how it can best serve the rubber product industry. Clearly, a study which is concerned mainly with one part of the rubber product industry should not attempt to address such a wide ranging issue;

ii.) our analysis shows that in it's early years, a privatised centre is unlikely to be financially self supporting.

The attraction to Government of such a privatisation is likely to be substantially reduced by the need to continue to fund the centre. In comparison with the alternative of the technical centre remaining with RRIM, this option would provide Government with the burden of providing subisdy without any control over direction and activities.

Setting up a new institution for the industry is only likely to be possible with Government help and resources. In the event that Government provides resources it may prefer a solution such as the product development association which would provide it with some measure of participation in decision making.

The Regional Situation

The preceding comments are concerned with the feasibility of setting up a centre for the Malaysian industry and its customers. We believe however that there is an important strategic component which should also be considered.

Our study indicates that, notwithstanding the limitations identified above, Malaysia currently enjoys a technological edge over competing ASEAN rubber product making countries. The setting up of a Technological Centre will contribute to the protection of this edge . However there is little guarantee that similar centres will not be set up in (say), Indonesia and Thailand within the next few years.

Indeed it is possible that, given the perceived growth in the importance of rubber products industry in the region, some organisation - European or from another developed region - may identify an opportunity to set up or participate in a Regional Rubber Technology Centre. If this were to occur then there is little doubt that country within which it has been set up will derive disproportionate benefits - not only for the rubber product industry but also for the end use sectors.

In our view therefore it is desirable that the comments concerning the setting up a Rubber Technology Centre in Malaysia should be considered in the wider context of the feasibility of setting up a Regional Centre. This would not only increase the market - and therefore the technological and financial viability/credibility of the centre but also provide additional protection for the Malaysian Rubber product industry.

To this end we recommend that potential alliances with other technology centres be explored.

Linkages

It will have been noted that we have indicated the need for any form of centre to act as a one - stop - shop for other resources. It will be essential therefore for the Centre, whatever it eventual form, to establish and maintain close contacts with all major centres of rubber technology, information and consultancy.

We would also deem it desirable if the Centre were to establish a more formal relationship with a well developed centre which would provide it with a regular transfusion of technology and consultancy expertise.

Short Term Needs

Hitherto we have addressed the mid-term development of the industry and the end use sector. There is however a need for a crash programme of development work. This is clearly illustrated by the extensive demand for the clinics which were run by Rapra Technology Ltd during the course of this study.

It must be acknowledged that some of this demand will have included an accumulation of problems which have arisen over a period of time. Notwithstanding this there is clearly scope for significant initiative in technology transfer for which Malaysia is, we have indicated above, under-resourced.

We perceive this need as follows:

i.) further clinics backed up by consultancy visits to the sites;

ii.) seminars on specific topics addressing many of the issues which have already been identified above:
- Materials Technology - with particular emphasis on synthetic rubber
- Processing and product development
- Markets and end uses

iii.) technology transfer to help develop underdeveloped product areas (see Section IV);

iii.) technology Visits to rubber product companies/end users in more developed countries.

It would be appropriate for Government to support this form of activity through subsidies of up to 50% for participating companies. Detailed proposals for such a programme should be sought from overseas consultants and the project implemented over a period the next 12 months. We estimate that the total cost would be of the order of M$150 to M$200 thousand of which half would be borne by Government.

The consultants should be asked to work through the Technical Consultancy Advisory Unit of RRIM under the supervision of MRRDB. This would help start the process of bolstering the capabilities of the Unit and start the process of marketing an enhanced technology service to the industry.

Recommendations

In the foregoing paragraphs we have presented the options available for the transfer of technology and expertise to Malaysian rubber product makers and end users. Overall we recommend as follows:

i.) take immediate steps to address short-term technical weaknesses - invite tenders for the required consultancy;

ii.) Coincidentally with the above formalise the existing activity within RRIM into a quasi-autonomous technology centre (GIRG Tec.) with its own management and budget as described above. The objectives of this body would be:

- market and develop confidence in the use of the Centre as a one stop shop for consultancy and information;
- provide services and consultancy as described in foregoing paragraphs;
- establish linkages with providers of technology and consultancy - and ensure the quality and impartiality of the latter;
- act as the main channel for all technology support funds to the rubber industry - in this role it would also establish and re-confirm the needs for consultancy of any company;
- establish gaps in technology which might be addressed through precompetitive projects and set these up;
- identify the opportunity for participation in precompetitive projects being run in other countries.

iii.) undertake a feasibility study for setting up a Regional Centre through discussions with other international organisations of a similar nature.

The centre would be set up for three years with a view to it becoming an independent Rubber Product Development Association within that time and the strategic intention of creating a Regional Centre within 5 years.

In our view, given the uncertainties over the financial viability of a technology support institution over the next few years, the correct approach is to bolster what currently exists and allow it to develop gradually into an independent organisation. When the success of the concept has been demonstrated it would be converted into an independent and more autonomous organisation.

Government would need to contribute the initial capital cost of establishing the Technology Centre - MS130 thousand as well as the annual shortfall in revenue. In the first year, we estimate this would be MS230 thousand (see figure 13) in the second, fall to MS150-200 thousand and in year three reduce further to MS50-100 thousand. For budgetary purposes we have allowed the sum of MS550 thousand to cover contingencies.

Benefits from this expenditure are difficult to quantify. But in other parts of the world, realising in output terms 20 times the value or double the level of profits to each MS spent on technical consultancy services have been found achievable.

The short-term technical assistance would cost Government approximately MS100 thousand. Benefits are likely to be in the same ratio as for long-term consultancy services.

XIV Export Market Development Programme

The Need

A key finding of our survey of Malaysian manufacturers of industrial and general rubber goods was that the majority of firms had limited understanding of export markets and lacked the resources and expertise to establish strong positions in export markets. This finding is consistent with the relatively small size of most Malaysian industrial and general rubber goods manufacturers and their comparatively recent exposure to export markets.

The lack of knowledge and resources to develop export markets effectively has three adverse consequences:

i.) Malaysian industrial and consumer rubber goods have a small share of most country markets and are confined mainly to small, low value segments in which price is the key determinant of success. This undersells the Malaysian industry's capability to produce products to international specifications and standards and in the long term, makes Malaysian exports vulnerable to competition from lower cost countries;

ii.) With the notable exception of companies with foreign participation, many Malaysian manufacturers export through intermediaries. This results in a loss of value and may make Malaysian products uncompetitive in price;

iii.) Export destinations for many products are confined to a few countries. The Malaysian industry has failed to develop export markets worldwide.

In the context of the future development of the industry, the issue of greatest strategic importance is the development of higher value segments of the market. With factor costs in Malaysia expected to rise rapidly, it is imperative that Malaysian manufacturers develop positions in higher value segments where considerations of product specification and quality are more important than price and where as a consequence, price realisation is higher.

It is a characteristic of such segments of the market - OE and high value segments of the replacement market for industrial products and own label and branded segments of the market for consumer goods that developing close relationships with end-users, distributors and retailers is a pre-requisite for success. Penetrating these segments requires active marketing effort by the manufacturer and cannot be left to intermediaries.

These market segments are demanding and call for a detailed understanding of factors for market success and a sustained commitment to developing a strong competitive position. Given the demanding nature of markets and the limited resources available to Malaysian manufacturers it is not surprising that in our survey, almost all Malaysian manufacturers indicated a need for assistance in developing export markets.

