3-3 Japan

3-3-1 Production Trends

The production volume of glassware in Japan was 3.1 million tons in 1987. Divided by product item, production of glass containers was 2.2 million tons, kitchen and tableware 0.14 million tons, and others 0.8 million tons. By production volume, glassware containers occupy the largest share. Between 1983 and 1987, the average annual increase of production of glass containers was negative 1.2%, and kitchen and tableware was 5.1%, while other glassware including glass bulbs as a major item showed a relatively high growth rate of 6.6%. (See Table VII. 3-10)

Table VII. 3-10 Production of Glassware Products in Japan

(Unit: 1,000 tons)

	1983	1984	1985	1986	1987
Glass Containers	2,305	2,413	2,251	2,149	2,202
Bottles for beverages	(1,280)	(1,371)	(1,224)	(1,160)	(1,149)
Others	(1,025)	(1,042)	(1,027)	(989)	(1,053)
Kitchen and Tableware	176	171	162	144	143
Glass	(97)	(94)	(85)	(73)	(71)
Others	(79)	(77)	(77)	(71)	(72)
Others	601	692	818	738	775
Bulbs for electron tubes	(363)	(423)	(526)	(478)	(517)
Light bulbs	(87)	(96)	(98)	(80)	(71)
Others	(151)	(173)	(194)	(180)	(187)
TOTAL	3,082	3,276	3,231	3,031	3,120

Source: Cabinet Statistics Dept., MITI

As shown in Table VII. 3-11, total output of glassware in 1987, on an ex-factory basis, reached ¥560 billion. Categorized by product, output of other glassware was ¥281 billion in terms of value, which accounted for about 50% of the total output of glassware, and it surpassed by far that of glass containers, which accounted for about 40%. Among the product items categorized in other glassware, bulbs for CRT occupied the largest portion, amounting to ¥189 billion.

3-3-2 Structure of the Industry

According to "Industry Statistics, 1981," the number of companies in the glassware industry was 1,355 in total. The number of employees in the industry was 64 thousand in total, which meant an average of 47 employees per company.

In the production of glass bottles in Japan, the 9 leading companies, which are the member companies of the Japan Glass Bottle Association, including Toyo Glass, Yamamura Glass and Shin Nippon Glass, jointly occupy more than 90% of the total output. In the production of glass tableware, the 5 so called "Machine processing" companies, such as Toyo Glass and Sasaki Glass, occupy a large share. For special glass for electronics, large companies represented by Nippon Electric Glass occupy a substantial share, making the market oligopolistic.

On the other hand, there are still a lot of manufacturers of handicraft glassware, production of which has not yet been automated, or of such glassware as bottles for drugs, containers for seasonings, containers for cosmetics, glass for lighting instruments and optical glass. These products are what is called "small quantity but large variety production items", and stemming from that nature, manufacturers of these products include numerous local small-scale ones.

Table VII. 3-11 Production Volume and Shipment Value of Glassware by Product Item in Japan 1987

	Production Volume (1,000 tons)	Shipment Value (¥ billions)
Glass Containers	2,202	223
(Bottles for beverage)	(1,149)	(103)
(Bottles for food and seasoning)	(503)	(48)
(Bottles for cosmetics and drugs)	(549)	(72)
Kitchen and Tableware	143	56
(Glass)	(79)	(28)
(Bowls and dishes)	(30)	(12)
(Others)	(35)	(16)
Others	775	281
(Bulbs for electron tubes)	(517)	(189)
(Light bulbs)	(71)	(16)
(Others)	(187)	(76)
TOTAL	3,120	560

Source: Cabinet Statistics Dept., MITI

3-3-3 Export and Import Trends

The total export value of glassware products from Japan in 1987 was ¥105.6 billion (approx. M$2.1). The major export product category was "others", which included glass bulbs for electronics tubes. The shares of glass tableware and glass containers in the total export value of glassware were very small, recording 10.4% and 1.0%, respectively.

Between 1983 and 1987, the average annual growth rate of exports showed an upward trend of 2.5%, but for 3 years since 1984, it showed a downward trend of negative 2.0%. (See Table VII. I 3-12)

On the other hand, the total import value of glassware products in 1987 was ¥30.7 billion (approx. M$600 million) as shown in Table VII. I 3-13. By Product, glass tableware, amounting to ¥12.1 billion, occupied 39.4% of the total import value,

followed by bead and other decorative items, and optical glass, taking 13.9% and 10.4%, respectively.

Table VII. 3-12 Export of Glassware Products from Japan

(Unit: FOB, ¥ million)

	1983	1984	1985	1986	1987
Glass tableware	9,990	12,482	12,486	11,376	11,062
Glass containers	1,763	1,450	1,556	1,116	1,086
Bottles for thermoses	16,320	14,918	15,699	12,196	10,192
Glassware products for the laboratory and hygiene	1,310	1,096	1,439	1,292	1,170
Optical glass	22,969	24,381	36,555	24,025	22,588
Glassware for lighting	1,378	1,697	1,728	920	559
Bead and other decorative products	1,228	2,009	2,458	2,589	2,763
Other glassware	40,718	54,262	69,154	53,055	56,134
TOTAL	95,674	112,294	131,436	106,569	105,555

Source: Cabinet Statistics Dept., MITI

Table VII. 3-13 Import of Glassware Products to Japan

(Unit : CIF, ¥ million)

	1983	1984	1985	1986	1987
Glass tableware	6,837	7,991	8,969	8,003	12,100
Glass containers	1,231	2,498	1,139	830	1,279
Bottles for thermoses	368	273	204	248	586
Glassware products for the laboratory and hygiene	1,234	1,303	1,521	1,119	1,262
Optical glass	4,651	4,559	4,633	3,477	3,202
Glassware for lighting	1,520	1,520	1,184	1,389	2,166
Bead and other decorative products	1,303	1,491	2,468	3,752	4,259
Other glassware	5,392	5,941	6,193	5,757	5,890
TOTAL	22,558	25,568	26,310	24,573	30,744

Source: Cabinet Statistics Dept., MITI

The import trend of glassware products to Japan showed a very stable average annual growth of 8.0% between 1983 and 1987. The leading item among imports was glass tableware, which increased its import value from ¥6.8 billion in 1983 to ¥12.1 billion in 1987, recording an average annual growth rate of 15.3%.

3-3-4 Future Trends

In 1988, the Japanese glassware industry is active thanks to (1) the increase in demand of glass bottles stemming from a substantial sales increase of beer and fresh juice, and (2) the increase in production of glass for electronic products stemming from an increase in demand for consumer electronics products.

On a long-term basis, however, domestic demand of existing glassware products is anticipated to reach a ceiling. To cope with the situation, for instance, the bottle industry has issued "Vision of the Glass Bottle Industry in the 1990's," and, in the vision, it was announced that the bottle manufacturer industry has to change its structure from the manufacture of simple "containers" to an "expression industry," where development of new design and new function are focussed.

Japanese glass tableware manufacturers, which have been heavily depending on exports, are losing their international price competitiveness in overseas markets because of the appreciation of the Japanese yen. Some manufacturers, therefore, are going toward new movements such as development of higher value-added domestic products, import of high-grade tableware through joint ventures with European manufacturers, and planning of overseas production.

On the other hand, for glassware products for the electronics field, it is considered to be difficult to maintain stable growth in Japan, as they have enjoyed before. The development of high value added special glass (new glass products) like optical fiber glass, for instance, is considered to be essential.

3-4 Korea

3-4-1 Trends of Production

(1) Trends of Production by Type

Production of glassware including bottles in 1984 increased 20.9% over the previous year to 633 thousand tons, but in 1985 it declined 2.1% to 619 thousand tons, and in 1986 it again fell 18.2% to 506 thousand tons. Responsible for the decrease of production was the growth in the use of such alternative containers as paper packs and cans for alcoholic liquors, soft drinks and medicine. As a result, production of glass bottles for these purposes dropped despite the strong demand for food and drink containers due to the recent growth of the food industry.

Production of glass tableware in 1984 increased 2.5% from the preceding year to 16.2 thousand, but in 1985 it declined 1.2% to 1.60 thousand tons. In 1986, however, it regained strength to rise 50.6% to 24.0 thousand tons. As a result, in 1986 the ration of tableware to total glassware production in Korea rose to 4.7% from the 2.6% mark in both 1984 and 1985.

Table VII. 3-14 Trends of Production of Glassware in Korea by Type of Product

(Unit: ton, %)

	1983	1984	(%)	1985	(%)	1986	(%)
Bottles for Alcoholic beverages	176,113	212,067	33.5	208,211	33.6	151,126	29.8
Bottles for mineral water	180,806	230,052	36.4	228,624	36.9	185,610	36.6
Bottles for medicine	117,892	141,819	22.4	135,718	21.9	121,032	23.9
Other bottles	24,389	22,600	3.6	21,259	3.4	14,511	2.9
Tableware	15,761	16,150	2.6	15,962	2.6	24,044	4.7
Others	8,603	10,028	1.6	9,602	1.6	10,162	20.0
Total	523,564	632,716	100.0	619,376	100.0	506,485	100.0

Source: The Korean Glass Industry Cooperative Association

3-4-2 Industry Structure

As of the end of September 1987, firms which were members of the Korean Glass Industry Cooperative Association numbered 67. Among them, 55 firms produce glassware including bottles, tableware and glasses, and 12 of them manufacture only glass bottles. Among the member firms of the association, 10 major manufacturers dominate the domestic market with a combined share of more than 90%. That figure rose a little from 96.8% in 1984 to 98.2% in 1985 and declined to 92.8% in 1986. Table VII. 3-15 shows the 10 major firms' volume of sales and market shares of the total domestic demand.

Table VII. 3-15 Market Share of 10 Leading Glassware Manufacturers in Korea

(Unit: tons)

		1984	1985	1986
Total demand	Glass bottles	591,215	550,000	509,528
	Glass tableware	11,232	12,200	30,326
		(4,099)	(2,800)	(4,250)
	Total (A)	598,348	559,400	535,604
Total sales by 10 leading companies (B)		579,259	550,503	496,986
B/A (%)		96.8	98.2	92.8

Note 1. Figures in parenthesis are import volume of glass tableware, which are excluded from the total demand

2. No imports of glass bottles

Source: The Korean Glass Industry Cooperative Association

3-4-3 Production System

As mentioned above, 67 firms were members of the Korean Glass Industry Cooperative Association as of the end of September 1987. Of these firms, 10, or 14.9%, have fully automated facilities. five (7.5%) have semi-automated facilities while 52 have manually-operated facilities. Along with the growth of the domestic economy since 1972, the level of national income rose and the consumption of glass bottles for alcoholic liquors and soft drinks increased. Major firms then entered the field and started to produce vials for medicines and cosmetics, using automated facilities.

(2) Employees

As of the end of July 1987, the number of employees of the association member firms totaled 10,394. The most numerous among them are skilled workers, numbering 4,456 and accounting for 42.9% of the total. In addition, unskilled workers numbered 2,692; clerical personnel, 1,453; technical personnel, 806; and other, 987.

Table VII. 3-16 Worker Classification by Occupation and Sex

No. of workers	Engineers	Skilled workers	Unskilled workers	Admin-istration	Others	Total	%
Male	795	3,335	1,500	1,062	548	7,240	69.7
Female	11	1,121	1,192	391	439	3,154	30.3
Total	806	4,456	2,692	1,453	987	10,394	100.0

Source: The Korean Glass Cooperative Association

(3) Wage Levels

The wage levels of workers in the glassware manufacturing industry at the end of June 1987 are shown in Table VII. 3-17.

Table VII. 3-17 Contents of the Wage Settlements in a Korean Glassware Manufacturer by Size of the Company

(Unit: Day, hour, wage)

Company size by number of employees	Average monthly work days	Average monthly work hours			Average monthly wage		
		Total work hours	Normal work hours	Overtime work hours	Total monthly wage	Fixed and overtime payment	Bonus
10-29 employees							
Production Workers	26.4	232.4	211.1	21.3	196,963	196,963	-
Male	26.4	232.4	211.1	21.3	196,963	196,963	-
Female	-	-	-	-	-	-	-
39-99 employees							
Production Workers	26.0	224.4	207.1	17.2	231,786	181,084	50,701
Male	26.1	224.2	208.1	16.0	262,031	209,029	59,002
Female	25.7	224.8	205.3	19.5	173,497	138,792	34,705
100-299 employees							
Production Workers	26.2	262.2	213.2	49.0	317,258	258,221	59,037
Male	27.0	265.6	215.3	50.3	365,206	295,162	70,043
Female	26.2	254.0	208.2	45.3	200,239	168,062	32,176
300-499 employees							
Production Workers	26.2	249.4	209.9	39.5	599,929	324,406	275,522
Male	26.4	245.2	210.8	34.3	649,047	347,443	301,603
Female	25.6	273.5	204.5	69.0	319,419	192,845	126,574
Over 500 employees							
Production Workers	27.7	242.1	207.9	34.2	782,044	350,677	431,367
Male	27.8	242.2	207.9	34.2	789,175	533,578	435,597
Female	26.4	239.7	208.0	31.7	363,984	180,619	183,364

Source: The Ministry of Labor

(4) Cost Structure

In the prime cost structures for glasses and glassware, the ratio of material expenses in 1986 rose to 60.3% from 54.0% in 1985, while the ratio of labor and various other expenses tended to fall. Table VII. 3-18 shows the prime cost structure of major and smaller firms.

Table VII. 3-18 Glass Products' Cost Structure by Size of Firms in Korea

			Large firms		Medium & small firms	
	1985	1986	1985	1986	1985	1986
Total prod. costs	100.00	100.0	100.0	100.0	100.0	100.0
Raw materials	54.0	60.3	53.3	60.1	57.4	61.3
Labor costs	15.3	14.6	15.2	14.3	16.1	16.3
Other expenses	30.6	25.1	31.5	25.7	26.4	22.4
(Employee welfare)	1.0	0.9	1.0	0.8	1.2	1.4
(Electricity)	4.4	3.7	4.3	3.8	4.7	3.5
(Water & lighting)	3.5	1.8	3.5	1.9	8.6	1.4
(Depreciation)	6.7	8.1	7.2	9.0	4.3	3.8
(Others)	15.0	10.7	15.4	13.9	12.5	12.2

Source: Bank of Korea

(5) Regulations

1) Inspection Regulation

In its Notification No. 81-2942 dated December 31, 1981, the Industry Promotion Agency designated industrial products requiring quality inspections (revised on September 27, 1986). Under the notification, kitchenware and tableware made of glass require ex post facto quality inspections. Twice a year, therefore, the Industry Promotion Agency at its discretion gathers glassware and tableware on the streets, asks the Korean Chemical Analysis, Experiment and Inspection Laboratory in Inchon or the Industrial Experiment Agency to inspect them, and issues correction orders to manufacturers of products found not meeting the inspection standards. Also, ward offices (industry sections) of major cities gather products on the streets four times a year, ask the above-mentioned test organs to inspect them, and issue correction orders in cases of failure to meet the standards. Moreover, the Korean Glass Industry Cooperative Association also (1) voluntarily makes experiments and analyses to see whether the ex post facto inspection standard values are appropriate and (2) gathers products on the streets for its own experiments and analyses as well as for inspection by authorized organs. The association informs the manufacturers concerned of the inspection results so as to make them improve product quality and takes steps to ban the sale of products found not meeting the inspection standards after a re-examination.

2) Anti-pollution Regulation

Based on the Environment Preservation Law (established on December 31, 1977), the Environment Agency on occasion inspects polluting facilities, in particular focusing its checkups on waste water disposal equipment, dust and smoke.

Further, the Korean Glass Industry Cooperative Association has responded to calls for the preservation of the environment through the introduction of a system for member firms to take their own measurements of pollutants.

(6) Purchase of Raw Materials

Currently, Dongyang-Chemical is the sole producer and supply source of soda ash, one of the main raw materials of glassware. Sale prices of soda ash by the firm are higher than the international level because salt, one of the main raw materials of soda ash, has to be imported.

The Korean Glass Industry Cooperative Association is implementing a system for the joint purchase of raw materials by member firms on an annual basis with the financial aid of the government. Aimed at the stable operation and timely purchase of raw materials, the system allows member firms to obtain raw materials at low prices. Response of the member firms to the system has been favorable with 56 firms out of the membership of 59, or 94.5%, taking part in 1986.