The Case for Intervention

For the Malaysian industrial and general rubber goods industry to realise its true potential, success in export markets is essential. The limited size of the domestic market for many products makes export development a pre-condition for sustained growth.

In the past, in many countries including Malaysia, government policies in the support of export growth have been confined to trade liberalisation and providing incentive structures for exporters. With the appropriate policy in place, it was assumed that industries in which the country had comparative advantage would be able to develop export markets.

But in recent years, studies of countries which have liberalised trade regimes and introduced incentives, often in support of structural adjustment programmes, show that such measures may be *necessary* conditions for export growth but are not by themselves *sufficient*. In many countries policy reform has not been sufficient to cause export growth.

The World Bank has recently examined the export performance of Korea, Hong Kong, Singapore and Taiwan as well as a group of Latin American countries - Argentina, Brazil, Columbia, Peru and Uruguay. The analysis reveals that supply-side measures, aimed at improving the export capability of enterprises, are an important component of successful export development strategies, alongside appropriate trade policies.

Malaysia has the appropriate trade policies and incentives in place for export growth. But our analysis shows, that in the industrial and general rubber goods industry it lacks the supply side-measures to support the development of strong positions in export markets.

Supply-side measures can take the form of technical support to upgrade products, improve process and product engineering and develop quality assurance systems (ISO9000) as well as measures aimed at improving the capabilities of enterprises to market their products to export markets.

Models for Export Development Programmes

A very wide range of programmes and institutions have been used by Governments to support export market development. The table below profiles the main types of programmes and institutions and the type of services they have provided:

Programme/Institution	Services Provided
Missions Abroad	• Market intelligence • On request, specific market information
Trade Promotion Organisation Type I	• As above, in conjunction with trade missions • Sponsorship of export promotion • Sponsorship fo participation in trade fairs
Trade Promotion Organisation Type II	• Market intelligence, market information through own offices abroad • Sponsorship of missions, fairs • Sector studies • Pro-active promotion through own offices abroad
Export Market Consultancy Programmes	• Subsidised consultancy services for market research and/or assistance in developing export markets
Sector Programmes for Export Market Development	• Consultancy assistance targeted at sectors with high export potential, focussing on product development, production management, quality assurance and assistance in market development

Most countries have found the use of missions abroad to be, by itself, an inadequate form of export development support. The missions abroad tend not to have the business acumen or marketing expertise to provide commercially relevant information and have to cover such a wide range of industries and issues that they cannot hope to meet adequately the needs of individual enterprises.

In the World Bank's review of the performance of successful exporting countries in East Asia and Latin America, one of the issues studied in detail was whether public sector Trade Promotion Organisations (TPOs) had been effective in using foreign and government assistance to develop exports. Their finding was that TPOs have frequently been ineffective instruments for assisting firms in marketing their products abroad, tending to concentrate on the provision of general information and organising trade fairs and missions, rather than providing direct assistance in overcoming market barriers - "most of the resulting export services are promotion activities are premature or hardly relevant for most industries" (Keesing and Lall).

The economy wide brief of such organisations their public sector orientation and methods of working and passive role has limited their effectiveness. The main activity of many TPOs is to assist businesses by sponsoring their participation in trade missions and fairs. It should be noted that such activities provide 'show cases' for the products of a country/company and are promotional in nature. By themselves, they seldom result in sales, though if leads/contacts made through missions and fairs are followed up, exports may result.
Countries such as Japan have developed superior versions of the TPO. In JETRO with its international network of offices and far more pro-active role, the country possibly has one of the most effective TPOs. But for all its capability and competence, even JETRO has shortcomings.

At the sector or enterprise level, JETRO has often had to rely on buying in consultancy assistance to supplement its own resources. It has proved impossible to hav . in-house capability across sectors and types of need to provide commercially relevant support in all cases.

Recent studies have pointed to consultancy assistance rather than the work of TPOs themselves as providing effective supply side support. According to one authoritative source - Keesing & Lall *"Marketing manufactured exports from developing countries :learning sequences and public support -"*.

The heart of an effective support programme seems to be consultancy assistance (complemented by training or design assistance or whatever else may be most needed) cimed at improving the export supply capabilities of enterprises with significant capacity and motivation to export, and then helping them learn how to market these capabilities.

In recognition of this, countries like the UK have attempted to support the export marketing efforts of their enterprises by launching programmes rather than creating trade promotion institutions. They have provided for their enterprises to have access to specialist consulting expertise in the industry in which they operate and/or in the country they wish to target, at subsidised rates.

Schemes like the UK's are based on the pre-condition that available in the country concerned is a high level of consultancy expertise in export market development which can be harnessed by enterprises. This pre-condition is not met in some newly industrialised and many developing countries and hence variants of the UK type of scheme have been developed for them.

Bilateral and multilateral aid agencies and specialist export development agencies have developed consultancy schemes whereby a country's exporters - current or potential - have been able to access consultancy expertise in the target market and in the relevant industry. Where industry expertise is not available in the country concerned, a choice has been made from consultants familiar with the country but not the industry concerned and industry specialists from another country.

We have first hand experience of a large scheme of this type in India which is sponsored by the Overseas Development Administration (ODA) of the UK and is run on their behalf by DeCTA, formerly the Developing Countries Trade Agency. A similar scheme has recently been introduced by the EC's PHARE programme in Poland and we understand new schemes are in preparation also for other countries of central and eastern Europe.

The types of services provided by each scheme varies but essentially there are two models - schemes which focus on providing marketing support and more comprehensive schemes which focus on enhancing the competitiveness of the enterprise, providing support to the marketing and production capabilities of the company, usually with a sector wide programme.

The former, market development schemes tend to be able to cope with a wider range of products than the latter, more intensive and comprehensive programmes of assistance. By its nature, the more intense and comprehensive the programme of assistance, the greater the resources and expertise required and hence the need to focus on a narrow range of products. The two types of schemes, the services provided and the indicative cost of each scheme per company are profiled below in figure 68.

Type of Scheme & Coverage	Services Provided	Cost per Company (to M$ '000)
Market entry development - general manufacturers	• Market research • Market planning and market development assistance	60
Comprehensive support - sector specific	• Market research planning and development assistance • Product development • Cost reduction • Quality assurance	240

figure 68

The costs outlined above are based on using UK consultants and assume that a full range of the schemes' services are used by the company as follows:

- Market Entry
  Market research to profile market and assess enterprise's competitiveness, market survey to define target segments, distribution channels and priority customers and assistance with customer and market development. It assumes about 30 days consulting assistance is used at a rate of £400/day plus expenses; budgeted at 25% of fees.

- Comprehensive Support
  Assumes all marketing services are used, product development undertaken, cost reduction programmes implemented and quality assurance improved. It assumes 120 days of consulting assistance at £400/day plus 25% of fess as expenses.

Recommended Export Development Programme

Since our First Interim Report was submitted we are informed that Malaysia's TPO, the Malaysian External Trade Centre (MATRADE) has been substantially upgraded. From 6 professionals it is intended to develop a team of 150 professional staff, providing both geographic market and sector expertise.

This should result in far more effective export promotion services to exporters. But, as we noted earlier TPO's have limitations particularly in providing assistance at the enterprise level. And, it would be expecting too much of the recently strengthened organisation to develop the industry specific expertise required for assisting Malaysian industrial and general rubber goods manufacturers.