Contents of the joint purchase of raw materials in 1986 are as shown in Table VII. 3-19.

Table VII. 3-19 Details on Joint Purchases of Raw Materials

(Unit: 1,000 won)

		1986 Planned		1986 Purchased	
		Quantity	Value	Quantity	Value
Soda ash	tons	9,000	1,503,000	10,141.1	1,691,545
Silica sand	tons	200	9,400	-	-
Limestone	tons	150	23,550	135.6	21,702
Arsenious oxide	tons	60	42,540	121.3	101,123
Potassium carbonite	tons	250	142,500	250.1	142,557
Borax	tons	1,500	540,000	1,843.8	642,112
Boric acid	tons	150	109,950	183.3	132,169

Source: The Korean Glass Industry Cooperative Association

3-4-4 Problems Faced by the Korean Glassware Industry

(1) Over Capacity of Glass Bottle Manufacturers and Structural Change

The bottle market in Korea, which is estimated to reach 150 billion won per year, has been declining as alternative products, such as PET bottles, packs and cans, penetrate. As a result, the production capacity of bottles, which is more than 700 thousand tons per year, surpasses the annual demand, which is less than 500 thousand tons, leaving excessive production capability of more than 200 thousand tons. These two movements have had an increasingly bad effect on the management of bottle manufacturers, and they are trying to shift their product line from bottles to glass tableware.

(2) Introduction and Development of New Technology

The development of new technology in the fields of quality improvement, diversification and introduction of high end products of glassware has been emphasized. It is regarded as necessary to push forward actively some measurements such as invitation of engineers from advanced countries to received technical instruction, while introducing new technologies from advanced countries such as the U.S. and Japan.

(3) Modernizing Production Facilities for Energy Saving

As the glassware industry is one of the major energy consumption industries, stable supply of various fuels and improvement of heat efficiency are regarded as important. Construction of NIRI-type kilns in addition to replacing old production facilities, therefore, has been undertaken among the industry to increase the efficiency of heat utilization in the processes of melting and annealing.

(4) Stable Procurement of Raw Materials

Soda ash, one of the main raw materials of glassware, is supplied solely by a single company, and its selling price is higher than that in the international market. This

is because the principal raw material of soda ash, salt, is imported mainly from Japan. It is, therefore, necessary to build up long-term plans including the scaling up of production facilities to turn out pure salt from domestic coarse salt, development of new production technology and increase of storage facilities.

(5) Sophistication and Diversification of Glassware Products

In competing countries/areas in the export of glassware, represented by Japan and Taiwan, up-grading and diversification of glassware products are carried on, focusing on glass craftwork and industrial glassware. On the contrary, in Korea, production of glassware is concentrated on bottles, such as those for medicine. It is, therefore, suggested to re-design the structure of the industry in order to cope with the need to increase exports.

3-4-5 Export and Import Situation

(1) Changes in Exports

Glassware exports in 1986 amounted to US$25.04 million, an increase of 93.2% over the previous year. The large increase contrasted sharply with the 32.8% fall in 1985 to $12.96 million.

Tableware exports in 1985 fell 17.1% from the preceding year to $6.64 million but in 1986 rose 78.0% to $11.81 million.

As a result, the ratio of tableware to the total of glassware exports was 41.5% in 1984, 51.2% in 1985, and 47.2% in 1986.

Divided by country of destination, the Middle East was the biggest customer, followed by Southeast Asia and Japan. (Refer to Table VII. 3-20)

Table VII. 3-20 Export of Korean Glassware by Destination of Country/Region, 1986

(Unit: US$)

	Glass Bottles	Tableware	Crystal Glass	Others	Total
U.S.A.	154,705	65,955	2,439,486	530,069	3,191,215
Japan	2,858,739	476,526	408,627	4,388,946	8,132,840
Southeast Asia	1,251,786	3,904,296	138,656	212,476	5,507,206
Middle East	402,420	6,976,359	-	67,399	7,446,178
Europe	26,000	151,067	320,997	-	498,064
Africa	-	239,267	-	-	239,267
Total		4,722,066	11,813,406	2,307,766	5,198,892
25,042,186					

Source: The Korean Glass Industry Cooperative Association

(2) Change in Imports

Glassware imports in 1986 reached $11.79 million, about three times those in 1985, which had amounted to $3.97 million or a 4.1% increase from the previous year. The increase in imported glassware was attributed to people's preference for imports stemming from an increase in the level of living due to an increase in national income, and an increase in hotel construction targeting foreign visitors, who are expected to increase towards the '88 Olympic Games.

By product category, glass tableware is, by far, the largest import, accounting for 97.8% of the total import of glassware in 1986. By country, import from Japan is the largest, followed by France, the U.S. and West Germany.

Table VII. 3-21 Import of Glassware to Korea by Country

Unit: volume: ton
Value: US$1,000

	Country	1984		1985		1986	
		Volume	Value	Volume	Value	Volume	Value
Glass	Japan	1,594	2,087	2,153	2,475	4,536	6,349
tableware	France	531	902	311	589	1,585	3,920
	U.S.A.	102	292	149	373	205	522
	Italy	530	257	46	93	93	206
	Fed. Rep. of Germany	156	144	116	113	154	349
	Others	57	117	36	140	54	158
	Total	2,970	3,977	2,811	3,858	6,627	11,534
Glassware	Japan	1	14	27	105	8	44
for	Others	-	-	3	6	27	210
decoration	Total	1	14	30	111	35	254
	TOTAL	2,971	3,813	2,841	3,969	6,662	11,788

Source: The Korea Glass Industry Cooperative Association

(3) Measures to Promote Exports and to Control Imports of Glassware

1) Export Promotion

Government and economic organizations are undertaking three measure to promote the export of glassware; (1) utilization of export related organizations such as KOREA, (2) supply of overseas market information and implementation of export deals and (3) sending sales missions to overseas countries to study the situation of overseas markets and development of the export market. To increase international competitiveness steadily the Korean Glass Industry Cooperative Association is promoting the following measure:

Increase in quality: of	1. Development of high quality glassware (obtain authorization K.S. mark and Q mark) 2. High grading and diversification of quality (responding to '88 Olympic Games)
Modernization of production:	1. Development of a new energy saving kiln (NIRI type kiln) 2. Implementation of voluntary experiments and analysis to prevent environmental pollution (own experiment and analysis laboratory)
Training of engineers	1. Establishment of training center to teach and train domestic glassware engineers (technical training) 2. Establishment of glassware craft 3. Overseas training to study the latest technology
Opening of various exhibitions:	1. Exhibition of household glassware 2. Exhibition to compare domestic products with overseas products 3. Exhibition of glassware craft 4. International exhibition to aid penetration into overseas markets 5. Exhibition of kitchenware for '88 Olympic Games 6. Sending of missions to study overseas industries and analyze overseas markets (the U.S., Europe, Southeast Asia)

2) Measures to Curb Imports

Effective July 1, 1983, glass tableware became an automatically authorized import item (AA item). But the government of Korea, in 1984, appointed glass tableware and glassware for kitchen (CCCN 7013) to the item, of which supplying countries have to be diversified. The measure was taken because imported glassware is preferred in the Korean market, which might subsequently cause rapid increase of imports of the product and cause more difficulty for domestic glassware manufacturers. Since 1984, import of products from Japan has been banned because of the regulation. Imports from other overseas countries are under strict inspection on quality and standards. European countries were demanding deregulation of this kind of import control measure taken by the Korean government. The government of Korea, to avoid trade friction, has widely decreased the number of items to be inspected in quality, and before-and-past inspection and import inspection have been exempted of products which have obtained such famous overseas standards as UL and JIS, since July 1, 1987.

3-5 Europe

3-5-1 Overview of the Market

As shown in Table VII. 3-1 and Fig. VII. 3-1 over the international market of glassware products, Europe is the largest glassware market in the world, taking 47.9%, or about half of the world's total import in 1985. According to data compiled by a magazine specializing in the field, the sales value of glassware products at retail prices in Europe was US$2.75 billion in 1984, and the major consuming countries included West Germany accounting for 24.4%, France 20.7%, Italy 14.9%, Spain 13.8% and the U.K. 11.8%. The combined market share of these 5 countries was more than 87% of the total import in Europe.

It has long been considered to be difficult to enter into the European glassware market since this market, having a long history with traditional industries was protected with many famous brand names. For the last several years, however, products from eastern Europe, Korea or Taiwan showed a remarkable penetration into the European market. This was made clear when JETRO sent professionals to Europe and conducted a market survey in February 1986.

3-5-2 Market Trends

In the European glassware market, production and demand both show healthy growth every year. A wide range of products, which effectively combine highly skilled handcraft products and machine processed products, are widely sold in the market.

High-grade handcraft crystal glass products take a relatively high share of 15-20% in the European market. In sales of this product category, the U.K., West Germany and France are the leading countries. Machine processed crystal glass products, which were rarely sold in the market some 20 years ago, have increased market share, and today hold a share close to that of handcraft products. In this field, the largest market is Italy, and 20% of all the sales of glassware products in Italy is taken by machine processed crystal glass products.

Machine processed soda glass products for mass-merchandising are low in price and have a wide variety of product items, and it is estimated that these products occupy more than 50% of the total sales in the European glassware products market. Furthermore, the products have shown an upward market share recently. In the last 5

years, the total sales of glassware products have been increasing as a result of the increase in sales of low-price soda glass products although handcraft crystal glass products have shown a downward sales trend. An increasing number of importers have changed their major importing country for low price products from West Germany to France to minimize the influence of currency fluctuation. Products made by Durand in France are, especially, shown in any city in Europe, and take large market share. Low-end products from East Germany, Czechoslovakia, Rumania and Spain have increased their presence.

By category, the European market is divided as follows:

(a) Market consisting of low price practical products, which are imported from middle income countries and developing countries

(b) Market consisting of high grade products, focussing on crystal glass products sold at specialty stores or department stores

(c) Market consisting of gift products, which are high value-added such as etching

(d) Market consisting of artistic products using colored glass produced in such countries as Italy and Austria.

3-5-3 Quality and Design

Glassware products in Europe have wide variety of product items, coming from its tradition, and their quality and design are regarded to be excellent. The many designs of the products can well match furniture or interior decoration, while being practical and decoratively beautiful.

High-grade crystal glassware is mostly produced in Czechoslovakia, West Germany and France, and is enhanced with added value such as traditional decoration and cutting. These products could be marketable even if only several pieces are produced per day. Most of the middle-grade products for practical usage are of European make. Most products are simple with less decoration although no substantial difference in quality is shown between them and high-grade products. These products are well designed and easy to use since they are used in everyday life. From an engineering point of view, in most cases, high-grade products are handcrafted, and middle-grade products are machine processed with handcraft decoration.

Popular products, which are spread over the countries, are mostly machine produced. Countries producing these products include East Germany, Rumania, Italy, France, Korea and Taiwan. Products made in France and Taiwan especially are found everywhere.

3-5-4 Retail Price Trends

The average retail price of glassware product in 1986 has increased 30% from 1983, or 10% from 1985, although there was no substantial difference in quality.

High-grade handcraft crystal glass products, made in Czechoslovakia, West Germany and France, use high technique in cutting and decoration, and the prices are high. Middle-grade crystal glass products, made by machine and handcraft, are used in everyday life by ordinary families and the prices are moderate.

At the handcraft element increases, the price of the product increases, and as the machine process element increases, the price of the product goes down.

3-5-5 Trends of Demand

Since Europe is a market with a long tradition, famous brand names, such as Baccarat and Kost Boda, are well known by consumers.

Glass tableware shown at retailers mostly consists of stemware such as wineglasses, and glasses such as tumblers. Glassware products used at the dining table are limited to salad bowl sets and dinner sets as chinaware products are preferred. Glassware products for cooking have become popular. Heat resistant glass pans and pots made by Corning, U.S.A., and heat resistant glassware for oven and microwave oven use have sold well sold recently. Glass kitchenware, made of wood, plastic and metal combined, is also gaining popularity.

Generally speaking, any region or country has its own characteristics. For instance, people living near the Mediterranean Sea prefer colorful and bright glassware, while people living in northern regions prefer dark or monotone glassware as they have a long dark winter season.

In the northern part of Europe, they spend lots of time in choosing goods, and the goods are used for a long time. The purchasing cycle, therefore, is relatively long.

3-5-6 Competitiveness

The high-grade product market in Europe is dominated by European products, of which the major producing country is Czechoslovakia. Each company produces high quality products with its own design, and its brand name is well known.

European manufacturers, through technical agreement, let manufacturers in eastern European countries produce their products with their brand names, and have started export of the products to European countries and the U.S.A. These products are of good quality, of European design, and of reasonable price.

Japanese products stand between high-grade and middle-grade, and, in the future, they are likely to compete with products of eastern European countries. As far as popular product items are concerned, penetration of products made in eastern European countries or developing countries is remarkable, but the finishing of the products is rough in quality and the packages are not good either, while the prices are cheap.

In the past several years, a popular product item made by D-Company in France has substantially increased its market share. This product is machine made and its quality is not so good but it is stable, and the price is very low. The product is always seen on sale in any department store or in any supermarket in Europe, and it competes with products from eastern Europe or developing countries.

On the whole, French products, varying from high-grade to low-grade, are increasing penetration into the European market, and the products compete with many products from many countries.

4. Cost Analysis

4-1 Unit Production Cost Comparison

The unit costs of major items used for the production of glassware both in Malaysia and in Japan were investigated and compared. The results are briefly summarized as follows:

Table VII. 4-1 Unit Production Cost Comparison

(Unit: M$)

Item	(Unit Volume)	Malaysia	Japan
A. Raw Material			
1) Silica sand	(ton)	30-40	124-144
Fe_2O_3; 0.1%			(124)
Fe_2O_3; 0.03%		(144)	
2) Limestone	(ton)	40	112
3) Aluminum hydrate	(ton)	400	n.a.
4) Iron oxide	(ton)	50	108
5) Soda ash	(ton)	447	684
6) Carbon	(ton)	1,622	810
7) Cromite	(ton)	3,850	4,240
8) Mirabilite	(ton)	530	600
9) Cullet	(ton)	120	280
B. Fuel			
1) Heavy oil	(kl)	300	580
2) LNG	(kg)	0.82	0.82
3) Gasoline	(l)	0.92	2.60
C. Water & Power			
1) Industrial water	(m^3)	Pumping from well	0.46
2) Power	(kwh)	0.21	0.30
D. Labour			
1) Unskilled	(Monthly salary)	250-350	4,000
2) Skilled	(Monthly salary)	350-450	8,350
3) Foreman	(Monthly salary)	450-500	10,850
4) Technician	(Monthly salary)	800	25,050
E. Transportation			
1) Truck-shorter	(720ml bottle)	0.01	0.03
than 20 km	(360ml bottle)	0.005	0.016
2) Truck-between	(720ml bottle)	0.04	n.a.
KL & Johore	(360ml bottle)	0.02	n.a.
F. Moulds			
1) Moulds for 6 section	(set)	25,000-30,000	n.a.
2) doubled-gob application			

Source: Field interviews

The above comparison results show that the raw materials costs of silica sand, limestone and cullet are low in Malaysia, while other material costs in Malaysia are relatively high compared with those in Japan. In fuel and utility costs, the costs of such items as gasoline or heavy oil are low in Malaysia, while the electricity costs in Malaysia have not such a large price advantage compared to those in Japan. In those unit costs such as labor or truck transportation, Malaysia has an obvious price advantage to Japan.

4-2 Manufacturing Cost Comparison between Malaysian and Japanese Products

4-2-1 Cost Comparison by Type

In order to evaluate the approximate level of production costs of glass containers in Malaysia, a type of product was selected and its production costs both in Malaysia and in Japan were investigated. The results are as follows:

Production Cost Comparison

Type of Product	Manufacturer	Production Cost (Ex-factory price)
One-way bottle for soft drink content 300 ml, weight 175 - 180g; bottle before film sealing	Malaysian firm A	M$0.19/bottle
	Malaysian firm B	M$0.15/bottle
	Japanese firm C	M$0.26/bottle

Further comparison was conducted for some other types of products. In most types of glass bottles, the present production costs in Malaysia were found to be much lower than those in Japan.