We suggest therefore, that in the Malaysian context the appropriate course is for MATRADE to run a programme of consultancy support for Malaysian industrial and general rubber goods manufacturers. But having decided to provide consultancy support, Government will have to select between the two types of consultancy schemes - market development and comprehensive support.

Cogent and persuasive arguments can be advanced for both types of schemes to be implemented in Malaysia. It can be argued that with government subsidising technical support through ITAF and subventions to the technology centre (described in Section I) the comprehensive support scheme would merely duplicate technical support. All that is required is marketing assistance.

On the other hand, the provision of integrated marketing and technical support dedicated to the single objective of export growth is clearly superior to a situation where companies would have to seek support from more than one institution and where the technical support institution may not be familiar with the precise requirements of the export market targetted. The main pros and cons of both schemes are summarised in figure 69 below:

Type of Scheme	Advantages	Disadvantages
Market Development	• Avoids duplicating technical support • Lower cost • Consultants selected on basis of one specialism and not two • Easier to monitor and manage	• Technical support not orientated to export markets • Conflict between marketing consultants and technology centre
Competitive Enhancement	• One stop support • Holistic approach • Accountability for performance	• Cost • Duplication of technical support • May damage viability of technology centre • Consultants may be good at only one discipline

figure 69

The choice between the two schemes is difficult and must be made by decision makers who are aware of competing calls on resources. If the more comprehensive level of support offered by the comprehensive support scheme is found affordable along with the extra demands likely to be placed on government for increased subvention for the technology centre, then it clearly is superior to the market development type of scheme.

For our part, we would recommend the market development scheme for the following reasons:

(i) provided the technology centre is well manned it should be able to provide adequate technical support to exporters;

(ii) for the future of the industry, in the longer term developing the technology centre is of greater significance than access to one-off foreign expertise to develop exports;

(iii) because the service provided is focused on one discipline, it is easier to manage and hence able to provide better value for money.

Significantly, in our experience, market development schemes have provided a better ratio of consultancy expenditure to export growth than more comprehensive programmes aimed at providing comprehensive support. The latter also have longer time horizons for maturity. In the context of the Malaysian industrial and general rubber goods industry, speed is important.

Outline of Operational Structure

Based on our experience, we would recommend the following action sequence for establishing the scheme as outline in figure 70 below:

Set Up 1	• Select consultants with expertise in marketing rubber products. Negotiate fee rates on basis of 'bulk' purchase. Cover following key target markets: *- Japan, Korea, Taiwan, Western Europe, USA*
Set Up 2	• Determine rules of scheme: - eligibility - selection criteria (priorities) - contribution from Malaysian manufacturers - application forms/data requirements
Launch	• Advertise scheme in Malaysia • Select Malaysian manufacturers • Agree work programmes/fees with consultants. Sign contracts
Monitor	• Monitor progress • Review quality of work done and take corrective action if required • Monitor incremental export performance

figure 70

Selection of consultants is of course crucial to the success of the scheme. The selection criteria should in our view include the following:

(i) track record of success in export market development;

(ii) expertise in marketing industrial and general rubber goods;

(iii) ability to provide a comprehensive service covering market research, market strategy and hands on assistance in market and customer development and export regulations, documentation and procedures;

(iv) commitment to the success of Malaysian exports.

The aim should be to appoint only one consultancy company per main market. This ensures continuity of approach and makes for greater accountability of performance. In addition, by purchasing a large volume of consultancy services from a single source, the scheme should be able to negotiate discounts on fee rates.

But in important markets such as Japan and the USA, it may be necessary to appoint also a second set of consultants as stand-bye. Although on the whole the likelihood of conflicts of interest in consultants promoting more than one Malaysian manufacturer's products is low - because the competitive advantage of manufacturers will vary and hence the market segments and customers targeted will differ - on some occasions the main consultant may be handling the products of a direct competitor and the Malaysian manufacturer prefer to work with another consultant.

The criteria of commitment to the success of the project, although difficult to define, is nevertheless, very important. Experience has shown that success in such schemes lies in the consultants identifying closely with the companies they work with and promoting their products effectively.

In this respect, it is vital that the consultancies are paid by and answerable to MATRADE, even if aid agencies are used to fund the scheme. Experience shows that where aid agencies have used consultants in their countries to support export development of products from developing countries and paid the consultants themselves the results have been variable - rather than being judged on results, consultants have been able to justify fees on the basis of effort expended.

Setting priorities for inclusion in the scheme and making them known to Malaysian manufacturers from the outset is important. The government must signal its intentions in providing subsidy and in the event the scheme is oversubscribed, manufacturers should know why their applications have not succeeded.

In our view priority should be given to:

(i) manufacturers currently exporting to priority markets looking to improve market position;

(ii) manufacturers of high value products looking to penetrate new, priority markets;

(iii) manufacturers with products with demonstrable competitiveness (meeting international product specifications at competitive prices) and strong track records in the domestic market looking to export high value products for the first time.

In determining the level of subsidy, MATRADE should aim to make the scheme affordable to the majority of Malaysian manufacturers, particularly small businesses. To serve as guidelines of affordability, examples can be drawn from two schemes which both use UK consultants and have similar fee structures:

- UK Marketing Initiative
  50% subsidy makes scheme accessible to most UK manufacturers.

- EDPI (India)
  Provides 75% subsidy to make scheme affordable for the more successful Indian manufacturer.

Experience shows that monitoring consultants' performance and results of the scheme is perhaps the most important factor in ensuring success. Inevitably performance by consultants varies, despite the most rigorous selection process. It is important to monitor progress and take corrective action where appropriate.

Cost / Benefits

The likely costs of establishing and operating the scheme are set out in figure 71 below:

Establishment and Operating Costs for the Market Development Scheme

Establishment Costs	MS '000	Operating Costs (per annum)	MS '000
Travel	60	Consultancy Cost: 15 companies	
Accomodation, Food	60	@ MS60,000/company	900
Communications	30	+ MATRADE Operational Costs	100
		- Less Contribution from private sector	
Total	**150**	(25% of consultancy cost)	(225)
		Total	**775**

figure 71

The main costs of establishing the scheme are likely to be the travel and accommodation expenses incurred by staff in visiting countries to select consultants. This is of course a one-off cost.

The main operational cost would be consulting fees and expenses and costs incurred by MATRADE in monitoring progress, which is likely to involve foreign travel.

We have budgeted for 15 companies to receive assistance each year. This number of companies appears appropriate given the size of the industry and number of Malaysian manufacturers able to meet the criteria for selection. The operational costs of the schemes would be offset partly by private sector contributions.

In figure 71 above, we have assumed that in order to make the scheme affordable to most, Government would be willing to subsidise 75% of the costs of consultancy. If a lower level of subsidy is considered appropriate, the costs of the scheme to government would be lower.

If the comprehensive support type of scheme were selected the annual consultancy costs of the scheme would be much higher - MS3.7 million as against MS1 million. Government's contribution would also be higher, at the 75% level of subsidy, MS2.8 million per annum.

On the assumption that the market development scheme is selected and contribution's from the private sector kept to 25% of consultancy costs, then over the three year period, government would have spent roughly MS2.5 million on the market development scheme, inclusive of establishment costs. The returns to Malaysia of this expenditure would derive from:

(i) increased value of exports;

(ii) growing capability of the Malaysian industry to market products in export markets;

(iii) improved competitiveness of the industry through developing products that succeed in export markets.