Type of Product	Malaysian Firm A	Japanese Firm C
(1) M$0.48/bottle Small size, amber(weight 260g)	Beer bottle	M$0.22/bottle
(2) M$0.49/bottle Film sealed (weight 175g)	Bender 300 PII	M$0.45/bottle
(3) M$0.83/bottle Orange juice (weight 397.5g)	Soft drink bottle	M$0.40/bottle

The film application cost in Malaysia for the above film sealed bottle Bender 300 PII is estimated at around M$0.19/bottle for the material and M$0.01/bottle for processing.

4-2-2 Manufacturing Cost Structure Comparison

As an approach to analyze the factors which create the difference of production costs between Malaysia and Japan, the manufacturing cost structure among Malaysian glassware manufacturers and an average Japanese manufacturer was investigated and compared. Because of the lack of data publicly available, many items were estimated from the results of the field interview survey. Thus, the comparison results are not very accurate.

Table VII. 4-2 Comparison of Glassware Production Cost Structure

(Unit: M$/ton)

Cost Item	Malaysian firm A. Co.		Malaysian firm B. Co.		Japanese firm Average of 7 firms	
Direct production costs						
Raw materials	152	(26.7)	167	(23.2)	300	(30.4)
Direct labor	182	(32.0)	201	(27.9)	365	(36.9)
Utilities	46	(8.1)	57	(7.9)	72	(7.3)
Depreciation	46	(8.1)	61	(8.4)	19	(1.9)
Other direct cost	30	(5.3)	46	(6.4)	61	(6.2)
Sales & administration costs						
Labor	38	(6.7)	34	(4.7)	65	(6.6)
Packing & transportation	11	(1.9)	11	(1.9)	27.	(2.7)
Interest payment	15	(2.6)	87	(12.1)	30	(3.0)
Others	49	(8.6)	57	(7.9)	49	(5.0)
Total Production Costs	569	(100.0)	721	(100.0)	988	(100.0)

Source: Field interviews
"Cost Structure Index of Small-and-medium Scale Industries", Small-and-medium Scale Industry Agency, Japan

Table VII. 4-2 shows that Malaysia glassware manufacturers have a cost advantage over Japanese manufacturers both in raw materials and direct labour costs. Due to the difference in production volume, however, Japanese firms have an advantage in the cost burden of depreciation expenses for the production of one ton of glassware products. In a Malaysian firm, the share of interest expenses to the total production cost exceeds 12%, which badly affects their cost competitiveness.

The raw material costs which are needed for the production of one ton of glassware products both in Malaysia and in Japan were estimated and compared. The results are shown in Table VII. 4-3 and Table VII. 4-4:

Table VII. 4-3 An Example of Unit Raw Material Cost in Malaysia

Name of Raw Material	(A) Input Volume (ton)	(B) Glass Conversion (%)	(C) Unit Cost (M$/ton)	(D) Glass Produced (ton)	(E) Raw Material Costs (M$)
Silica	100	95	40	95	4,000
Soda ash	32	58.5	447	18.7	14,304
Limestone	23	56	40	12.9	920
Mirabilite	1.0	43.7	530	5.3	530
Carbon	0.2	0	1,622	5.3	324
Total	156.2	-	-	137.2(F)	20,078 (G)

Raw material costs per ton (G) ÷ (F) = M$148.50

Table VII. 4-4 An Example of Unit Raw Material Cost in Japan

Name of Raw Material	(A) Input Volume (ton)	(B) Glass Conversion (%)	(C) Unit Cost (M$/ton)	(D) Glass Produced (ton)	(E) Raw Material Costs (M$)
Silica	100	95	124	95	12,400
Soda ash	32	58.5	684	18.7	21,888
Limestone	23	56	112	12.9	2,576
Mirabilite	1.0	43.7	600	5.3	600
Carbon	0.2	0	810	5.3	162
Total	156.2	-	-	137.2(F)	34,626 (G)

Raw material costs per ton (G) ÷ (F) = M$256.85

In labour costs, the average monthly salary of general workers in Malaysia is at the level of M$350 - 450, while that in Japan would be around ¥200,000 (M$4,000), which is about 10 times higher compared to Malaysia.

In productivity per worker, there also exist a large gap of around 4 - 5 times between that in Malaysia and in Japan, as is shown in Table VII. 4-5.

Table VII. 4-5 Comparison of Annual Sales Value per Worker

(Unit: M$/ton)

Cost Item	Malaysian firms A. Co.	Malaysian firms B. Co.	Japanese firm Average of 7 firms
Annual Sales (M$1,000)	25,901	14,994	28,880
Number of Employees	420	300	108
Annual Sales/Worker (M$1,000)	61	50	267

As a result, the difference in the weight of direct labour costs to the total production cost would become smaller than that in the absolute wage rates in comparing Malaysia and Japan.

In utilities, major cost items would be heavy oil costs and electricity costs. As was shown in the previous section, the unit cost of heavy oil in Malaysia is around half of that in Japan. Unit electricity costs in Malaysia are also much lower than those in Japan. Due to the obsolescence of the furnaces presently used by existing Malaysian manufacturers, the thermal efficiency in Malaysian factories is inferior to that in Japanese factories. This fact makes the cost advantage of Malaysian manufacturers lower than the actual difference in unit costs. However, the present Malaysian manufacturers plan to upgrade their furnace efficiency.

In such cost items as depreciation on interest payments, the cost burden is heavier in Malaysia than in Japan. This is because of the fact that most Malaysian manufacturers have made relatively large capital investments in recent years in order to compete in the very competitive market of Malaysia.

4-3 Sea Transportation Costs of Glassware

4-3-1 General

For the export of glassware, the heavy burden of sea transportation costs is considered to be one of the largest cost factor. Due to the wide fluctuation of sea transport costs, however, it is difficult to identify the exact figures. The following are the major factors which would cause the fluctuation of sea transport costs:

1. Freight rate fluctuation
2. Packaging requirements from customers
3. Ports to be used

In this section, the general sea transportation costs of glassware were calculated based on various assumptions, and the approximate level of the transportation cost on glassware exports to Japan was measured.

4-3-2 Sea Transportation Costs of Container Cargos

For the exports of container cargos, Malaysian exporters use either Port Klang, Penang or Singapore port. In cost, it is generally cheaper to use Port Klang rather than to use Singapore port. For the export of glass products which require a lot of inventory space and where regular shippings are required from customers, Malaysian exporters often use Singapore port rather than Port Klang.

The sea transportation costs calculated based on the assumption that a Malaysian firm exports a container cargo from Malaysia to Japan through Singapore port are shown in Table VII. 4-6. In this cost estimate, the packaging cost of products and the inland transportation costs from factory to container yards are not included.

Table VII. 4-6 Sea Transportation Costs of Container Cargo

(Unit: M$/Container)

	20 ft.	40 ft.
(1) Stuffing & terminal charge	1,152	1,184
(Stuffing)	(168)	(336)
(Dragging)	(912)	(1,440)
(Terminal charge)	(72)	(108)
(2) Custom clearance & inspection	264	300
(Custom clearance)	(168)	(168)
(Handling charge)	(60)	(96)
(Inspection)	(36)	(36)
(3) Sea freight	1,860	3,420
Total	3,276	5,604

(1) Packaging and inland transportation costs are excluded.

(2) Insurance fee would be added at 2% of invoice value.

Source: A forwarding firm in Singapore

Further, a comparative study has been conducted on the following two cases: a Singapore firm would export a 20 ft.-container cargo to Japan through port Singapore, and a Malaysian firm would export the same size of container cargo to Japan making use of port Singapore. The results are briefly summarized as follows:

Table VII. 4-7 Comparison of Sea Transportation Cost of 20 ft. Containers

(Unit: M$/Container)

	Malaysia	Singapore
(1) Stuffing & terminal charge	1,152	444
(Stuffing)	(168)	(192)
(Dragging)	(912)	(180)
(Terminal charge)	(72)	(72)
(2) Custom clearance & inspection	264	132
(Custom clearance)	(168)	(36)
(Handling charge)	(60)	(60)
(Inspection)	(36)	(36)
(3) Sea freight	1,860	1,860
Total	3,276	2,436

Source: Same as Table VII. 4-6

The analysis results show that Malaysian firms would have to pay around 35% higher sea transportation costs compared to Singapore firms, even excluding inland transportation costs from factories to port.

4-3-3 Effects of Sea Transportation Costs on Malaysia Glass Products

In order to measure the extent of the effect of sea transportation costs on the export of Malaysian glass products, the unit transportation cost per empty bottle was calculated, based on the assumption that a Malaysian manufacturer exports their glass containers, as a container cargo, to Japan through Singapore port.

In order to calculate the unit cost per bottle, the number of empty bottles loaded into a 20 ft.-container was investigated, and the results are as follows:

Type of product :	Empty glass bottle for soft drinks Content 200 ml
Container capacity :	1,071 cases/20 ft.-container
	24 bottles/cases
	25,704 bottles/20 ft.-container

From the above, the unit sea transportation cost of empty bottles from Malaysia to Japan is estimated at around M$0.13 per bottle.

Based both on the above calculated sea transportation costs and on the unit production costs reviewed in the previous section, the Malaysian glass containers exported to Japan, except for those of very cheap prices, are judged to have enough price competitiveness with those produced by Japanese manufacturers in the Japanese market.

In practice, however, the present level of price differences is considered still insufficient for Malaysian products to compete with Japanese products in the Japanese market.

5. Measures for the Development of Malaysian Glassware Industry

5-1 Findings of Specific Problems in the Industry

As a base to identify the measures to promote the glassware industry in Malaysia, major problems facing Malaysian manufacturers were reviewed. Because of the large difference in problems faced by glass and other glass product manufacturers, they were reviewed separately by each category.

(1) Glass Containers

Excess production capacity: The glass container industry is a highly capital intensive industry, and once a furnace is installed it has to be operated continuously for 24 hours per day. Because of this nature of the industry and the unsatisfactory growth of market demand for glass bottles, the production capacity of bottle manufacturers exceeds the domestic demand not only in Malaysia but also in many other nations/areas such as Korea, Taiwan, S. Africa or Turkey. The above market situation, together with the high transportation costs of empty bottles, makes it difficult for Malaysian glass container manufacturers to direct their products into export markets other than Singapore.

Unit production volume: In the processing of glassware, the production loss which is associated with color changes or mold changes is very large. Accordingly, the productivity of each firms depends largely on the unit production volume of each order. Because of the small market size and diversified product demand in Malaysia, most Malaysian glass container manufacturers face the problem of productivity loss due to frequent job changes.

Distribution channels: In many other nations, the glass container manufacturers who have been confronted with the problem of over-production capacity to market demand have often succeeded by diversifying their product line to glass tableware. In Malaysia, however, most of the bottle manufacturers seem to be rather reluctant to expand their production in the field of tableware due to the domestic distribution structure of mass-consumption products such as tableware which is more complicated than that for glass containers.

Transportation: Because a large space is required for the inventory of glassware, particularly in bottles, the requirement from customers for regular shipping is very high. Malaysian manufacturers are favoured with a highly advanced road network, and there are no problems for the transportation to domestic and Singapore markets. However, for the export to other destinations using containers, Malaysian manufacturers occasionally meet with the problem of the low frequency of ship calls or container handling capacities at Malaysian ports.

Financing: Due to the nature of the industry which is highly capital intensive, the financing requirement is very large in those capital investment cases such as facility modernization, facility expansion or diversification of product lines. Because investment fund recruitment is not so easy in Malaysia, some obsolete machinery and equipment were observed in some factories.

(2) Glass Tableware

Demand structure: The domestic market demand for glass tableware in Malaysia reaches as large as M$50 million per annum, which is more or less the same size as with glass containers. However, the types of glass tableware demanded in Malaysia are widely diversified from very high quality type of products to lower-end products. Thus, the market size for a particular type of product often becomes smaller than minimum production scale for domestic production.

Product quality: At present, glass tableware in Malaysia is produced by glass container manufacturers with limited scale, making use of the same melted glass used for container production. Accordingly, the present product quality is low and the type of products are limited to jugs and cups mainly used as promotional items of brewery and beverage firms.

Domestic market size: After starting production of the glass tableware factory presently planned by an Indonesian investor, the domestic demand for soda-lime type of products, which occupy a significant portion of the market demand, would mostly be fulfilled. Thus room for import substitution would be in high value-added types of products such as lead-crystalware and heat-resistant tableware. The domestic market demand for these types of products is, however, still limited in Malaysia.

(3) Other Glass Products

Domestic processing volume: At present, such products as fluorescent and incandescent lamps, chemistry and general laboratory glassware or pharmaceutical containers are produced making use of imported glass tubes or semi-finished glass products. However, their present processing volume is still insufficient for manufacturers to start production from mineral raw materials.

Domestic market size: For those high value-added types of products such as optical glasses or pharmaceutical containers, the domestic demand in Malaysia is quite limited. Most of these products produced or processed in Malaysia would have to be exported.

5-2 Promotion Measures

(1) Glass Container Industry

Production diversification: As a measure to cope with the over-production capacity problem of glass containers in Malaysia, a product diversification policy of glass container manufacturers is needed. At present, however, Malaysian manufacturers have not enough know-how of product diversification. For one, R & D efforts have to be made both in public and private sectors. For another, the establishment of a training facility to train technicians who could be used for the development and production of new products is needed.

Development of export market: Because the present production capacity exceeds domestic demand, the development of export markets is essential. Due to the nature of glass containers which are bulky and easy to break, the development of export markets is not easy, except for the market of Singapore to which road transport could be used. Efforts have to be made, both from public and private sectors, to gather sufficient overseas market information and to improve sea transportation conditions for container cargos.

Inspection of export products: In order to compete in the very competitive export market, an established quality image for products is essential. For this purpose, the

introduction of an inspection system for glass products directed for exports would be one of the most effective measures.

Soft-term financing scheme: In the glassware industry which is very capital intensive, the problem of fund recruitment is very heavy for most manufacturers, not only in the case of new investments, but also in those cases of plant modernization or of expansion of facilities for product diversification. For those capital investment needs, some kind of credit schemes which would make available softer-term financing would be required. Especially, the modernization of furnaces which are already obsolete would directly improve the productivity of Malaysian manufacturers. The improvement of furnaces is one of the key areas to resolve the present bottleneck of production in some firms and improve thermal efficiency and total production cost performance.

Training Facilities: At present there are no facilities to train glass product technicians in Malaysia, and most of them are fully depended on on-the-job training in each factory. The establishment of some training facilities would be desired.

(2) Glass Tableware

Feasibility Studies: Because most of the domestic demand for soda lime glass tableware is expected to be fulfilled by a newly established tableware factory, the new investment projects would have to be those which mainly aim at export markets. More detailed and wide-range feasibility studies should be conducted in such product areas as hand-cut type of soda-lime glass tableware, hand-made lead crystalware or heat resistant tableware.

Overseas information: For the new investments for projects mainly targeted for overseas markets, constant efforts have to be made to collect overseas market information or the information on new technology.

Capital or technical tie-up with foreign manufacturers: In order to start the production of export oriented glass tableware in Malaysia, it is essential to promote new capital investment of, or technical tie-up with, foreign manufacturers which have an established brand image and distribution network in the overseas market. Constant promotion efforts for investment in Malaysia would have to be extended to overseas potential investors.

(3) Other Glass Products

Studies for starting production from mineral raw materials: For such glass products as electric lamps, pharmaceutical bottles or chemical-use measurers, only processing work is conducted in Malaysia. With the present processing volume, it is said to be economically unfeasible to start production from mineral raw materials. Joint efforts of both public sector and private manufacturers have to be made to study and identify the time and conditions which would make such integrated processing feasible.

Capital and technical tie-ups with foreign manufacturers: As for high-value-added products such as optical glass or pharmaceutical containers, there is almost no domestic demand. Accordingly, the invitation of or the technical tie-ups with foreign manufacturers which have strong sales capabilities in overseas markets would be the quickest and most practical way to start new production in Malaysia. To approach simultaneously potential overseas investors in the fields of both glass production and glass product processing would be recommended.

VIII. RECOMMENDATION

VIII. RECOMMENDATION

1. Proposal for the Comprehensive Industrial Promotion Programs

1-1. Comprehensive Promotion Program of the Mould and Die Industry in Malaysia

1-1-1. Basic Strategy

In the mould and die industry of Malaysia, a portion of the foreign-owned industry is equipped with high technology. However, the industry comprises mostly small scale local enterprises.

The mould and die industry in Malaysia is dedicated widely to the electrical, electronics, plastics, metal working and rubber industries. The industry is expected to grow in the future at a yearly rate of 30%.

The problems the mould and die industry of Malaysia faces are as follows:

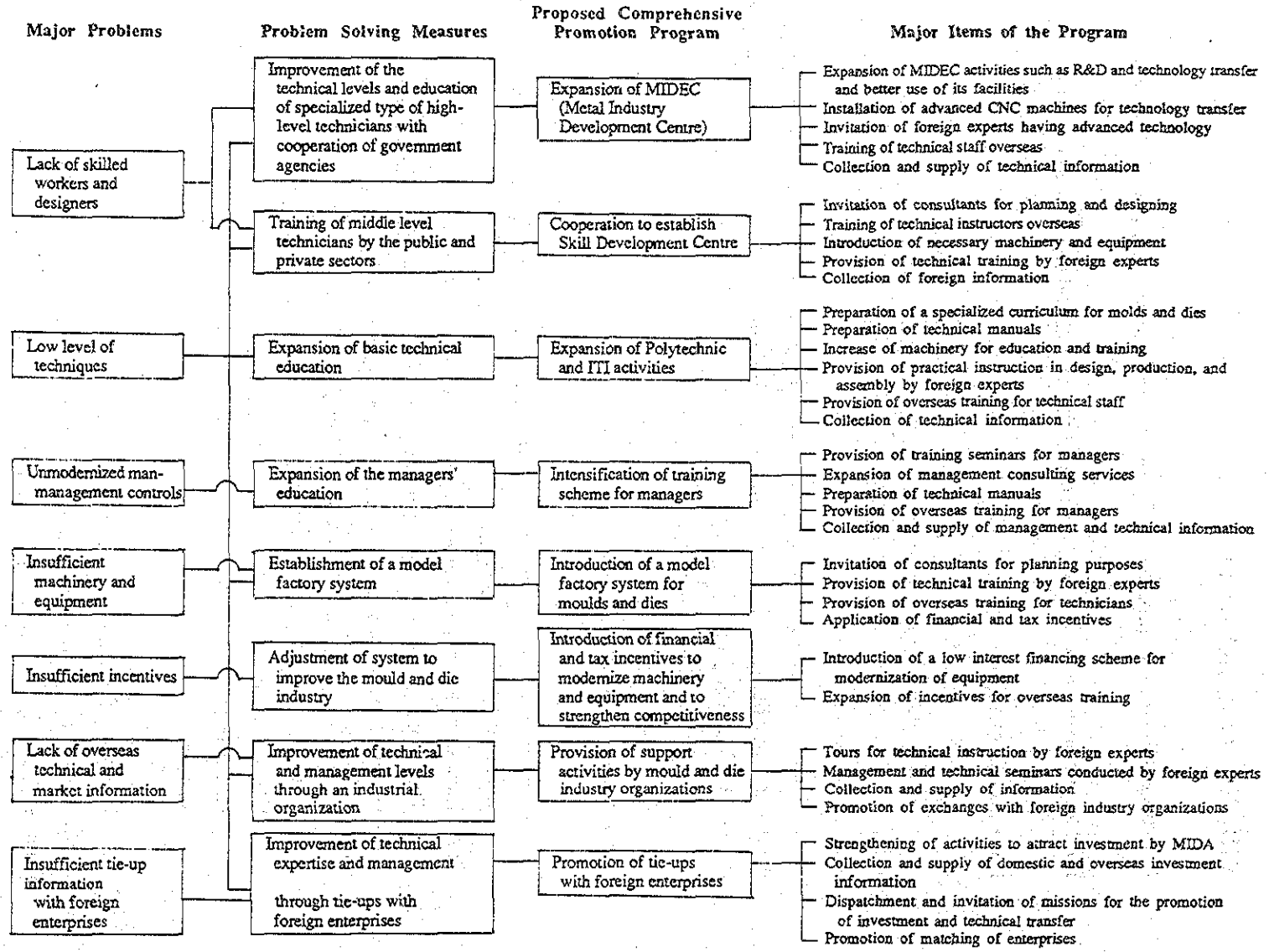
(1) Lack of skilled workers and designers
Most companies lack skilled workers and designers, a situation for which urgent solution measures are needed. To raise technical levels, it is necessary to develop skilled workers and designers.

(2) Lack of modern management control systems
There are many enterprises which do not have modern management control systems. An improvement in the management systems of firms is needed.

(3) Insufficient cooperation with international enterprises
Cooperation with multi-national companies is a very effective method for improving technical levels. For producing precision moulds and dies in particular, for which demand is increasing, cooperation with foreign enterprises is a shortcut.

In light of the above circumstances, following are the basic concepts of a comprehensive program to build up the mould and die industry in the future. The details of the relationships among the present major problems of the industry, problem solving measures and an overall promotion program are shown in Fig. VIII.1-1.

Fig. VIII.1-1 Proposed Comprehensive Program of Mould and Die Industry in Malaysia —Problems and Solution—



Basic Strategy

(1) In order to improve technical levels and to train high-level special technical staff for the mould and die industry, the mould and die section of MIDEC (Metal Industry Development Centre) would have to be expanded.
(2) To train middle-level technicians in local areas, with the cooperation of the public and the private sector, prompt establishment of the Skill Development Centre would be expected.
(3) Additional education is a necessary step to improve production and business administration skills.
(4) There should be more promotion to attract investment from overseas enterprises.

1-1-2. Comprehensive Promotion Program of the Mould and Die Industry

Program (1)

<Package of measures (1)>

This measure is to promote technology development & transfer and education of any specialized type of high-level technicians with the cooperation of government agencies. The Metal Industry Development Centre (MIDEC) is in Shah Alam, Selangor, the centre of mould and die industry. In the mould and die section of MIDEC, new machineries such as the Wire Cut EDM, EDM, and CNC MC, have been installed, and technical staff have attained certain levels with these equipments. It is most realistic and effective to develop and transfer the latest mould and die technology and train and educate skilled workers and mould and die designers as well as MIDEC's technical staff using these existing and expanded facilities.

-- Program --

Expansion of MIDEC (Metal Industry Development Centre).

- Expand MIDEC activities such as R&D and technology transfer of mould and die and make better use of its facilities.
- By fully utilizing MIDEC's existing and expanded facilities, promote R&D and technology transfer and intensify the training program for skilled workers and designers as well as MIDEC's technical staff.
- Install advanced CNC machines for technology transfer.

- A variety of machines already has been installed in MIDEC. However, in order to expand the training program, more advanced CNC machine tools should be introduced and operation know-how has to be extended.

• Invite foreign experts having advanced technology.

- It is recommended that foreign experts be invited on a long-term assignment basis to carry out the training of MIDEC's and private sectors' senior technical staff.

• Train technical staff overseas.

- It is desirable to continue the overseas training of MIDEC's technical staff.

• Collect and supply technical information.

- It is desirable to collect technical information that helps to improve technical levels and to supply it for the use of private enterprises.

Program (2)

<Package of measures (2)>

This measure is to train middle-level technical staff with the cooperation of both the public and private sectors.

At present, mould and die firms are eager to establish a Skill Development Centre, with the cooperation of the public and the private sector, as a more practical skill development and training agency.

The IMP (Industrial Master Plan), which is the basis of industrial policy, notes the importance of cooperation between the public and private sectors. The Skill Development Centre plan would fit IMP's above policy.

-- Program --

Establishment of Skill Development Centre

• Invite consultants for planning and designing.

- The use of consultants is desirable from the F/S stage for its realization.

• Train technical staff overseas.

- It is useful to have overseas training for technical staff at the initiation stage of this center.

• Introduce necessary machinery and equipment.

- It is desirable to introduce high-level machinery and equipment from overseas for use in the operation of the center.

• Have practical technical training by foreign experts.

- It is desirable to have experts from overseas give training to private technical staff, including training on the usage of advanced machineries.
- Collect and supply technical information.
- Collect technical information that helps to improve technical levels and use it for private enterprises.

Program (3)

<Package of measures (3)>

This measure is designed to expand basic technical education.

Practical education and training are not usually carried out in polytechnics or in vocational schools. And even when they are, they are not taught to a satisfactory extent, and most of what is taught is not useful in the work place. The establishment of a training curriculum specializing in making moulds and dies, and expansion of machinery and equipment should be carried out in ITI and polytechnics located both in Penang and in Kuala Lumpur, the two main sites of the mould and die industry.

-- Program --

Expansion of Polytechnic and ITI Activities

- Prepare a curriculum specifically for moulds and dies.
- For training in the mould and die course, creation of a well prepared curriculum would be effective.
- Prepare technical manuals.
- Preparation of technical manuals for education and training regarding moulds and dies is needed.
- Expand the machinery for education and training.
- It is necessary to expand the variety of machines for practice use in the design and manufacturing of moulds and dies.
- Have foreign experts provide practical instruction in design, production and assembly of moulds and dies.
- Train technical staff overseas.
- Collect technical information.
- In addition to the importation of teaching materials, foreign technical information has to be collected and then supplied to private enterprises.

Program (4)

<Package of measures (4)>

This measure is designed to expand education of managers.

As the history of the mould and die industry is still short, and there are many small- and medium-scale industries, modern management control systems are not advanced. Therefore, it is necessary to strengthen the business administration training of many young managers. The NPC (National Productivity Centre) would be a main training center for such activities.

-- Program --

Intensification of Training Scheme for Managers

- Provide training seminars for managers.
- Training seminars are necessary for the education of managers.
- Expand management consulting services.
- It is useful to expand consulting services in order to help private enterprise and to supply modern management techniques.
- Prepare technical manuals.
- As part of a managers' education, it is necessary to prepare technical manuals, which are needed from a management point of view.
- Train managers overseas.
- Collect and supply management and technical information.

Program (5)

<Package of measures (5)>

This measure is to set up several model factories and have them authorized by a competent authority. The establishment of these model plants will encourage other enterprises. Since there are few training facilities, the model factories could also be used for practical training purposes.

-- Program --

Introduction of a Model Factory System for Moulds and Dies

(Expansion of SIRIM activities)

- Invite consultants to make plans.

- To plan the introduction of this system, it is desirable to have the assistance of consultants.
- Have foreign experts provide technical training.
- Technical instruction by experts would be done at model plants as a model for other enterprises.
- Train technical staff overseas.
- Apply financial and tax incentives.

Program (6)

<Package of measures (6)>

This measure is to introduce incentives to modernize equipment and expand incentives for technical training for small- and medium-scale mould and die enterprises.

-- Program --

Introduction of Financial and Tax Incentives to Modernize Machinery and Equipment

- Introduce a low interest financing scheme for modernization of equipment.
- Expand incentives for training.

Program (7)

<Package of measures (7)>

This measure is to improve technical abilities and management levels through an industrial organization.

The mould and die industry still has no independent association and association activity is limited. By activating these groups, improvement of management levels and technical abilities used in the industry overall will be promoted.

-- Program --

Provision of Support Activities by Mould and Die Industry Organizations

- Have tours of technical instruction by foreign experts.
- To improve the technical levels of the mould and die industry overall, it is desirable to have industry experts make tours of technical instruction.
- Hold management and technical seminars by foreign experts.
- Collect and supply information.

- Promote exchanges with foreign industry organizations.
- To promote technical cooperation and exchange of information, it is desirable to cooperate with overseas industry organizations.

Program (8)

<Package of measures (8)>

This measure is to improve technical expertise and management through tie-ups with foreign enterprises.

To correspond to the increasing demand for precision moulds and dies and to improve technical management levels, tie-ups with foreign enterprises are effective shortcuts.

-- Program --

Promotion of Tie-ups with Foreign Enterprises

- Strengthen activities to attract investment by MIDA.
- MIDA performs many activities to attract investment. It is necessary to continue and strengthen these activities.
- Collect and supply domestic and overseas investment information.
- To attract foreign enterprises, it is necessary to introduce the domestic situation, such as the investment environment. For this reason, collection and extension of essential information as a guide to investment is necessary for foreign investors.
- Dispatch and invite missions for the promotion of investment and technical transfers.
- Dispatch missions on moulds and dies. Invitations should be continued.
- Promote the matching of enterprises.
- To realize joint ventures and technical tie-ups with foreign enterprises with the provision of institutional support.

Table III.1-1 Proposed Comprehensive Program of Mould and Die Industry in Malaysia

Problem Solving Measures	Comprehensive Promotion Program	Execution Means and their Schedule: Means	1st year	2nd year	3rd year	4th year or after
Improvement of the technical levels and education of specialized type of high-level technicians with co-operation of government agencies	Expansion of MIDEC (Metal Industry Development Centre)					
	• Expansion of MIDEC activities such as R&D and technology transfer and better use of its facilities	Use of foreign experts	o	o	o	o
	• Installation of advanced CNC machine tools for technology transfer	F/S by foreign experts	o			
		Introduction of new equipment		o		
	• Invitation of foreign experts having advanced technology	Use of foreign experts	o	o	o	o
	• Training of technical staff overseas	Overseas training	o	o	o	o
	• Collection and supply of technical information	Information gathering	o	o	o	o
Training of middle level technicians by the public and private sectors in local areas	Cooperation to establish Skill Development Centre					
	• Invitation of consultants for planning and designing	F/S by foreign experts	o			
	• Training of technical staff overseas	Overseas training		o	o	o
	• Introduction of necessary machinery and equipment	Introduction of new equipment		o		
	• Provision of technical training by foreign experts	Use of foreign experts		o	o	o
	• Collection of foreign information	Information gathering	o	o	o	o
Expansion of basic technical education	Expansion of Polytechnic and ITI activities					
	• Preparation of a specialized curriculum for moulds and dies	F/S by foreign experts	o			
	• Preparation of technical manuals	Preparation of manuals	o	o	o	
	• Increase of machinery for education and training	Introduction of new equipment		o		
	• Provision of practical instruction in design, production, and assembly by foreign experts	Use of foreign experts	o	o	o	o
	• Provision of overseas training for technical staff	Overseas training	o	o	o	o
	• Collection of technical information	Information gathering	o	o	o	o
Expansion of the managers' education	Intensification of training scheme for managers					
	• Provision of training seminars for managers	Use of foreign experts	o	o	o	o
	• Expansion of management consulting services	Use of foreign experts	o	o	o	o
	• Preparation of technical manuals	Preparation of manuals	o	o	o	
	• Provision of overseas training for managers	Overseas training	o	o	o	o
	• Collection and supply of management and technical information	Information gathering	o	o	o	o

Establishment of a model factory system	Introduction of a model factory system for moulds and dies					
	• Invitation of consultants for planning purposes	F/S by foreign experts	o			
	• Provision of technical training by foreign experts	Use of foreign experts		o	o	o
	• Provision of overseas training for technical staff	Overseas training		o	o	o
	• Application of financial and tax incentives		o			
Adjustment of system to improve the mould and die industry	Introduction of financial and tax incentives to modernize machinery and equipment and to strengthen competitiveness					
	• Introduction of a low interest financing scheme for modernization of equipment		o			
	• Expansion of incentives for training		o			
Improvement of technical and management levels through an industrial organizations	Provision of support activities by mould and die industry organization					
	• Tours for technical instruction by foreign experts	Use of foreign experts	o	o	o	o
	• Management and technical seminars conducted by foreign experts	Use of foreign experts	o	o	o	o
	• Collection and supply of information	Information gathering	o	o	o	o
	• Promotion of exchange with foreign industry organizations	Promotion of exchanges	o	o	o	o
Improvement of technical expertise and management through tie-ups with foreign enterprises	Promotion of tie-ups with foreign enterprises					
	• Strengthening of activities to attract investment by MIDA	Promotion activities	o	o	o	o
	• Collection and supply of domestic and overseas investment information	Promotion activities	o	o	o	o
	• Dispatch and invitation of missions for the promotion of investment and technical transfer	Promotion activities	o	o	o	o
	• Promotion of matching of enterprises	Promotion activities	o	o	o	o

1-2. Comprehensive Promotion Program of the Automotive Metal Parts Industry in Malaysia

1-2-1. Basic Strategy

At the core of Malaysia's automobile industry is PROTON, which produces the national car. Major part of its aim is to promote related industries. Considering the fact that the country's population is 16.5 million, its purchasing power is not very large, and a recent decrease in auto production has affected the automotive parts industry very badly.