Of these, the most easily quantified is the increased value of exports. This measure should, in our view, form the most important criterion for evaluating the scheme.

Experience of such schemes elsewhere shows that a well run, well targeted scheme should over a five year period from the date of assistance result in a 10:1 ratio of increased export value to consultancy spend. Hence, if the Malaysian scheme is as well run, it should result in an increase in exports of MS27 million, which would represent over 10% of the current value of industrial and general rubber goods exports.

Rationale

A key part of the strategy outlined in the First Interim Report was to attract to Malaysia, foreign manufacturers with the capability to develop strong positions in priority markets in the Asia-Pacific region, Western Europe and the USA. The objective was not only to accelerate the development of capability within Malaysian industry but also to defend against the threat posed by such manufacturers locating in competitor countries.

We recognised, however, that Malaysia has lost much of its advantage over neighbouring countries as a location for foreign investment. On the one hand, neighbouring countries now match Malaysia for economic prospects and location incentives and are able to provide adequate infrastructure making them more attractive to investors. On the other, Malaysia's rising labour and other factor costs, shortage of labour and small domestic market have started to represent substantial disadvantages compared with neighbouring countries such as Indonesia and Thailand.

In view of this, our strategy was to use the currently higher level of development of the Malaysian industrial and general rubber goods industry as a means of attracting foreign manufacturers to Malaysia. By offering foreign manufacturers the opportunity to form alliances and joint-ventures with Malaysian manufacturers, it would be possible to offer them an investment opportunity superior to a greenfield venture elsewhere because:

i.) investment costs for alliances and joint-ventures would be lower than for greenfield developments;

ii.) gestation periods would be shorter;

iii.) the overall risk would be lower for alliances and joint-ventures against greenfield ventures.

Mobilising Local Manufacturers

For this aspect of the strategy to succeed, it is obviously vital that Malaysian industrial and general rubber goods exporters are persuaded of the strategic rationale for entering into alliances and joint-ventures. Such arrangements by their nature, represent loss of control on the part of Malaysian manufacturers over aspects of their business. Hence, for manufacturers to contemplate entering into such arrangements they must be convinced of the strategic advantages.

During the seminar arranged by MIDA and MRRDB to present the findings contained in our First Interim Report to industry, it became clear to us that many Malaysian manufacturers were already sensitized to the advantages of establishing alliances and joint-ventures. A number approached us for help in identifying partners.

We believe that generating additional interest amongst Malaysian manufacturers will require MIDA, as the Government's foreign investment promotion agency, to offer its services in identifying and mobilising suitable partners. Although interested in principle in alliances and joint ventures, many Malaysian manufacturers may not pursue the matter further as they lack the knowledge of foreign industries required to locate suitable partners. However, if the rationale for alliances was set out

clearly and the offer of MIDA's services publicised within the industry we are of the view that it may be possible to mobilise substantial level of interest within the rubber industry.

Interest is likely to be high amongst rubber compounders looking to increase value added. In addition, old established industrial and general rubber goods manufacturers who have lost out in recent years to newer, more technically sophisticated rivals with foreign partners, may view this as an opportunity to regain position in the industry. Other IRG and GRG manufacturers may view it as a means to enter new, higher value product markets which have begun to emerge in Malaysia.

In addition to manufacturers of industrial and general rubber goods, the service provided by MIDA should be publicised also to up stream rubber producers, processors and sheet manufacturers and to manufacturers of other rubber products. They may view the service MIDA would provide as a favourable opportunity for vertical or horizontal integration.

In our view, to make the programme of action required to identify and mobilise foreign investors worthwhile, a minimum of 5 Malaysian manufacturers should be interested in taking advantage of MIDA's services. This number is likely to be achieved comfortably given the interest already shown.

Identifying and Mobilising Foreign Investors

Numerous techniques have been used in the past to identify and mobilise foreign investors. MIDA's Foreign Investment Promotion Division is no doubt familiar with these techniques and based on past experience will have its own preferred method. In the sections below, we set out our recommended programme of action as a guideline for identifying and mobilising investors, to be modified and amended in the light of MIDA's own experience.

The objective would be to identify foreign *manufacturers* of industrial and general rubber goods which ideally met the criteria listed below:

Investor Profile
• strong position in attractive market segments of priority markets; • reputation for supplying high value, high integrity product; • relatively large resource base - finance, manpower (compared with similar business); • track record of M&A activity, alliances, JVs.

figure 72

As a second priority, it may also be appropriate to target *distributors* of rubber products that fulfil the above criteria. They can help provide the market access Malaysian manufacturers require, even if they cannot help with technical development.

To start the process of identification we would provide MIDA, along with our draft final report, a long list of companies from which it should be possible to find manufacturers and distributors who meet the above criteria and who may be interested in investing or forming alliances with the Malaysian rubber goods industry. The list would include a few companies who have on their own accord approached RAPRA to indicate interest in the Malaysian industry.

In addition to the major programmes described in the sections above, we outlined in the First Interim Report three further areas for action which would help accelerate the development of the Malaysian industrial and general rubber goods industry:

- Underdeveloped Product Areas
- Import Substitution
- Tariff Reform

We consider in turn the actions required in each area.

Underdeveloped Product Areas

During our field work in Malaysia it became clear that the Malaysian GIRG industry was capable of manufacturing most rubber products. There were, however, a number of product areas in which the Malaysian industry was underdeveloped compared with its counterparts in more developed countries. Moreover, the areas of underdevelopment included products for which demand was likely to grow both at home and in overseas markets and they met the important criteria of offering high value addition. The product areas are:

- Closed cell sponges made of synthetic rubber
- Oil industry related products
- Calendered sheet and sheet products
- Adhesive tapes

In the case of the first two - closed cell sponges and oil industry related products - increasing production in these product areas represents a natural process of product diversification. Indeed, some Malaysian manufacturers have already started to explore their manufacture.

Diversification into these product areas by manufacturers of industrial rubber goods does not call for large amounts of new capital investment. They have the equipment to manufacture them but lack knowledge of the technology - materials and processes - involved in their manufacture.

Calendered sheet and products made from sheet such as inflatable rubber products and adhesive tapes, require the establishment of new, dedicated plants to increase output. What we propose is the commissioning of studies to evaluate the feasibility of their manufacture.

In the sections below for each product area we set out a brief outline of the opportunity they represent and the actions required to exploit it.

Closed cell sponges

Closed cell sponges are already being manufactured in some form within Malaysia. In this context we are however suggesting increasing output of products based on synthetic rubbers such as:

Silicone	•	Fire stop barriers to smoke, gas and dust
	•	Gaskets/extreme high/low temperature resistance
Fluorosilicone	•	Gaskets, seals for aircraft, vehicles etc
EPDM	•	Thermal insulation for refirgeration and air conditioning
	•	Weatherstrips
	•	Vibration damping
Nitrile	•	Oil related insulation
Nitrile Ebonites	•	Floats (liquid level controls) automatic relief systems
Hypalon	•	Underwater accoustics
Polyurethane	•	Dock fenders, cushions
PVC/Nitrile	•	Gaskets, seals and trim for vehicles
	•	Foam life saving devices
	•	Shock/vibration control
Epichlorohydrin	•	Seals and gaskets
Neoprene	•	Gloating hose outer covers

Individually the market for each type of product within Malaysia is small, though growing, but taken together, these products represent a significant opportunity for Malaysian industrial rubber goods manufacturers to enter attractive, high value markets.