Following are the problems of the automotive metal parts industry in Malaysia:

(1) A gap between production and manufacturing technology.
Both enterprises having foreign tie-ups and those without them have low technical levels. A plan to cope with this situation is necessary.

(2) Noncompetitive prices.
Considering present technical standards, production levels and control prices are not competitive. It is necessary to take measures to promote domestic production.

(3) Low production volumes.
Expansion of exports is needed in order to assure volume production of automobiles in Malaysia.

Noting the above background and problems, the basic concepts for a comprehensive program to promote automotive metal parts industry in Malaysia are as follows. The details of the relationships among the present major problems of the industry, problem solving measures and an overall promotion program are showin in Fig. VIII.1-2.

Basic Strategy

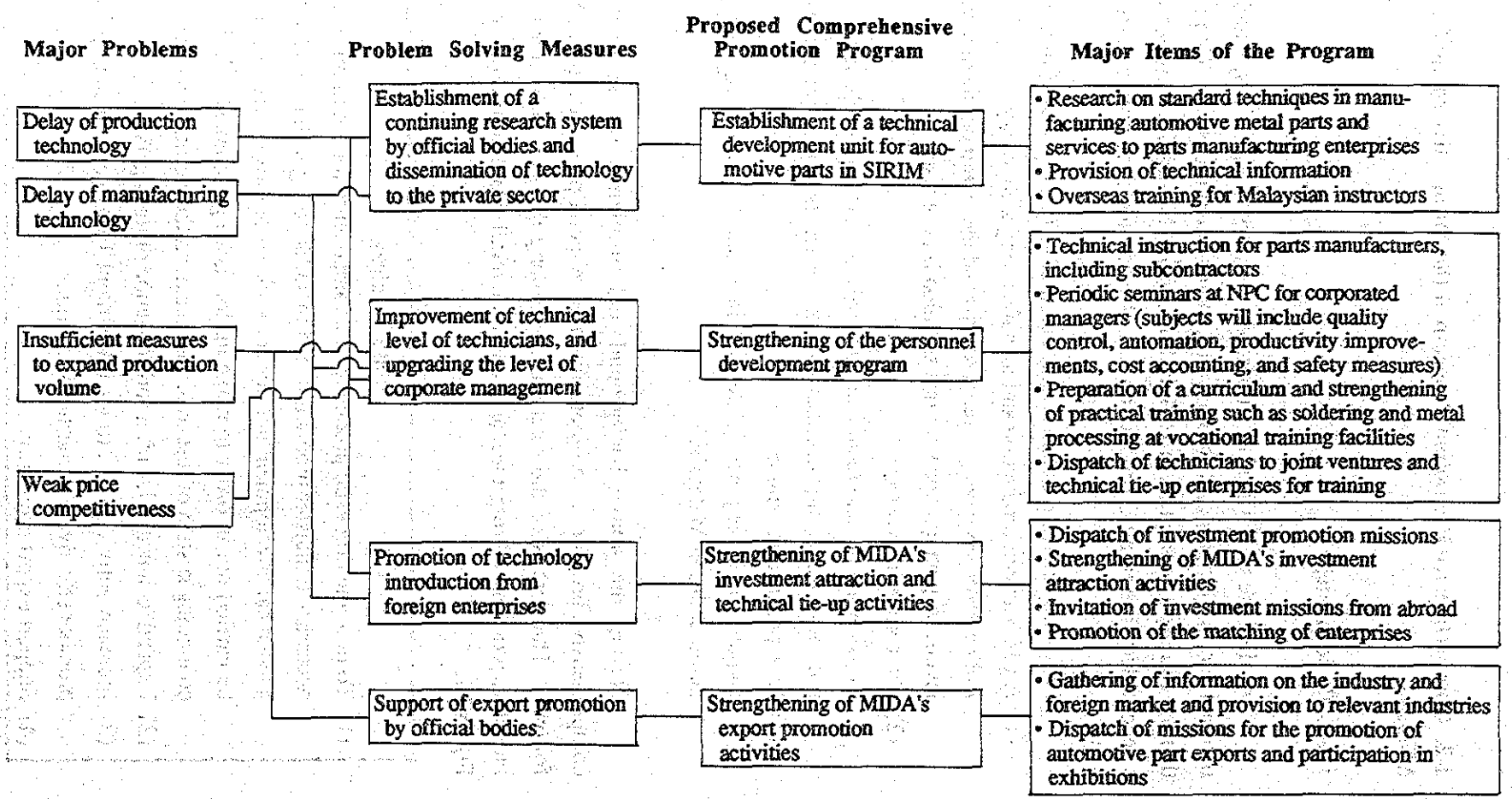
(1) To promote domestic production of components for automotive metal parts, it is necessary to master production and manufacturing technology. Establishment of a technical development unit for domestic automotive parts within the SIRIM is to be carried out in order to make up for lacking technical abilities, to establish a continuing system of research, and to extend the results to the private sectors.

(2) Expand technical education and education of managers.

(3) Increase activities to attract investment from foreign enterprises in order to promote effectively domestic production.

(4) Support export promotion.

Fig. VIII. 1-2 Proposed Comprehensive Program of Automotive Metal Parts Industry in Malaysia
— Problems and Solution —



1-2-2. Comprehensive Promotion Program of the Automotive Metal Parts Industry

Program (1)

<Package of measures (1)>

This measure is to establish a continuing research system to promote domestic production in the long term, to promote activity to supply research results to the private sector and to cope with the lack of technical ability. This will be handled by an official organization.

It is necessary to acquire production and manufacturing technology in order to promote domestic production, especially for automotive parts. Extension of the results of research to the private sector is also important.

-- Program --

Establishment of a Technical Development Unit for Automotive Parts in SIRIM

- Establish a technical development unit for automotive parts in SIRIM to supply information concerning metals. Research materials will be introduced and field surveys will be carried out by experts when necessary.
- Research manufacturing techniques for parts and provide services to manufacturers.
- Carry out research on production and manufacturing technologies.
- Hold technical seminars or short-term consulting in order to supply technology to private companies.
- Supply technical information to private enterprises.
- Offer technical information such as seminar reports and research results to private enterprises.
- Provide overseas training for Malaysian instructors.
- Send persons for training abroad who will take a leadership role in technical research sections.

Program (2)

<Package of measures (2)>

This measure is to improve the skills of workers and upgrade the level of enterprise management.

It is necessary to improve the technical abilities of workers and technicians to cope with the gap between production and manufacturing techniques. Also, training for enterprise managers is necessary.

-- Program --

Expansion of the Program to Educate Technicians and Workers in such organization as ITI or to Educate Managers at NPC

- Provide technical instruction for parts manufacturers including subcontracted enterprises.
- In order to improve quality standards, technical instruction should be given on the spot to manufacturers.
- Organize seminars at NPC for managers. (Subjects will include quality control, automation, improvements in productivity, cost accounting, multiple equipment operation and safety measures.)
- Prepare a curriculum to strengthen actual training such as of soldering and metal manufacturing at vocational training facilities.
- Provide training for technicians dispatched to joint and technical tie-up enterprises.
- To be enforced at each enterprise. However, to improve the technical abilities of technicians it is necessary to dispatch and have them trained at joint and technical tie-up enterprises.

Program (3)

<Package of measures (3)>

This measure is to have official bodies attract foreign investment for the effective promotion of domestic production, and establish joint enterprises and promote technical tie-ups.

Continued promotion of tie-ups is necessary to improve management-level technical abilities as well as production. They will be achieved the launching of foreign enterprises.

-- Program --

Promotion of Technical Tie-ups and Attraction of Investment

- Dispatch missions to promote investment.

- There already are many missions dispatched abroad to promote foreign investment; however, it is necessary to continue these missions for attracting investment to the automotive parts industry.

• Strengthen investment attracting activities of MIDA.

- MIDA promotes many activities to attract investment. However, it is necessary to continue strengthening these activities.

• Invite investment missions from abroad.

- In order to create an actual investment environment for investors from overseas, it is necessary to invite as many foreign investment missions as possible.

• Promote the matching of enterprises.

- Individual support is needed to have definite technical and joint tie-ups with foreign enterprises.

Program (4)

<Package of measures (4)>

This measure is to give support for official export promotion organizations.

For export promotion in Malaysia, MEXPO supports many activities. However, it is not yet satisfactory.

-- Program --

Strengthening of the Promotional Activities for Export of Automotive Parts by MEXPO

• Collect and supply information on the industry and foreign markets and refer this to the proper industries.

- Provision of information through publications is being done. Collect marketing information concerning automotive parts, and supply it to enterprises.

• Dispatch automotive part export promotion missions and hold exhibitions (support for enterprises with no tie-ups overseas).

- Dispatch missions to markets that seem to be promising, mainly with manufacturers that do not have relations overseas. This information can come through joint tie-ups. It is necessary to study the feasibility of utilizing exhibits.

Table VIII.1-2 Proposed Comprehensive Promotion Program of Automotive Metal Parts Industry in Malaysia

Problem Solving Measures	Comprehensive Promotion Program	Execution Means and their Schedule: Means	1st year	2nd year	3rd year	4th year or after
Establishment of a continuing research system to promote long-term domestic production handled by official organizations. Extension of research results to the private sector. Technical support to the private sector.	Establishment of a Technical Development Unit for automotive parts in SIRIM. • Services to parts manufacturing enterprises for research on standard techniques in manufacturing automotive metal parts.	• F/S by foreign experts	o			
		• Introduction of materials		o	o	
		• Use of foreign experts Research on production and manufacturing technology		o	o	o
		• Use of foreign experts. (Service and cooperation from private sector) Technical seminars.	o	o		
		Short-term consulting	o	o	o	o
	• Offer of technical information		o	o	o	o
	• Overseas training for Malaysian instructors	• Overseas training (Long-term)			o	o
		Overseas training (Short-term)		o		
Upgrading of the level of enterprise management and improvement of the skills and technical abilities of workers and technicians.	Strengthening of personnel development program • Technical instruction for parts manufacturing including subcontractors	Use of foreign experts	o	o	o	
	• Periodic seminars at NPC for managers (Subjects will include quality control, automation, productivity improvements, cost accounting, and safety measures).	Use of foreign experts	o	o		
	• Preparation of a curriculum and strengthening of practical training such as soldering and metal processing at vocational training facilities	Use of foreign experts	o	o		
	• Dispatch of technicians to joint ventures and technical tieup enterprises for training.	Overseas training	o	o	o	

Have official bodies attract foreign investment for the effective promotion of domestic production, establish joint enterprises and promote technical tieups	Promotion of technical tieups and attraction of investment				
	• Dispatch of investment promotion missions.	Promotion activities	o	o	o
	• Strengthening of MIDA's investment attraction activities	Promotion activities	o	o	o
	• Invitation of investment missions from abroad	Promotion activities	o	o	o
	• Promotion of the matching of enterprises	Promotion activities	o	o	o
Support of export promotion by official bodies	Strengthening of the promotion activities for export of automotive parts by MEXPO				
	• Gathering of information on the industry and foreign markets and provision to relevant industries				
	• Dispatch of missions for the promotion of automotive part exports and participation in exhibitions (support for enterprises with no tieups overseas)	Discovery of potential clients by experts		o	
		Cooperation from foreign country		o	

1-3. Comprehensive Promotion Program of the Chinaware Industry in Malaysia

1-3-1. Basic Strategy

Except for a small number of foreign-affiliated firms having high production technology, most Malaysian chinaware manufacturers are family-management type small-scale firms. These manufacturers are classified into several groups creating separate enclaves, which makes balanced growth of the ceramic industry difficult. The technical level of the majority of local manufacturers is less developed when compared with neighboring countries such as China and Thailand.

Although Malaysia abounds in the major raw materials for chinaware production, they are not fully utilized to produce high value-added products.

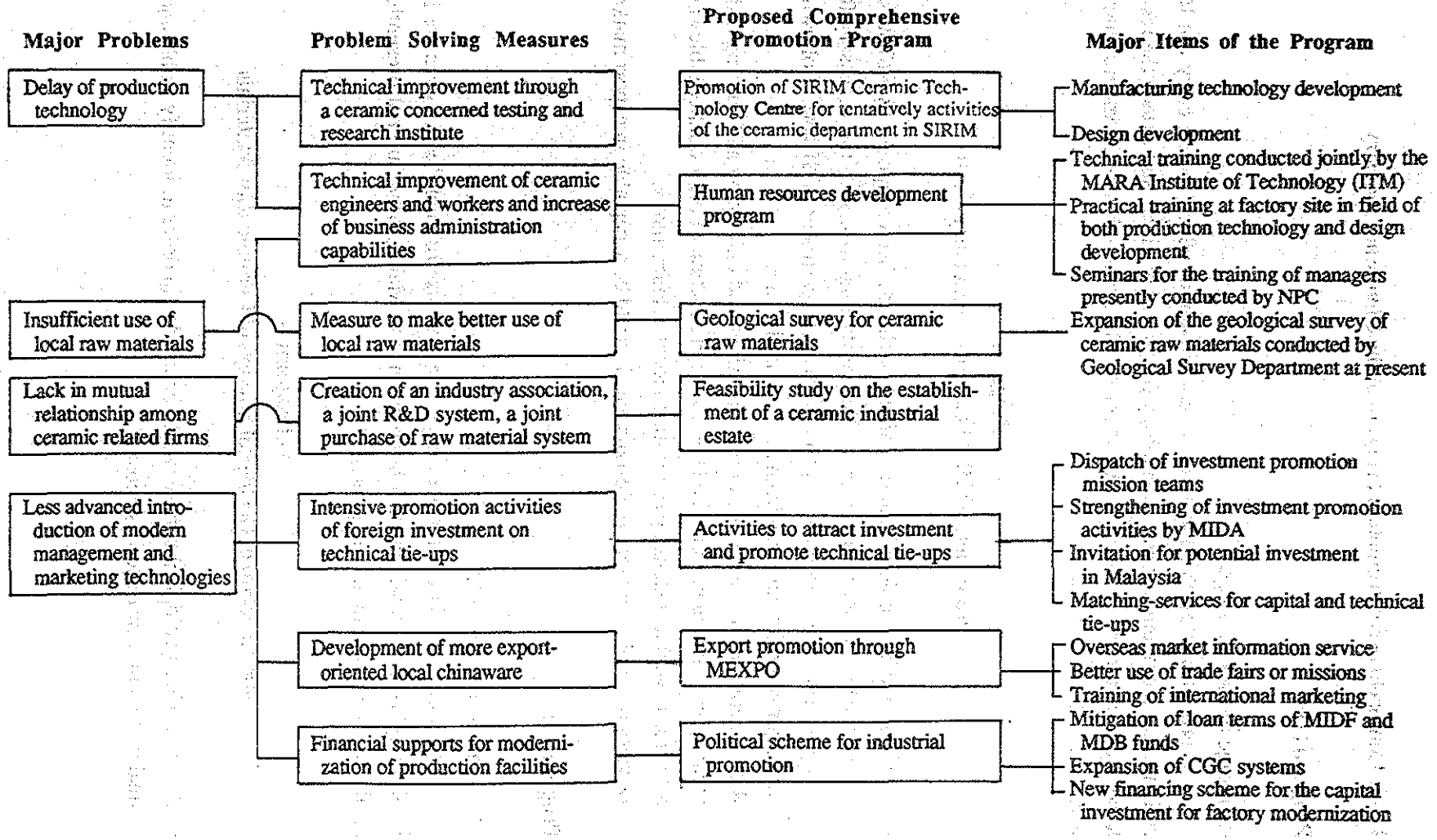
Small domestic market size is another major problem for Malaysian chinaware manufacturers. To expand sales into overseas markets, most local manufacturers have no experience in exports or else they do not have enough capability to produce or design sufficiently competitive products for overseas markets.

Under the above mentioned circumstances, the basic concepts of the comprehensive program for the development of the chinaware industry in Malaysia could be summarized as follows. The details of the relationships among the major problems of the industry, problem solving measures and an overall promotion program are shown in Fig. VIII.1-3.

Basic Strategy

(1) Establish the Ceramic Technology Centre which was already proposed by SIRIM at the earliest stage in order to upgrade the production technology levels of general chinaware manufacturers.
(2) Expand the geological surveys of ceramic raw materials.
(3) Improve the overseas marketing capabilities of local chinaware manufacturers through overseas market information services and support for design development.
(4) Promote the invitation of foreign investors.

Fig. VIII.1-3 Proposed Comprehensive Program of Chinaware Industry in Malaysia
— Problems and Solution —



1-3-2. Comprehensive Promotion Program of the Chinaware Industry

Program (1)

<Package of measures (1)>

Through the establishment of a ceramic center which would carry out R & D activities on the manufacturing technology of various products and extend the results to local manufacturers, the technology level of Malaysian chinaware manufacturers in general should be upgraded.

-- Program --

Promotion of SIRIM Ceramic Technology Centre

- The Ceramic Technology Centre which has already been proposed by SIRIM should be established as soon as possible. Before its establishment, the necessary R & D activities should be promoted by the Ceramic Department of SIRIM. Following are the major activities expected from the proposed Centre.
- R & D activities in the mixing of raw materials, and in forming and burning and other techniques, particularly those related to the production of high-quality tableware and artware, as well as extension of results to local manufacturers.
- Development of new types of designs which could be acceptable in export markets.

Program (2)

<Package of measures (2)>

This measure is to enhance more effective use of such local raw materials as Kaolin or plastic clay, which exist in abundance in Malaysia but are not presently used for the production of high quality products.

-- Program --

Intensification of Geological Surveys of Ceramic Raw Materials

- A nationwide geological survey would be needed in order to identify stable and high quality mineral raw material deposits.

Program (3)

<Package of measures (3)>

This measure is to upgrade the technical abilities of ceramic engineers and workers, and improve the business administration capabilities of Malaysian managers.

-- Program --

Execution of Human Resources Development Programs

- Give technical training to ceramic engineers and workers which are generally conducted jointly by the MARA Institute of Technology and SIRIM.
- Provide practical training on factory sites in the areas of both production technology and design development.
- Have seminars and training programs of Malaysian managers in the area of business management which are usually conducted by NPC.

Program (4)

<Package of measures (4)>

This measure is to establish a nationwide industry association of chinaware manufacturers and introduce a joint R & D or a joint purchasing system of ceramic raw materials, which would contribute largely to the harmonized development of the industry.

-- Program --

Feasibility Study for the Establishment of a Ceramic Industrial Estate

- After finding a good mineral raw material deposit, a feasibility study on the establishment of a ceramic industrial estate having a joint R & D institution and an organization to supply all the necessary raw materials to all manufacturers located in the estate should be conducted.

Program (5)

<Package of measures (5)>

This measure is to upgrade the production, sales and administration capabilities of the Malaysian chinaware industry through capital and technical tie-ups with foreign manufacturers.

-- Program --

Intensive Promotion Activities for Foreign Investment and Technical Tie-ups

- Dispatch investment promotion mission teams to potential investors' areas.
- Expand MIDA investment promotion activities.
- Invite investment mission teams to Malaysia.
- Strengthen matching services for capital and technical tie-ups between local and foreign firms.

Program (6)

<Package of measures (6)>

This measure is to support local chinaware manufacturers to be more export-oriented.

-- Program --

Chinaware Export Promotion through MEXPO

- Gather and supply to local manufacturers overseas market information on chinaware.
- Actively participate in trade fairs overseas, and dispatch trade mission teams to potential markets.
- Have training programs and seminars which target international marketing know-how for chinaware.

Program (7)

<Package of measures (7)>

This measure is to provide financial support in order to strengthen the competitive power of local firms through the modernization of chinaware factories.

-- Program --

Establishment of a Political Schemes for the Development of the Chinaware Industry Particularly in Regard to Financing

- Mitigate lending terms of MIDF or MDB loans.
- Expand the CGC scheme.

- Establish new financing schemes for capital investment directed for factory modernization.

Table VIII.1-3 Proposed Comprehensive Program of Chinaware Industry in Malaysia

Problem Solving Measures	Comprehensive Promotion Program	Means	Execution means and their schedule 1st year	2nd year	3rd year	4th year or after
Improvement of manufacturing technology level of local chinaware manufacturers through the establishment of a ceramic concerned testing and research institute	Promotion of SIRIM Ceramic Technology Centre (or tentatively the activities of the Ceramic Department in SIRIM) Activities are to be directed into the development of chinaware industry by solving major technical problems most of firms are now facing.					
	• Manufacturing technology development of various kinds of Products	Recruitment of new equipment		○	○	○
		Use of foreign experts	○	○	○	○
		Overseas training	○	○	○	○
	• Design development	Use of foreign experts	○			
		Overseas training	○	○		
Development of measure to make better use of domestic raw materials	Intensification of geological survey of ceramic raw materials					
	• Expand the survey activities of the Geological Survey Department	Use of foreign experts	○	○		
		Recruitment of new equipment	○	○		
The improvement of the technical level of ceramic workers and the managerial skills of the managers of private firms	Execution of Human Resources Development Programs					
	• Promotion of technical training conducted jointly by MARA/ITM and by SIRIM	Use of foreign experts	○	○	○	○
		Overseas training	○	○	○	○
	• Practical training at factory site of each private firm in the field of both production technology and design development	Use of foreign experts	○	○	○	○
	• Seminar of business management for managers of private firms conducted by NPC	Use of foreign experts	○	○		

Problem Solving Measures	Comprehensive Promotion Program	Means	Execution means and their schedule 1st year	2nd year	3rd year	4th year or after
Improvement of cooperation among ceramic related firms through association, joint R&D and joint use of raw materials	Feasibility study for the establishment of a ceramic industrial estate	Use of foreign experts	○			
The improvement of manufacturing and managerial capabilities through capital and technical cooperation with foreign manufacturers	Intensive promotion activities of foreign investment and technical tie-ups					
	• Dispatch of Investment promotion mission teams	Promotion activities	○	○	○	
	• Expansion for MIDA promotion activities	Promotion activities	○	○	○	
	• Invitation of foreign investor mission teams to Malaysia	Promotion activities	○	○	○	
	• Matching service for capital and technical tie-ups between local and foreign manufacturers	Promotion activities	○	○	○	
Support for local chinaware manufacturers to be more export-oriented	Chinaware export promotion through MEXPO					
	• Gathering and dispatch of overseas market information		○	○	○	
	• Better use of trade fairs or trade missions	Cooperation from foreign countries	○	○	○	
	• Training programs and seminars for international marketing	Use of foreign experts	○	○	○	
Financial support in order to strengthen the competitive power of local firms through modernization of production facilities	Establishment of political schemes to develop chinaware industry					
	• Mitigation of loan terms handled by MIDF and MDB		○			
	• Expansion of CGC system		○			
	• New financing schemes for the capital investment for factory modernization		○			

1-4. Comprehensive Promotion Program of the Glassware Industry in Malaysia

1-4-1. Basic Strategy

There are only 3 manufacturers that produce glass products from mineral raw materials (except for sheet glass) in Malaysia at present. All of these firms have relatively strong relationships with leading foreign glassware manufacturers, and have modernized mass-production facilities. Due to stagnant market demand for glass bottles, their total production capacity far exceeds the present domestic market demand, and all of these firms are faced with the urgent necessity of strengthening their managerial bases by product diversification, export promotion or productivity.

Domestic market demand for glass tableware is nearly as large as that for glass containers, and significant portion of this domestic demand is expected to be filled by a new glass tableware factory to be established by an Indonesian investor. As for other glass products such as electric lights, pharmaceutical or chemical containers or measurement cylinders, only finishing work is conducted in Malaysia. Their present production volumes in Malaysia are considered to be insufficient to start production from mineral raw materials.

For the future development of the glassware industry in Malaysia, export promotion would be an essential element, for which cooperation with foreign manufacturers having high production capabilities and established overseas sales networks would become a major factor.

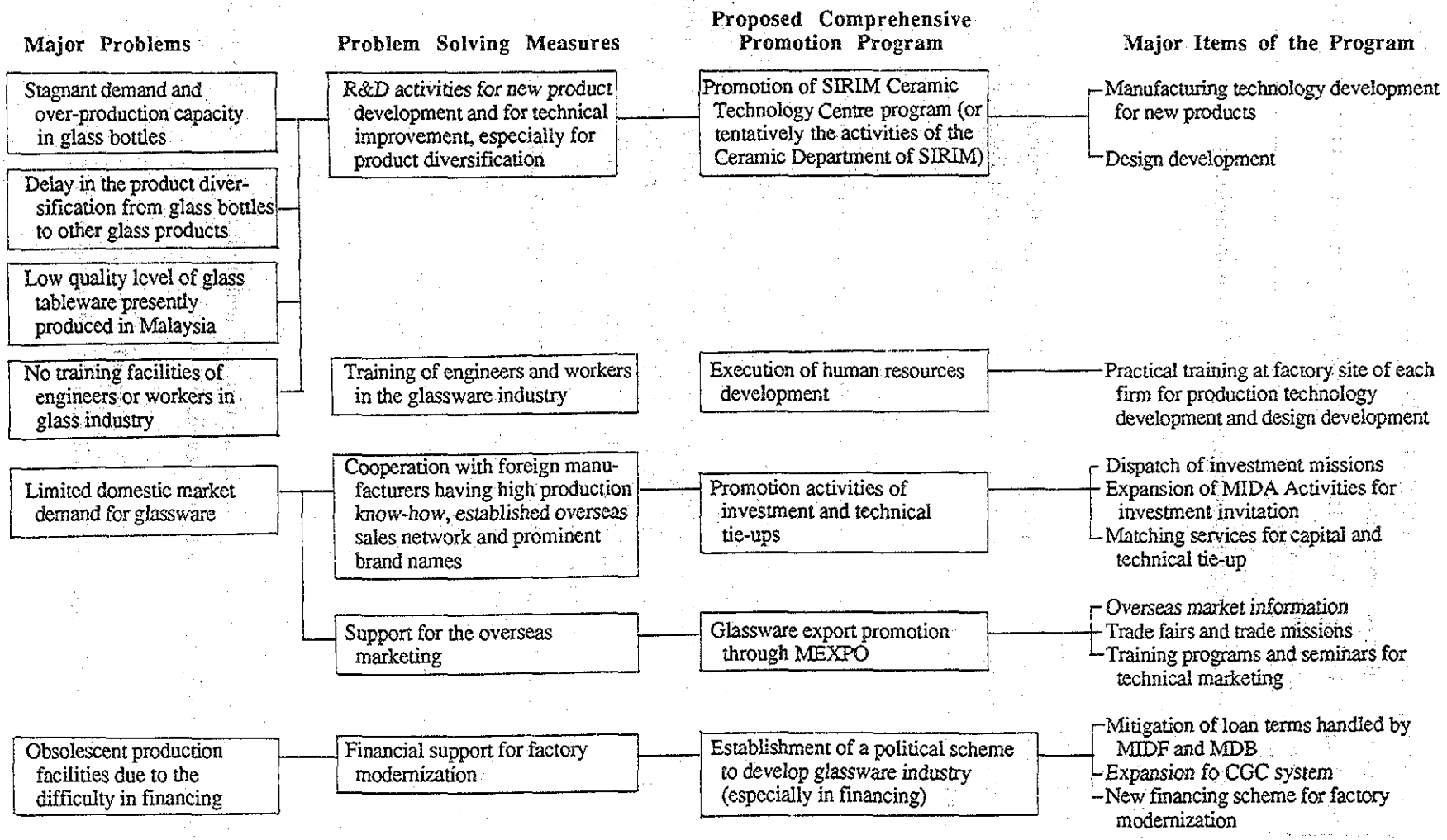
From the above present status of the glassware industry in Malaysia, the basic concepts for the comprehensive industrial development program would be summarized as follows. The details of the relationships among the present major problems of the industry, problem solving measures and an overall promotion program are shown in Fig. VIII.1-4.

Basic Strategy

(1) Establish an R & D glass production technology centre (a glass laboratory in the proposed SIRIM Ceramic Centre), which would support the product diversification and productivity development of existing firms.

(2) Improve export capability of glassware manufacturers through governmental support for overseas market information collection, for improved container transport facilities and for the establishment of an inspection system on exported glass products.

Fig. VIII.1-4 Proposed Comprehensive Promotion Program of Glassware Industry in Malaysia — Problems and Solution —



(3) Investigate the possibility of giving more favorable financial support for factory modernization or expansion.
(4) Promote the invitation of foreign investors having established overseas networks and product brand images.

1-4-2. Comprehensive Promotion Program of the Glassware Industry

Program (1)

<Package of measures (1)>

This measure is to promote product diversification and the improvement of overall technological levels of glassware manufacturers by extending to Malaysian manufacturers the results of R & D activities.

-- Program --

Promotion of a Ceramic Technology Centre (Glass Laboratory)

The establishment of a Glass Laboratory in the Ceramic Centre, which has already been proposed by SIRIM, should be promoted. Before its establishment, the Ceramic Department of SIRIM should engage in R & D activities to promote the development of the glassware industry, including R & D to improve technological levels. The following are the major activities expected from the proposed Centre.

- Carry out R & D activities on various production technologies.
  The results of R & D on production technology by type of product such as glass, tableware, or containers will be provided to manufacturers.
- Engage in design Development.
  Promote the improvement and development of designs.

Program (2)

<Package of measures (2)>

This measure is to provide training to technicians and workers at private enterprises to improve technological levels.

-- Program --

Execution of Human Resources Development Programs

- Practical training at a factory site of each firm for production technology development and design development will be especially effective to increase the skills of technicians and workers.

Program (3)

<Package of measures (3)>

This measure is to promote investment by leading foreign manufacturers which have established brands and production know-how for high-grade products and to promote tie-ups with those companies. Cooperation of major foreign manufacturers is required in order that the Malaysian glassware industry can manufacture products which will meet domestic demands for high-grade products and can compete in the world market.

-- Program --

Promotion Activities for Foreign Investment and Technical Tie-ups

- Dispatch investment mission teams.
- Mission teams whose objectives are focused on the promotion of investment and technical tie-up should be dispatched.
- Expand MIDA promotion activities.
- MIDA's role in investment promotion should be reinforced.
- Provide intermediary services between domestic and foreign enterprises.
- Individual, concrete support should be provided in order to match the conditions of both sides and to promote joint-venture businesses and technical tie-ups.

Program (4)

<Package of measures (4)>

This measure is to provide support for overseas marketing activities including product planning, production for foreign markets and sales activities.

-- Program --

Glassware Export Promotion through MEXPO

- Gather information on overseas markets and provide it to the industry.

- The gathering and provision of information focused on glassware are necessary because present information services are insufficient to grasp the situation of overseas markets.
• Participate in trade fairs and dispatch trade missions.
- Participation in trade fairs and the dispatch of inspection and trade missions are necessary to promote exports.
• Have training programs and seminars on overseas marketing activities.
- It is desirable to provide to private enterprises as much information as possible on overseas market trends and sales methods.

Program (5)

<Package of measures (5)>

This measure is to provide financial support for plant modernization and for the improvement of competitiveness. A financial support scheme is required because there are domestic manufacturers which need to modernize their plants and equipment or which have poor fund raising abilities.

-- Program --

Establishment of a Political Scheme for the Development of the Glassware Industry Particularly in Regard to Financing

• Mitigate loan terms on MIDF and Malaysia Development Bank funds.
• Expand activities of the Credit Guarantee Cooperation (CGC).
- The activities of CGC should be expanded because this system gives loan borrowing opportunities to medium- and small-scale enterprises in particular.
• Establish new financing schemes to promote capital investments for plant modernization.