Further, the consumption of these products will increase not only in Malaysia but also in neighbouring ASEAN countries and others in the Asia-Pacific region. Currently, the production of these products within the region is limited to higher cost countries. If Malaysia can increase capability in these products, it will be well placed to compete for these export markets, as well.

Making Malaysian manufacturers aware of the applications and markets for these products, the opportunity they represent in terms of value addition and to familiarise them with the technology involved is the type of technology transfer activity that a technology support institution should carry out. But it is unlikely that the GIRG Tec at RRIM that we recommend or any other institution Government may decide to establish will be in place for some time to come and hence other measures are necessary if the Malaysian industry is to respond to this opportunity before its counterparts in neighbouring countries.

We recommend that the task of alerting Malaysian manufacturers to opportunities in these areas and more importantly to familiarise them with the technology of their manufacture be included as one of the tasks for the consultants appointed to help meet the short-term needs of the rubber product industry.

In addition, it has been bought to our notice [illegible] RRIM [illegible] at some of the Malaysian manufacturers currently producing closed cell sponge are [illegible] viably. The short term consultants should be charged to investigate the cause of this. Pri[illegible] Far[illegible] there is every reason to suggest that Malaysian manufacturers should be com[illegible]ive in this p[illegible]ct category.

Oil Industry Related Products

Demand for rubber products for use by the oil industry in Malaysia is growing. Currently much of the demand is satisfied by imports from Europe and the USA. In addition, the oil and gas industries of other countries in the Asia-Pacific region are also poised for rapid growth. If the Malaysian industry develops capability in this field faster than lower cost rivals it should be well placed to compete in these markets against higher cost suppliers from Europe and USA.

Exploiting this opportunity does not require the establishment of a new dedicated manufacturing plant. Regional demand may not be sufficient for this purpose. But there is every reason to suggest that some of Malaysia's world class companies would be able to manufacture these products competitively.

But, these are high value products used in critical applications, hence price is not the most important purchase criteria. The products are highly technical and require great skill in their manufacture since failure can be both economically and environmentally catastrophic. Hence the key to market success lies in product technology rather than cost competitiveness.

There are a very wide range of such products with the common feature of resistance to oil. Some of the products are listed above under closed cell sponge. They too are SR dominated. World class and good domestic Malaysian companies should be able to make such products. They should be exploring sources of technology with SR suppliers and with engineers purchasing these products.

To reinforce industry's efforts we would recommend, as in the case with closed cell sponge, that the task of familiarising manufacturers with the technology used to manufacture these products should be entrusted to consultants charged with providing short-term technical assistance.

Calendered Sheet and Sheet Products

Currently in Malaysia the capacity to manufacture calendered sheet is limited. As a result, the downstream manufacture of calendered sheet products is restricted. A facility to manufacture calndered sheet can sell product either as sheet or as manufactured products. The range of products possible is large, as follows:

Type of Sheet		Downstream Products
Unsupported	-	roofing material, reservoir linings etc.
Supported	-	inflatable rubber products; *dinghies, motorised rafts, life rafts, offshore rescue rafts, large flexible vessels such as water storage tanks, oil booms etc.*
	-	cut seals *gaskets etc*
	-	coated fabrics *for garments, other applications*

In addition, such a facility would be able to make conveyor and transmission belting provided it acquired appropriate presses and/or curing ovens.
The main markets for calendered sheet are in the first instance likely to be abroad. The Malaysian market is likely to be very small as downstream product manufacturing has not developed as yet.

In the case of most of the products noted above, currently Malaysian demand is mainly being met through imports. For any single product, Malaysian demand is not large enough to warrant establishing a dedicated facility, including conveyor belts where the volume of imports is comparatively large (MS10 million) and inflatable rubber products (imports MS5.5 million).

Potential export markets for these products include neighbouring countries as well as Europe, USA and Japan. For instance, inflatable rubber products are currently being manufactured in Taiwan for the European and US markets.

The manufacture of calendered sheet is capital intensive requiring investment of MS3.5 million in equipment cost alone. The manufacture of sheet products is labour intensive and investment costs would not be high.

If the facility is used to manufacture conveyor belting it would be necessary to purchase either a press of a rotocure system for continuous curing. A press would cost in the region of MS1 million and the rotocure MS3 million.

Given the need to address more than one market and the high investment cost involved, the Malaysian industry although aware of the opportunity has to date not exploited this opportunity. In order to stimulate interest in this area we recommend that MIDA commission a feasibility study to investigate the manufacture of calendered sheet by itself and with a mix of downstream products.

An important consideration in this feasibility study should be the consideration of the way current tariffs on industrial textiles effect the viability of the venture. We have recommended below the review of those tariffs and an evaluation of their impact on a potential new product area may provide additional evidence on the impact they have on the development of the industry.

It has been bought to our attention by RRIM, that a technical write-up has been prepared on this subject in June 1993. Clearly that write-up should be used as the basis of the feasibility study and up-dated where appropriate.

We estimate that the study is likely to cost MS100,000 or so, if foreign consultants are used. The cost would be less if appropriate local consultants are found. The results of the study should be disseminated widely to industry by MIDA through RRIM and MRPMA.

Adhesive Tapes

There are essentially two types of tapes under consideration here:

i.) Industrial
ii.) Medical

Though a few Malaysian manufacturers claim capability in the manufacture of adhesive tape, most adhesive tape sold in Malaysia is imported. Imports have grown from MS 0.3 million in 1988 to MS1.3 million in 1992 and we suspect their value to be higher as tape is also imported under the classification of medical products.

The market for such products will continue to grow in Malaysia with economic growth and higher levels of health care. In addition, international trade in industrial and medical tape is increasing. The process involves mixing, calendering, the application of a backing, cutting and slitting. If purchased new the equipment would cost of the order of MS5 million. It is a highly quality conscious product and requires good technology to be made well.
Given the high cost of investment and the need for good technology and the fact that vaibility may depend on export markets this is a product area that Malaysian manufacturers may be reluctant to enter.

We recommend that MIDA commission a study to investigate the feasibility of manufacture of tapes in Malaysia. The study should consider whether a joint-venture would improve prospects for the undertaking.

Some tape products use industrial fabrics. As recommended for calendered sheet the consultants should consider the impact of these tariffs on the viability of the venture. The cost of the feasibility study is likely to be the same as for calendered sheet.

Import Substitution

The very high level of imports of industrial and general rubber goods in Malaysia (over MS250 million) represents a major opportunity for the domestic industry to increase output.

The main source of these imports are higher cost countries such as Japan, Korea, Taiwan, US and European countries over which Malaysia has a substantial cost advantage. If the Malaysian industry can match the product specification, performance and high quality of suppliers from these countries it should be able to displace them in the Malaysian market.

As noted in our First Interim Report, however, the very large amount of these imports (MS196 million) are grouped together under the category Articles of Rubber not elsewhere specified (n.e.s.). This category breaks down further as follows (figure 74):

Malaysian Imports of Articles of Rubber Products (n.e.s.) - 1992		
Code	Description	Value (M$ million)
629.1	Hygenic Articles (seals, soothers etc)	11.5
629.2	Transmission and conveyor belting	40.5
629.9	Hard Rubber: Articles of hardened rubber or unhardened vulcanised rubber, n.e.s.	144.0
		196.0

figure 74

A further breakdown of code 629.9 reveals the following:

Breakdown of Imports of Articles of Hard Rubber (n.e.s.) - 1992	
Description	Value (M$ million)
Articles of Hard Rubber	7.5
Other articles of cellular rubber	4.4
Floor covering	1.9
Pipe seal ring of unhardened vulcanised rubber	4.1
Other than pipe seal rings	17.8
Boat of dark fenders	6.8
Inflatable articles	5.5
Automotive components	3.9
Rubber band	1.5
Other articles n.e.s.	84.6

figure 75

Once again the main import category is articles n.e.s.. From published data it is not possible to disaggregate import data further.