Table VIII.1-4 Proposed Comprehensive Program of Glassware Industry in Malaysia

Problem Solving Measures	Comprehensive Promotion Program	Means	Execution means and their schedule 1st year	2nd year	3rd year	4th year or after
Increase of product diversification capabilities and overall technical levels of glassware manufacturers through R&D	Promotion of a SIRIM Ceramic Center (or tentatively the activities of the Ceramic Department in SIRIM)					
	• Manufacturing technology development of various kinds of new products	Recruitment of new equipment		○	○	○
		Use of foreign experts	○	○	○	○
		Overseas training	○	○	○	○
	• Design development	Use of foreign experts	○			
		Overseas training	○	○		
Training of engineers and workers in the glassware industry	Execution of Human Resources Development	Use of foreign experts	○	○	○	○
	• Practical training at factory site of each firm for production technology development and design development					
Cooperation with foreign manufacturers having high level of production know-how, established overseas sales-network and brand names	Promotion activities of foreign investments and technical tie-ups					
	• Dispatch of investment mission teams	Promotion activities	○	○	○	
	• Expansion of MIDA promotion activities	Promotion activities	○	○	○	
	• Matching service for capital and technical tie-ups	Promotion activities	○	○	○	
Support for overseas marketing	Glassware export promotion through MEXPO					
	• Gathering and dispatch of overseas market information		○	○	○	
	• Participation in trade fairs and dispatch of trade missions	Cooperation from receiving countries	○	○	○	
	• Training programs and seminars for international marketing		○	○	○	

Problem Solving Measures	Comprehensive Promotion Program	Means	Execution means and their schedule 1st year	2nd year	3rd year	4th year or after
Financial support for factory modernization	Establishment of a political scheme to develop glassware industry					
	• Mitigation of loan terms handled		○			
	• Expansion of CGC system		○			
	• New financing schemes for the capital investment for factory modernization		○			

1-5. Industry Promotion Program Proposed from Macro Policy Framework

1-5-1. Background

The followings are the brief summary of the major findings in macro policy framework relative to the foreign investments, local industry promotion and export promotion.

Invitation of Foreign Investment

(1) The present levels of domestic technology and technical know-how are not sufficient for further development of these four industries. So, aggressive policy measures to invite foreign investors or technologies in Malaysia would be required in some areas of these industries.
(2) For the invitation of foreign investors, a compilation system of basic information required from potential investors has to be established.
(3) For site selection, information relative to the development of local supporting industries is especially needed. From the viewpoint of the establishment of macro industrial development policy, the compilation of industry information, which would even include the activities of each firm in the industry, would be needed.

Local Industry Development

(1) The FTZ system has contributed largely to the invitation of many foreign affiliated firms in Malaysia. In the system, however, the linkage between foreign affiliated firms located in FTZ and local industry groups has been neglected. Thus, the development of local supporting industries which would supply their products mainly to firms located in FTZ is still insufficient.
(2) The market is, however, gradually expanding from foreign affiliated firms located in FTZ to local supporting industries. For one, the sales to FTZ area are regarded as exports and the all of the tax and other incentives relative to exports are applicable. For another, the foreign affiliated firms, especially those from Japan, are intentionally increasing the recruitment of the parts from the local market due to the rapid rise in the prices of imported parts and materials.
(3) One of the major problems that many the local firms face for the sales to foreign affiliated firms is their very strict requirement for product quality control of the products.

(4) As one of the policy measures to improve the product quality of Malaysian products, the "Scheme for the Assessment and Registration of Quality System" has been started in SIRIM. For the implementation of the scheme, however, trained experts who could evaluate the quality level of various products are lacking in SIRIM.

Export Promotion

(1) The many private enterprises in Malaysia, often point out the lack of information on overseas markets, and insufficient opportunities to approach the foreign buyers are often pointed out.
(2) MEXPO has been established as an organization to promote exports from Malaysia. Their activities in trade inquiry matching services or consulting services for product improvement for exports are highly evaluated by private firms. Due to the limit of the present budgetary allocation, further expansion of these MEXPO activities is very difficult. More active participation in overseas trade fairs is another area that MEXPO desires to expand, but they are not succeeding due to their budgetary limitation.

Under the above circumstances, the promotion programs, which are proposed from a macro policy framework, and which would contribute for the development of the 4 selected industrial product, are as follows:

1-5-2. Programs Proposed from the Macro-Political Framework

Programs proposed from a macro political framework would lead to the promotion of the four selected industries and to the acceleration of their exports.

Program (1)

<Package of measures (1)>

One part of this measure is to intensify activity to attract foreign investment. One of the measures to be carried out is the collection of nationwide information related to investments and the quick supply of it. Data-based information such as on industrial estates, labor demand and supply, or labor cost, is to be collected by MIDA for the convenience of investors.

Another part of this measure is to establish a data base on domestic enterprises. Some SEDC (State Economic Development Corporation) produce "Supporting Industry Directory." MIDA is collecting information and putting it into a computer data base. MIDA could become a one-stop agency for foreign investors interested in tie-ups with Malaysian firms. Effective use of up-to-date information on supporting enterprises would provide domestic enterprises with opportunities to expand. The information shall be collected and used by both MIDA and SEDC in each state.

-- Program --

Expansion of Investment Attraction Activities by MIDA

- Connect MIDA and SEDC in each state with an on-line system, and make possible the usage of information related to investment and enterprises.
- In addition, for concentrated activity to attract specific target industries, or the publication of a guidebook on the subjected industry, dispatch and acceptance of investment missions, etc., would be needed. For intensified consulting services to potential investors, experts with broad knowledge of specified industries shall be assigned.

Program (2)

<Package of measures (2)>

This measure is to put more emphasis on the activities to support local enterprises for export promotion such as those presently conducted by MEXPO.

-- Program --

Expansion of Export Promotion Activities through MEXPO

- Collect information on foreign markets regarding target items, guidelines to improve quality, and the holding of seminars.

Program (3)

<Package of measures (3)>

This measure is to improve the quality of Malaysian products by the enforcement of the "Scheme for the Assessment and Registration of Quality System", which is presently planned at the SIRIM.

In order to put this system on the right track, a program to train SIRIM staff members to be quality evaluation experts, with guidance by a foreign expert, should be performed. In addition, through the seminar, knowledge regarding the importance of quality control shall be diffused.

-- Program --

Promotion of the Scheme for the Assessment and Registration of Quality System by SIRIM

- Educate experts from among the SIRIM staff members in order to promote the above scheme.
- Invite foreign experts to be instructors for seminars.

Program (4)

<Package of measures (4)>

This measure is to introduce modernized management systems for the development of the industry. Therefore, educational opportunities to managers of small and medium scale domestic enterprises should be expanded.

-- Program --

Expansion of Manager Training at NPC (National Productivity Centre).

- Establish a training center for small and medium scale enterprises within the NPC for the education of managers which aims to implant modern business administration skills

Table VIII.1-5 System and Policy

Comprehensive Promotion Program	Execution Means and their Schedule				
	Means	1st year	2nd year	3rd year	4th year or after
Expansion of MIDA (Malaysian Industrial Development Authority)					
• Centralize all information regarding investment at MIDA and supply it to investors. Concretely, connect SEDC (State Economic Development Corporation) and MIDA by an on-line system and supply information on investment and enterprises.	F/S by experts for data base of information	o			
	Recruitment of machinery and facilities		o		
• Publish materials regarding target industries, dispatch and invite foreign investor mission teams. And for the intensification of counseling, assign experts to industries concerned.	Use of foreign experts	o	o	o	o
	Supply of basic industrial information	o	o	o	
	Promotion activities	o	o	o	
	Implementation of match making	o	o	o	
Expansion of export promotion activities of MEXPO (Malaysian Export Trade Centre)					
• Collect overseas market information regarding the target items, guide design and quality, and organize seminars.	Guidance for the improvement of products	o	o	o	
Promotion of Scheme for the Assessment and Registration of Quality System by SIRIM					
• Train experts in SIRIM to promote this scheme	Use of foreign experts		o	o	o
	Overseas training		o	o	o
Expansion of NPC (National Productivity Centre)					
• Establish a training centre in the NPC for managers of small and medium sized enterprises.	F/S by experts		o		

2. Integration and Prioritization of the Proposed Programs

2-1. Positioning of the 4 Selected Industries of the Study

The positioning of the 4 targeted industries of the study, which were selected in the process as mentioned in the introduction chapter, are examined in this section in order to provide the framework for the integration and priority evaluation of the programs proposed separately for each of the 4 industries.

Outlines of the four industries are summarized and compared in Table VIII.2-1.

2-1-1. Moulds and Dies

Moulds and dies are widely used in the production processes of various products including electronics and electrical apparatus, automobiles, machinery and equipment such as office equipment and optical instruments, glass containers, rubber products, etc. The development of the mould and die industry, which plays the role of supporting every industrial sector, will decide the future of the country's industrial development.

The mould and die industry basically engages in diversified small lot production. The production system can be divided into various types, from the type which requires high technology and know-how to more basic labor-intensive production. Medium- and small-sized enterprises occupy the dominant position in the mould and die industry. Even in advanced countries, mould and die manufacturers often engage in production with little capital and a small number of employees. As for the manufacture of moulds and dies, hence, there are several areas which are suited for the developing countries.

The Malaysian government fully recognizes the importance of the mould and die industry as a supporting industry of export-oriented industries. The government, in the IMP published in January, 1986, accorded priority status to the development of the mould and die industry as the central sector in the machinery and engineering industry. Among development strategies for this industry, the government put emphasis on the improvement of technological levels and production efficiency in order to decrease dependence on the import of moulds and dies. The mould and die industry is designated as a promoting industry in the Promotion of Investment Act and various incentives such as tax reduction are provided.

The main focus of the mould and die industry in Japan has shifted from the expansion of production to the improvement of quality. Japanese manufacturers tend to transfer the production bases of labor-intensive manufacturing which does not require

precision to developing countries. Some Japanese-affiliated enterprises manufacturing moulds and dies in developing countries export their products to Japan.

Under these circumstances, the Malaysian mould and die industry will be expected to play a more important role in supporting export-oriented industries. Foreign investment in this sector is also expected to increase.

2-1-2. Automotive Metal Parts

The vehicle registration rate in Malaysia is estimated at 14.1 persons per vehicle, which is, as well as that in Singapore, a relatively high rate among ASEAN countries. Considering the demand for automobiles in the population of 16.5 million, the domestic market for automobiles is not large.

It is estimated that 34,000 passenger cars and 15,000 commercial vehicles were assembled in Malaysia in 1987. Malaysia has promoted local content development as have neighboring countries. However, the limited production scale has raised the problem of high production cost. The government has taken a flexible policy for automotive parts. Because of these factors, local content development has not made much progress. The expansion of production volume is fundamentally required to develop local content. The promotion of parts exports is considered as one solution to this problem.

In 1983, PROTON, which had been one of the projects of greatest concern, was established as a joint-venture with a Japanese enterprise to manufacturer the national car. PROTON started production and sale of the national car in 1985. The government positions the national car project as a focal point of development and intends to promote the development of the automobile industry and related industries. Besides the Mandatory Deletion Programme, the government announced a parts procurement schedule for the national car and invited the supply of parts from domestic and overseas manufacturers. The local content ration of PROTON is estimated to reach approximately 40% because PROTON has a sheet metal plant. The industry has to look towards the export market, which has been considered a medium- and long-term target, in order to achieve economies of scale. PROTON has already embarked on experimental exports.

Excluding the national car, the local content ratio of automobile manufacture is estimated at approximately 20-30%. It is difficult to increase the application of domestic parts because of the limitation of production scale.

The biggest problem of the automotive metal parts industry is that investment in the industry should be restrained because of limited demand. But there are some encouraging factors. For example, Japanese automobile manufacturers are increasing

their procurement of parts from overseas suppliers. And Japanese parts manufacturers are tending to set up production bases in Asian countries. By promoting investment foreign enterprises including Japanese firms and technological tie-ups, it may be possible to expand the export of OEM automotive parts. The development of the automobile industry and the automotive parts industry will generate substantial spin-off effects on the related industries as expected in the IMP. Among these industries, the development of the automotive metal parts industry, above all, is an important task because the promotion of local content for this sector is considered relatively difficult.

2-1-3. Chinaware

In the IMP 1986/95 released in January, 1986, the Malaysian government accorded priority status to the non-metallic mineral products (NMMP) industry, which covers a wide range of products including chinaware as well as cement, glass, and glass products, as a resource-based industry. Although the importance of the NMMP industry in the Malaysian economy is still relatively small, the government expects much from the development of this industry. It said that the industry has a strong potential for promoting related development projects and encouraging overall economic activities. IMP stressed those aspects and pointed out the following roles which the industry should play in the future.

- To develop and utilize abundant local resources
- To reinforce the structure of affiliated industries, especially to provide essential inputs to the construction sector
- To promote large-scale, capital-intensive and high technology industries
- To disperse industries to less-developed regions
- To encourage the growth of small-scale industries.

The IMP described the basic policy toward chinaware in the section on product strategies. The Malaysian government expects the future market acceptability of Malaysian chinaware and has an interest in promoting its exports. The following are product strategies for chinaware.

- High-grade ceramic tableware
  Malaysia still imports a large volume of ceramic tableware from China, Japan, Taiwan, etc. Imported tableware is of higher quality and/or is less expensive than domestic goods. Imported tableware occupies a dominant position in the market

ranging from prestigious hotels and restaurants to households. Domestic products can enter the high-grade tableware market and substitute for imports when the Malaysian industry introduces modern technologies, utilizes high-quality mineral resources, develops excellent designing ability, and introduces thorough quality control.

- Other ceramic products

  Other ceramic products which are recognized for promotion are novelties and handicrafts, and various ceramic products for industrial use.

Some Japanese chinaware manufacturers have moved their production bases to the ASEAN countries including Malaysia reflecting the appreciation of the yen. Some manufacturers have made applications for investment projects.

2-1-4. Glassware

The glassware industry is identified as a priority industry in one sector of the NMMP industry. The IMP considered, in the section on product strategies, that there is a potential demand for glassware in the domestic market and also the high possibility of export.

Among glassware, tableware and kitchenware are listed as development targets. Although the present demand for those products is not large, potential demands are regarded as large.

Malaysian glassware, especially glass bottles, are exported to neighboring countries such as Singapore, Hong Kong, and Pakistan. The exports have tended to increase in recent years. On the other hand, the production volume of such glassware as tableware and novelties is still small. Those sectors would be export industries with the development of marketing techniques and designing abilities, and the acquisition of technologies.

Table VIII.2-1 Positioning of 4 Selected Industries

	Moulds and Dies	Automotive Metal Parts	Chinaware	Glassware
1. Size (M$ million)				
Production	40-50 (1987)	93 (1985)	80 (1986)	78 (1987)
Exports (FOB)	25 (1987)	16 (1987) 1)	34 (1986)	29 (1986)
Imports (CIF)	105 (1987)	622 (1987) 1)	20 (1986)	36 (1986)
2. Growth rate (%)				
Production	200-250 (1985-1987)	97.8 (1981-85)	13.8 (1982-86)	N.A.
Exports	230 (1985-1987)	0.6 (1983-7)	57.0 (1982-86)	18.5 (1983-86)
3. Overseas market				
Major competitors	Basically not appropriate for exports and imports	Developed countries/ Asia NIES	Developed countries/ Asia NIES/China etc.	Developed countries/ Asia countries
Competition		Very hard	Very hard	Very hard
Competitive power of Malaysian products		Low	Low	Low
4. Domestic raw materials				
Self-Sufficiency rate	Low	Low	Medium	Medium
5. Impact to other industries	Large	Medium	Medium	Small
6. Future growth prospect for domestic production	Large	Medium	Medium	Medium
7. Future growth potential of exports	Large (but indirect)	Small	Medium	Small

Note: 1) Total exports or imports of automotive parts including CKD parts.