In order to alert industry as to the possibilities of import substitution, further analysis is required to determine:

i) the specific products imported;
ii) the main countries of origin of the products
iii) the applications and end-uses
iv) main customer requirements

There are two ways that this could be achieved:

i.) with the cooperation of the Department of Statistics, attempt further disaggregation of statistical data;

ii.) conduct a survey of importers and users of imported products to determine their product requirements, reasons for importing and their requirements of a domestic supplier to replace current source of imports.

Attempting to obtain disaggregated data from the Department of Statistics may have limitations. The department may not be able to analyse data at a more disaggregate level and it may have reservations in terms of confidentiality to release source data. Nevertheless, this avenue should be explored further.

The problem with the method of working through importers and users to analyse requirements is that their numbers are likely to be large. From our knowledge of the Malaysian industry we can identify the following main categories of imports and this is by no means a comprehensive list:

i.) general rubber goods importers;
ii.) importers of automotive components and vehicle manufacturers and assemblers;
iii.) importers and users of construction materials;
iv.) electrical and electronic companies;
v.) importers of spare parts for machinery and machinery manufacturers;
vi.) importers of sports goods;
vii.) importers and retailers of household goods.

Despite the problems involved we believe that the large value of imports justifies further study. We recommend that MIDA commission consultants to carry out a study of rubber goods imports. Such a study is entirely within the scope of local consultants and the costs should be in the region of MS50,000.

When the study has been completed and the requirements of importers identified, the process of alerting industry to the opportunity and encouraging Malaysian industry to take on the challenge of competing in these markets could be carried out through MRPMA and the Ministry of International Trade & Industry's (MiTI's) Small and Medium Industries Division. The MITI Division has launched a vendor development programme in which rubber goods are identified as a priority sector. The programme, by linking large businesses with smaller suppliers provides an effective way of both incentivising small businesses to undertake product development and large businesses to buy from them.

Policies and Incentives

Our First Interim Report identified areas of concern regarding policies and incentives:

i.) tariffs on some imports used in the manufacture of rubber products were high and either substantially reduced effective protection or in some case resulted in negative protection (a disincentive to manufacture);

ii.) incentives to rubber product manufacturers although attractive were not being taken up by small manufacturers. The awareness and accessibility of incentives needed improvement.

The concern over tariffs on imports is particularly strong in the case of zinc oxide (30%), carbon black (15%) and industrial textiles (15%). Zinc oxide and carbon black are widely used in the industry, though they do not usually represent a high proportion of raw material cost. Nevertheless, the effect of tariffs is to make the domestic price higher than the world market. Where Malaysian manufacturers receive no protection on output, higher than world market price of inputs (no matter how small a part of total cost),results in negative protection.

We understand that the reason for protection was import substitution, by encouraging domestic suppliers. But to our knowledge, domestic suppliers are now well established (at least for carbon black) and hence an infant industry argument no longer applies.

The levying of tariffs on these imports is clearly not sufficient to make the Malaysian industry uncompetitive. But if the rationale for their imposition no longer applies, they should be removed to reduce the negative impact they have on competitiveness, no matter how small.

As against these two inputs, industrial textiles do account for a large proportion of the material cost of products. High tariffs on this input takes away from the protection given to products such as conveyor belting and V-belts and reinforced hose. No doubt the protection was given to encourage domestic manufacturers. But it is not clear that competitive domestic supplier has emerged or is likely to emerge as industrial textiles continue to be imported.

What is required is a reappraisal of the case for the continuation of tariffs on these inputs, taking account of the trade-offs between encouraging domestic manufacture and the uncompetitiveness of downstream users. MIDA is well placed to carry out such a review.

MIDA has in the past, attempted to increase industry's awareness of incentives available through road shows and to simplify procedures for application. Yet analysis of MIDA records shows that many smaller manufacturers have not applied for incentives. The problem is not just confined to the incentives MIDA is responsible for such as Pioneer Status and investment allowances but also to two other key incentives:

i.) ITAF assistance for technology and product upgrading; and

ii.) loan finance for small and medium industries available through MIDF and other development finance institutions.

We recommend that with the help of MRPMA and RRIM, MIDA attempt to publicise to the industry the range of incentives available and the procedures for application. The information disseminated should highlight also the confidentiality with which applications are treated.

Summary of Recommendations

In summary our recommendations are:

i.) transfer technology in the fields of closed cell sponge and oil related products as part of the programme of short term technical assistance to industry;

ii.) commission feasibility studies for the manufacture of calendered sheet and sheet products and industrial and medical tapes at the cost of MS100,000 each;

iii.) commission a study of import substitution opportunities at a cost of MS50,000. Publicise opportunities through MRPMA and RRIM and encourage domestic supply through MITI's vendor development programme.

iv.) MIDA to carry out a reappraisal of tariffs on carbon black, zinc oxide and industrial textiles;

v.) with the help of MRPMA and RRIM, MIDA to publicise incentives available to rubber product manufacturers;

It is difficult to quantify the benefits from these activities. Much depends on the outcome of technology transfer activities, feasibility studies, re-appraisal of tariffs and the extent to which the take-up of incentives results in additional investment in the industry. But we are of the opinion that the sums noted above are small in comparison with the benefits that could be realised.

In order to assess the impact the Action Plan outlined above is likely to have upon the development of the industrial and general rubber goods industry, we set out below the likely growth pattern of the industry, *with* and *without* the measures proposed. It should be noted these figures should serve as general indicators of likely performance only. They refer to future periods and are based on assumptions of economic growth and industry competitiveness which may not be realised.

Projected Growth of the Malaysian Industry - Without Action Plan

Based on our diagnostic for the Malaysian rubber product industry, we hold the view that over the next decade, the Malaysian industrial and general rubber goods industry is likely to continue to grow at a rapid pace. A combination of high economic growth at home and recovery of markets abroad should result in substantial growth.

But our view is that the pace of growth will be slower than it has been in the past because:

i.) up to now, the growth of output of rubber products has outpaced economic growth. But gradually, the Malaysian industry will tend to the long term position where output of rubber products is closely correlated to growth of GDP;

ii.) export market growth will slow as easily exploited markets are saturated, products come under more intence price competition from lower factor cost countries and Malaysian exports find progress in more demanding markets slow to achieve.

In the sectors below we examine prospects in both domestic and export markets, to assess likely future growth.

Domestic Market

During the Fifth Plan period 1985 - 1990, in real terms output of the industrial and general rubber goods industry, as measured by rubber consumption, grew faster than GDP, broadly in line with manufacturing. Figure 76 below presents indicators of performance for the economy and the industry:

The Growth of GDP Manufacturing and IRG & GRG - Output 1985-1990	
Indicator	**Growth during Fifth Plan 1985 - 1990 (% p.a.)**
GDP	6.7
Manufacturing	13.7
Construction	0.4
Rubber consumption industrial and general rubber goods (1)	12.5

Note (1): From 1986-1990

figure 76

Rubber consumption and hence industry output during the 1985-1990 period was held back by the poor performance of an important end-use sector, construction. Nevertheless, growth of output was roughly in line with manufacturing growth.

Evidence over the past two years shows that this pattern has been broadly speaking maintained though in 1991 rubber consumption appears not to have grown despite booming manufacturing and construction sectors whereas in 1992, rubber consumption outpaced both manufacturing and construction.

Looking to the future, projections for the economy, manufacturing and construction industries are as follows:

Indicator	Sixth Malaysian Plan 1990 - 1995 (% p.a.)	Outline Perspective Plan II 1990 - 2000 (% p.a.)
GDP	7.5	7.0
Manufacturing	11.5	10.5
Construction	8.0	7.0
Consumer Expenditure	n/a	7.2

figure 77

These estimates represent strong growth over the next decade with slightly faster growth in the 1990-95 period than in later years. In fact, it is likely that in the 1990-95 period, GDP, manufacturing and construction will exceed these projections. In the 1990-93 period, GDP growth has been more than 8% in all years, manufacturing over 13% in all years, whilst construction though more erratic has recorded 14.6% and 13.5% growth in 1990 and 1991 and 11% in 1993.

The projections above also show that growth will occur across all areas. Though manufacturing will record the highest growth, GDP, construction and consumer expenditure are also expected to grow rapidly. Hence, it is likely that all parts of the industrial and general rubber goods industry will face growing markets.

There is evidence to suggest that over the next five years, domestic demand for rubber products may grow faster than even the manufacturing sector. Key end-use sectors for industrial products such as automotive and construction are poised for very high rates of growth and new demand will emerge from machinery and oil sectors as set out in our First Interim Report.

But after that period, growth is expected to slow and may well fall below the rate of growth of manufacturing. Domestic markets for industrial and rubber goods will by then start to become mature and will grow only at the level of GDP growth. Therefore looking to the next decade, 1992-2002, it would not be unreasonable to project the growth of domestic demand for rubber goods at around the rate of growth of manufacturing.

Provided the domestic industry maintains its level of competitiveness, output serving the domestic market should therefore grow at 10% p.a.

Export Markets

In addition to domestic demand, a high proportion of the industrial and general rubber goods ouput is exported. Official figures would suggest that almost all the output is exported. We believe, however, that official figures substantially underestimate output and hence a more accurate assumption is that 50% is exported.

During the 1982-1992 period exports of industrial and general rubber goods increased on average by over 16% per annum though from a low base. Recent evidence suggests that export growth has slowed down as a result of world recession and the fact that the industry has already exploited the most easily accessed opportunities. Though growth remained strong up to 1991, in 1992 it slowed to 7% p.a.

With the slow down in world trade in 1993 and key markets such as Japan and much of Western Europe remaining depressed, export growth will slow further.

But with recovery in world trade expected from 1994 onwards and a trend towards greater international trade in rubber products, over the next five years, export growth should recover and remain strong at 7-8% per annum for the next 3-4 years.

After that period, Malaysian industrial and general rubber goods manufacturers may find such a high rate of growth difficult to maintain. Competition is likely to increase and easily accessed markets become close to saturation. We would expect the rate of growth to fall to perhaps 5-6% p.a.. Hence, over 1992-2002 decade export growth is likely to average about 7% p.a..

Main Performance Indicators

Over the 1992-2002 period, output for the domestic market can be expected to grow at 10% p.a. and export markets at 7.0%. Overall, output would be expected to grow at about 8.5% p.a. With output increasing fast, rubber consumption will increase rapidly too. But, it is unlikely to keep pace with growth of output demand. An increase in value added is not only desirable but must occur if the industry is at all likely to cope with increasing labour costs.

Taking these trends on board, figure 78 presents our projections for output, exports and rubber consumption over the 1992-2002 period without the Action Plan. We have used official figures as the basis of our projection to present estimates which can be monitored easily. As we stated in the First Interim Report, we believe official figures to be underestimated:

Projections for the Growth of the Industrial and General Rubber Goods Industry 1992-2002 Without Action Plan

Indicator	1992 (M$ million)	2002 (M$ million)	Average Annual Growth (% p.a.)
Output	351.2	810.0	8.5
Exports	222.2	440.0	7.0
Rubber consumption	44.5	88.0	7.0
% NR	85%	75%	

figure 78

It should be noted that despite these very impressive rates of growth the industry is likely to remain smaller than tyres and tubes (1992 output M$855 million) and much smaller than the latex sector (1992 output MS1283 million). Further, Malaysia's industrial and general rubber goods industry will remain much smaller than the industries of countries such as Taiwan. Rubber consumption in the non-latex GRG sector in Taiwan exceeded 150 thousand tonnes in 1992.

Projected Growth of the Malaysian Industry - With Action Plan

The Action Plan is likely to impact on all the above indicators of development. The aim of the Action Plan is designed to improve the competitiveness of the industry in both domestic and export markets. Hence the Malaysian industry can be expected to improve its share of the domestic market and to increase exports.

The overall effect of the Action Plan on key indicators of performance and the specific measures which will bring about the improved performance are shown in figure 79:

Effects of Action Plan

Measures	Effect
Output:	**higher for both domestic and export markets**
Technology Centre - problem solving - technology transfer	Greater share of domestic market for technically demanding products. Export of technically demanding products
Export Market Development	Greater marketing capability for export markets
Alliances/JVs/Investor Promotion	New entrants serving both the domestic and export markets.
Underdeveloped Product Areas	New end-uses exploited.
Import Substitution	Greater share of domestic market
Tariffs	Improved competitiveness in domestic market
Incentives	New entrants, investment
Exports:	**higher particularly in target markets**
Technology Centre	Greater manufacturing capability will allow new market segments to be exploited.
Export Market Development	Improvement in export marketing.
Alliances/JVS/Investor Promotion	Exports from new entrants.
Underdeveloped Product Areas	New product markets developed.
Rubber Consumption:	higher as a result of increased output, but higher value addition likely, so increase not as high as output.

figure 79

Whilst in some instances it is possible to quantify relatively precisely the benefit that would arise from each measure for other measures it is possible only to state the general effect. We set out the expected benefits of each measure below:

Measures	Likely Impact
Technology Centre	Difficult to measure precisely. As a rough guideline, for each M$ spent on consultancy, an output increase of M$20 can be expected. Rough estimate of impact would be M$10 million per year from 1995 onwards.
Export Market Development	Assuming 10:1 ratio of consultancy spend to exports, M$27 million increase in exports.
Alliances/JVs/Investor Promotion	If one new venture results, increase of M$10 million in output, M$5 million in exports likely.
Underdeveloped Product Areas	Brings forward entry into new product areas. All gains cannot be considered incremental as area may have developed later, without intervention. But early development of product capability likely to result in higher aggregate output and exports.
Import Substitution	Systematic targeting of imported products should result in lower imports. If programme succeeds in replacing 5% of current value of imports, will cause over M$10 million increase of output.
Tariffs	Tariff reform should result in greater competitiveness in domestic market, but difficult to quantify.
Incentives	Should result in greater investment and hence improved manufacturing capability and perhaps greater number of new entrants, but difficult to quantify.

figure 80

It should be noted that the measures reinforce each other. Hence their effect taken together would be more than their individual parts. For instance, the improved capability and competitiveness resulting from the Technology Centre would contribute to the success of the export development programme and the drive for import substitution.