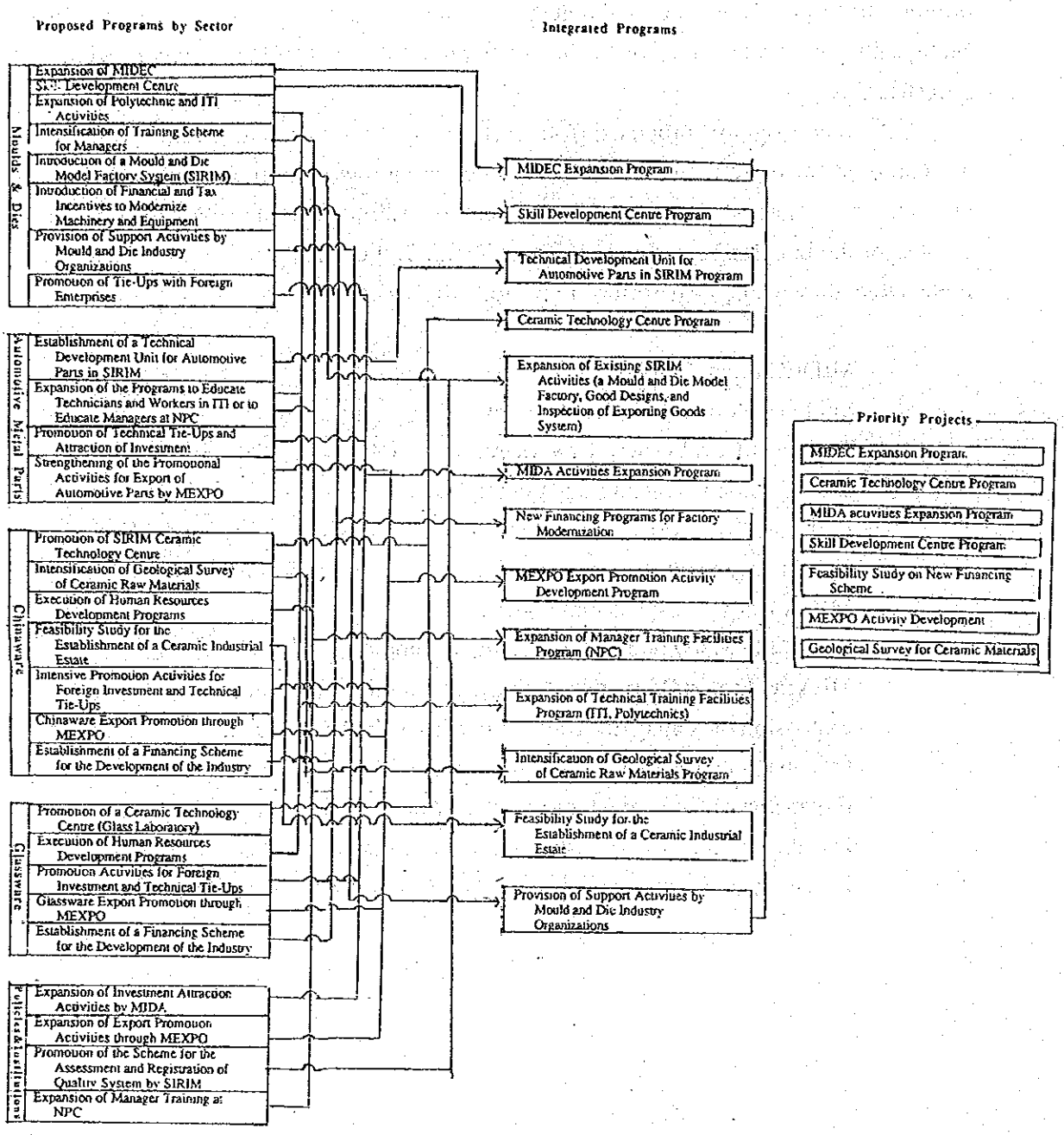
2-2. Integration of the Proposed Programs

A package of programs is separately proposed as an overall industrial promotion program for each of the 4 selected industries and for the macro policy framework of the Malaysian government relative to the development of small-scale or export-oriented industries.

Among programs proposed from each sector, a relatively large number of them are common for more than 2 sectors. By integrating these common programs among sectors, the number of proposed programs could be limited to the following 13. The process of the integration is shown in Table VIII.2-2. For the priority projects showing in the table, they would be described in the following section.

- MIDEC Expansion Program
- Skill Development Centre Program
- Technical Development Unit for Automotive Parts in SIRIM Program
- SIRIM/Ceramic Technology Centre Program
- Expansion of Existing SIRIM Activities (a Mould and Die Model Factory, a Good Design and an Inspection of Exporting Goods System)
- MIDA Activity Expansion Program
- Feasibility Study on New Financing Scheme
- MEXPO Export Promotion Activity Development Program
- Expansion of Managers' Training Facilities Program (NPC)
- Expansion of Technical Training Facilities Program (ITI, Polytechnic)
- Expansion of Geological Surveys for Ceramic Raw Materials Program
- Feasibility Study for the Establishment of a Ceramic Industrial Estate
- Provision of Support Activities by Mould and Die Industry Organizations

Fig. VIII.2-1 Integration of Programs and Priority Projects



2-3. Review of the Priority Projects

To develop the industries selected for this study, it is desired that all of the programs proposed as an overall industry promotion program for each industry sector should be put into practice at once with full efforts.

In practice, however, it is necessary to make a rough priority selection to each proposed program in order to implement the programs under the very tight limitations on both funds and human resources.

Because all the programs proposed in this study were not identified through sufficient feasibility studies, a priority ranking of each program could not be given in very strict criteria such as figures of the IRR (International Rate of Return) of each project.

As a second best approach, the selection of priority projects was made based on the rather subjective judgement of the Study Team on the following basic criteria:

(1) Existence of established organizations in charge of the project
For those projects that have already established organizations for their implementation are given higher marks than those having no existing organizations in charge, due to their readiness for implementation.

(2) Maturity level of the project
Those projects which support some existing schemes are regarded as being at a high maturity level and are given high marks for priority ranking. Those projects for which the plans are already approved by the Government but not implemented are given the evaluation of medium, and those projects which have to be started from the planning stage are regarded as low maturity projects and given low marks.

(3) Urgency of the needs of the project
Those projects for which implementation is urgently needed are given high marks, while those projects of which implementation is needed but not urgent are given a relatively low marks.

(4) Scale of investment in the project
This criteria is one of the basic factors to evaluate project cost-performance. Due to the lack of benefit evaluations for each project, the cost scale was not directly used as the criteria for priority evaluation.

(5) Level of direct impact of the project on the development of the targeted industry

For those projects which have direct impact on the targeted industries high marks are given while for those which would have only indirect influence lower marks are given.

(6) Necessity for support from other organizations

Those projects for which supports from other organizations are needed for implementation are given higher marks than those projects that would be implemented by the self-efforts of the existing organizations.

(7) Industries to which the project effects would extend

Judging from the position of each industry in and the levels of influence that each industry would extend to the total Malaysian industry, a relatively high mark was given to mould and die industry and a rather low mark to glassware industry.

The results of the review of the priority ranking are summarized in Table VIII.2-3, from which the following 4 high ranking programs were selected as priority projects.

- MIDEC Expansion Program
- SIRIM/Ceramic Technology Centre Program
- MIDA Activity Expansion Program
- Skill Development Centre Program
- Feasibility Study on New Financing Scheme
- MEXPO Activity Development
- Geological Survey for Ceramic Materials

Table VIII.2-2 Summary of the Results of Priority Project Identification

	MIDEC	Skill Development Centre	Ceramic Center	Technical Development Unit for Automotive Parts	Various SIRIM Activities	MIDA Activity Expansion	New Financing Scheme F/S	MEXPO Activity Development	Training Center for Business Administration	Technical Training Expansion at ITI	Geological Survey for Ceramic Materials	Ceramic Industrial Estate F/S	Mould and Die Industrial Association
1. Existence of established organizations in charge	Yes (SIRIM/ MIDEC)	None (Under planning)	Yes (SIRIM)	None	Yes (SIRIM)	Yes (MIDA)	None	Yes (MEXP0)	Yes (NPC)	Yes (ITI)	Yes (Geological survey Dept.)	None	None
2. Maturity level of the project	High (Support for existing scheme)	Medium (Planning stage)	High (Planning completed)	Low	Medium (New/ Expansion)	High (Support for existing schemes)	Low	High (Support for existing scheme)	High (Support for existing scheme)	High (Support for existing scheme)	High (Support for existing scheme)	Low	Low Support
3. Urgency of the project	High	Medium	High	Medium	Medium	High	Medium (Complementary schemes exist)	High	Medium	Midium	High	Low	Medium
4. Scale of the investment amount	Large	Large	Large	Large	Small	Medium	Small	Medium	Small	Small	Medium	Small	Small
5. Level of the direct impact of the project for target industries	Large	Large	Large	Medium	Medium	Large	Large	Medium	Medium	Medium	Large	Small	Medium
6. Necessity for support from outside of the organization in charge	Large	Large	Large	Large	Small	Small	Large	Small	Small	Small	Medium	Medium	Medium
7. Industries covered	Moulds & dies Automotive metal parts	Moulds & dies Automotive metal parts	Chinaware Glassware	Automotive metal parts	Moulds & dies Chinaware Glassware	Moulds & dies Automotive metal parts Chinaware Glassware	Moulds & dies Chinaware Glassware	Moulds & dies Automotive metal parts Chinaware Glassware	Moulds & dies Automotive metal parts Chinaware	Moulds & dies Automotive metal parts Glassware	Chinaware	Chinaware	Moulds & dies
Priority selection	A	A	A	B	B	A	A	A	B	B	A	B	B

Note: A shows that the project is selected as a priority project.
B shows that the project is not selected as a priority project.

3. Outline of the Priority Project

3-1. Expansion Plan of the SIRIM/MIDEC

(1) Background of the project

The mould and die industry will play a more important role in the future as a supporting industry.

In the mould and die division of MIDEC, the latest mechanical facilities have been installed, and appropriate personnel are being fostered. By using the existing and expanded mechanical facilities and personnel, a plan to promote the development and to transfer advanced mould and die technology to senior level engineers of private companies by inviting foreign experts is considered necessary for the further development of the mould and die industry.

(2) Proposed Expansion Plan

In addition to the existing facilities, the following types of machinery are to be added.

a) Mechanical facilities

i. Latest CNC wire cut EDM	Work size 600 x 400mm class,	1
ii. Latest CNC EDM	Work size 650 x 350mm class,	1
iii. Accessories necessary for above 2		1 set
iv. CAD system to which linkage is possible for the above 2		1 set
v. Latest CNC milling machine	Work size 100 x 700mm class,	1
vi. Latest CNC forming grinder		1
vii.Accessories necessary for above machines		1 set
viii. 50 ton high-speed press machine, feeder and accessories		1 and 1 set

The disbursement schedule of the project costs for both development and operating expenditures is as shown below.

(Unit: ¥1 million)

	1st year	2nd year	3rd year	Total
Development Expenditures				
Equipment and facilities	300	0		300
Operation Expenditures				
Salaries and allowances	20	20	20	60
Supplies and materials	50	50	50	150
Professional services	10	10	10	30
TOTAL	380	80	80	540

b) Invite trainers from abroad:

Qualifications for experts necessary for technical development and training are as follows:

i. Design, CAD (Press Die & Plastic Mould)	2 persons (aged 40 to about 60)
ii. Machining, Assembly (Press Die & Plastic Mould)	2 persons (aged 40 to about 65)
iii. Period	3-5 years

(3) Activities

The following activities should be conducted in addition to the present activities.

- Promote development and transfer of mould & die technology
  - Intensify R&D activities and positive technology transfer to private sectors
- Provide very high level technical training.
  - By the foreign experts, this training shall be carried out both at MIDEC and at factory sites of private companies.
- Hold technical seminars.
  - Make use of the MIDEC facilities to hold technical seminars by the foreign experts.
- Technical staff training in foreign countries.
  - Continue to carry out the training of MIDEC's technical staff in foreign countries.
- Collect and supply technical information.
  - Collect technical information which contributes to the improvement of technical levels in Malaysia and offer it to private enterprises.

(4) High-Level Technical Training

Considering the present rapid growth of the Malaysian mould and die industry, each company has very little room to send technical staff to MIDEC. In addition, there is a possibility that sending valuable company technical staff for a long period will become a hindrance to company activities. Therefore, it is necessary to conduct some sort of short-term practical training and to establish incentive systems which will contribute to some degree to Malaysian companies.

Advanced Grade-1

1) Press Die Machining & Assembling

a) Trainees: 5-10 trainees having 2-4 years actual die production and comparable experiences
b) Period: 1 course = 40 hours per week Totally 15 weeks
c) Courses: "Press Technology", "Precision Cutting Technology", "Jig Milling Technology", "EDM Technology", "Wire Cut EDM Technology", "Forming Grinding Technology", "Jig Boring Technology", "Jig Grinding Technology", "Heat Treatment Technology", "Machining Centre Technology", "Precision Measuring Technology", "Precision Surface Grinding Technology", "Assembling Technology", etc.
Totally 15 courses
d) Target: Making mono-functional press dies such as precision blanking die, precision drawing die and precision bending die with the products' accuracy of 0.05-0.1mm order.

2) Press Die Designing

a) Trainees: 5-10 trainees having 2-3 years actual die designing and comparable experiences
b) Period: 1 course = 40 hours per week Totally 10 weeks
c) Courses: Designing mono-functional press dies such as precision blanking die, precision drawing die and precision bending die.
Totally 10 courses
d) Target: Designing mono-functional press dies such as precision blanking die, precision drawing die and precision bending die with the products' accuracy of 0.05-0.1mm order.

3) Plastic Mould Machining & Assembling

a) Trainees: 5-10 trainees having 2-4 years actual mould production and comparable experiences
b) Period: 1 course = 40 hours per week Totally 15 weeks
c) Courses: "Plastic Forming Technology", "Precision Cutting Technology", "Jig Milling Technology", "EDM Technology", "Wire Cut EDM Technology", "Forming Grinding Technology", "Jig Boring Technology", "Jig Grinding Technology", "Heat Treatment Technology", "Machining Centre Technology", "Precision Measuring Technology", "Precision Surface Technology", "Assembling Technology", etc.
Totally 15 courses

d) Target: Making precision plastic moulds with the products' accuracy of 0.1mm order.

4) Plastic Mould Designing

a) Trainees: 5-10 trainees having 2-3 year actual mould designing and comparable experiences
b) Period: 1 course = 40 hours per week Totally 10 weeks
c) Courses: Designing precision plastic moulds.
Totally 10 courses
d) Target: Designing precision plastic moulds with the products' accuracy of 0.1mm order.

Advanced Grade-2

1) Press Die Machining & Assembling

a) Trainees: 5-10 trainees having 3-5 years actual die production and comparable experiences.
b) Period: 1 course = 40 hours per week Totally 10 weeks
c) Courses: "CNC Forming Grinding Technology", "CNC EDM Technology", "CNC Wire Cut EDM Technology", "High Speed Press Technology", "CAD Technology", etc.
Totally 10 courses
d) Target: Making high precision dies such as progressive die and transfer die with the products' accuracy of 0.01-0.02mm order.

2) Press Die Designing

a) Trainees: 5-10 trainees having 3-5 years actual die designing and comparable experiences.
b) Period: 1 course = 40 hours per week Totally 5 weeks
c) Courses: Designing high precision dies such as progressive die and transfer die.
Totally 5 courses
d) Target: Designing high precision dies such as progressive die and transfer die with the products' accuracy of 0.01-0.02mm order.

3) Plastic Mould Machining & Assembling

a) Trainees: 5-10 trainees having 3-5 years actual mould production and comparable experiences.
b) Period: 1 course = 40 hours per week Totally 10 weeks
c) Courses: "CNC Forming Grinding Technology", "CNC EDM Technology", "CNC Wire Cut EDM Technology", "CAD Technology", etc.
Totally 10 courses
d) Target: Making high precision plastic moulds or multi-slide moulds with the products' accuracy of 0.05mm order.

4) Plastic Mould Designing

a) Trainees: 5-10 trainees having 3-5 year actual mould designing and comparable experiences.
b) Period: 1 course = 40 hours per week Totally 5 weeks
c) Courses: Designing high precision plastic moulds or multi-slide moulds.
Totally 5 courses
d) Target: Designing high precision plastic moulds or multi-slide moulds with the products' accuracy of 0.05mm order.