Based on the above evaluation of the effects of the measures, we expect that by the year 2002 the key performance indicators for the industry would at least have been changed as follows:

Projections for the Industrial and General Rubber Goods Industry With Action Plan - 1992 - 2002

Indicator	1992 (M$ million)	2002 (M$ million)	Incremental Gain Over No Action Plan (M$ million)	Average Annual Growth (% p.a.)
Output	351.2	890	80	9.7
Exports	222.2	490	50	8.2
Rubber Consumption	44.5	95	7000 tonnes	7.9
%NR	85%	70%		

figure 81

The figures above indicate that we would expect output to be 10% higher, exports over 11% higher and rubber consumption 8% higher. The use of both types of elastomer would increase, but SR is likely to increase its share of rubber consumption fr the following reasons:

As noted in the Second Interim Report, it is our view that the future growth of rubber consumption in the GIRG industry will result in a greater proportionate use of SR over NR. The use of both types of elastomer will increase, but the growth of SR consumption will outstrip the growth of NR consumption.

Our view is based on the following:

i) As shown in figure 82 the proportion of NR in total rubber consumption in Malaysia is extremely high (93%) in comparison with other major rubber using countries where the proportion of NR is typically 30-60%. It is also higher than in the other major rubber producers, Thailand (76%) and Indonesia (69%). This is due mainly to the higher proportion of rubber consumed in the latex industry (62%) in Malaysia, but the proportion of NR in the GIRG industry is also very high (86%). As the GIRG industry expands in Malaysia, the proportion of NR in total rubber consumption, is likely to approach 50-50, which would bring it in line with the GIRG industries of major rubber consuming countries;

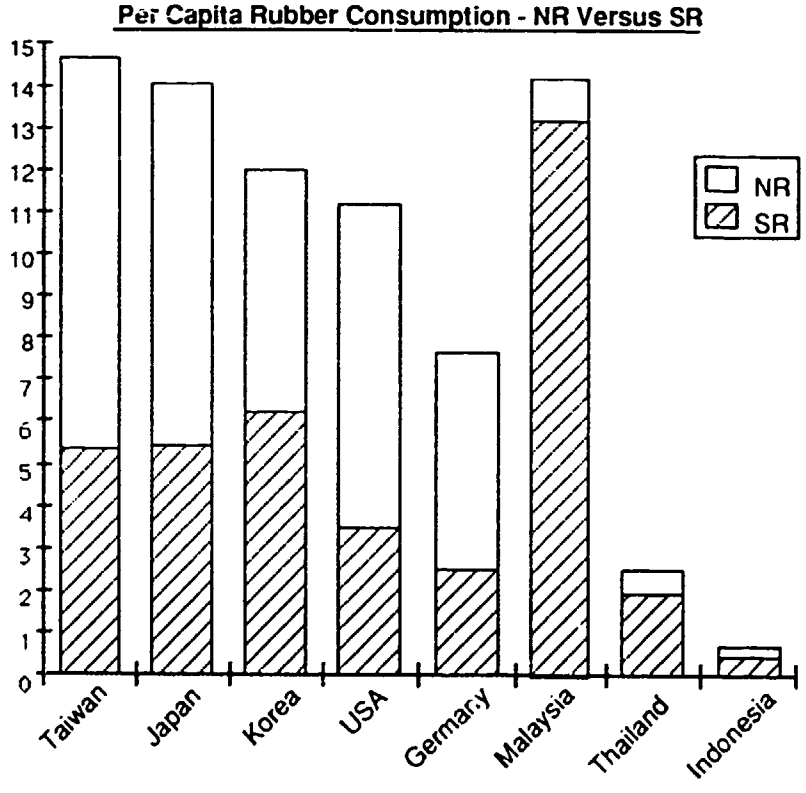

figure 82

ii) over the 1986-92 period, in the Malaysian GIRG industry, whilst total rubber consumption has increased by 11% p.a. consumption of SR has grown by over 40% p.a. leading to an increase in SR's share from 4% to nearly 15% of total consumption. This trend is likely to continue.

iii) in many of the end-uses which are likely to record high growth rates in Malaysia - automotive, electronic and electrical, machinery and the oil industry - SR is the dominant material for many applications;

iv) in terms of technological competence, the Malaysian GiRG industry is less familiar with predominantly SR products than NR products. As their competence develops in predominantly SR products, they will be able to exploit parts of the market currently met by imports and hence increase the proportion of rubber consumed as SR.

SR consumption is likely to increase faster than NR consumption but at a rate lower than the 40% p.a. increase recorded between 1986 and 1992.

We estimate that SR consumption will increase twice as fast as the rate of growth of total rubber consumption at 16% p.a. Thus by 2002, SR consumption is likely to have grown from the current 7.5 thousand tonnes to just over 32 thousand tonnes and its share in total consumption increase from 15% to 35%.

Overall, this outcome is by no means unfavourable to Government's objectives of promoting greater NR usage in Malaysia. Despite SR gaining share from NR, consumption of the latter is likely also to increase significantly, from the current 38 thousand tonnes to 62 thousand tonnes.

Government, through MRRDB, is attempting to influence the proportion of NR used by rubber goods industries worldwide by looking to enhance the performance characteristics of NR. We understand that the main new developments in this respect are the marketing of ENR 25 and ENR 50 with a view to matching SR's oil resistance properties, de - proteinised natural rubber (DPNR) which is purer, absorbs less water and has better dynamic properties than NR and the development of thermoplastic natural rubber (TPNR).

These products have tremendous potential but as yet, have not been able to compete commercially on a large scale against their synthetic rivals . If they were able to compete effectively on a large scale, they could make a significant contribution to the proportion of NR used by the GIRG industry.

The assumptions on incremental gains above are relatively modest. For instance, the following scenario is also possible:

i.) the programme to promote alliances and joint-ventures could result in 10 new ventures being formed which would result in additional MS100 million of output and MS50 million in exports instead of the MS10 million and MS5 million respectively, assumed above;

ii.) the combination of the Technology Centre and the import substitution programme result in 30% of the 1992 value of imports being manufactured domestically adding MS75 million to output instead of the MS15 million assumed above;

iii.) the export market development programme result in a 20:1 ratio of exports to consultancy spend instead of the 10:1 ratio assumed above and the mix of the Technology Centre and new product areas contribute a further MS20 million in exports. Hence, exports would increase by a further MS75 million instead of the MS30 million assumed above.

The cumulative effect of this scenario would be that industry output would be well over MS1 billion and rubber consumption for industrial and general rubber goods over 110 thousand tonnes. The Action Plan would thus have made a substantial difference to the development of the industrial and general rubber goods industry and enabled the sector to compete against tyres and tubes for the

position of second largest part of the industry after latex products. If this more favourable but still plausible scenario is realised, the Malaysian industry would start to become a major force in the Asia-Pacific region. Although not likely to be as large as the Taiwanese industry it would, nevertheless, have started to challenge it's position strongly.

In our analysis of the impact of the Action Plan we have not allowed for any gains in employment. Gains in labour productivity are essential if the Malaysian industry is to remain competitive and hence we believe that with the help of the Technology Centre, industry will attempt to increase the efficiency of labour use. No doubt the substantial increase in output would cause some increase in employment, but on the whole, output should increase as a result of higher value added and efficiency gains rather than higher labour usage.