No. 38

A STUDY ON INDUSTRIAL SUB-SECTOR DEVELOPMENT IN THE REPUBLIC OF INDONESIA

Summary

SECOND YEAR FINAL REPORT

DECEMBER 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

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Executive Summary

1. The current situation and problems with regard to the three industrial sub-sectors surveyed under the second year of the study (ceramic products, aluminium downstream products and plastic products) are summarized as follows:

1) Current situation

[1] Compared with industries of textiles and processed wood products, the two major export items after oil and gas, the three sub-sectors are relatively young and have insufficient production facilities, personnel, technology, etc.
[2] Although the growth rate of exports has risen since the latter half of the 1980s, the value of exports is still small. With dependence on the domestic market remaining high, the three types of industry have not established themselves as export industries.
[3] Nevertheless, a bright prospect could be expected for them with the sharp expansion of domestic and foreign investments during the latter half of the 1980s supporting their development and an increase in exports.

2) Problems

[1] Partly because of the short history of the industries, the supply of personnel, production technology, quality control, etc., which are indispensable for industrial development, are insufficient or lagging behind. In addition, the supply of raw materials is unstable.
[2] With the exception of some leading firms or joint ventures with foreign capital, export marketing activities are insufficient.
[3] The activities of public R&D institutes and export/investment promotion organizations are yet inadequate and the rate of utilization of these organizations by private firms is generally low.
[4] With regard to the business environment, policy coordination is insufficient, infrastructure lags behind and measures for environmental preservation are not keeping pace with the times.

2. The following characteristics are almost identical with industrial development in the competing nations in Asia.

1) To assist the development of private enterprises, governments provide incentives while proceeding with deregulation and take the initiative in upgrading infrastructure and strengthening public support systems.

2) Partly because of government initiatives, the activities of private enterprises have become vitalized. While proceeding with the attraction of foreign investment, technology transfer from overseas and training of skilled personnel, private businesses are making efforts to expand exports on their own.

3. Export promotion should be based on the market environments in importing countries and the needs of these markets.

1) With regard to market environment, changes are seen in terms of comparative advantages as a result of increasingly fierce international competition. The Asian NIEs are losing competitiveness in labor intensive industries and their positions are being taken over by ASEAN countries and China. Concern about product safety and preservation of the environment is growing, mainly in the industrialized nations.

2) Importers or users/consumers want to buy inexpensive and good quality products which are delivered quickly. They also want products which match consumption/demand trends.

4. Viewpoints on development are as follows:

[1] For industrial development, comparative advantages such as labor force, natural resources, a huge domestic market, etc., should be used efficiently.
[2] High growth is expected to continue in the economies of Indonesia and the rest of Southeast Asia. In addition to an expansion of exports to the markets of industrialized nations, internal demand from the Asian region can be expected to rise.
[3] Indispensable for nurturing the three industrial sub-sectors as export industries through a sustained expansion of exports is the enhancement of the international competitiveness of the group of firms behind the leading enterprises or foreign capital-affiliated ventures.

5. With regard to export markets to be targeted for the products of the sub-sectors under survey, the following courses may be considered.

1) For the time being, Indonesian products are expected to be able to display the country's comparative advantage in the field of labor intensive products. As for the grade of products, exports would begin with the field of low-grade products and then efforts should be made to upgrade products to the level of medium-grade goods. In the case of parts and components, it will be practical for local manufacturers to deliver the products first to foreign capital-affiliated user industries in Indonesia. Then, if they acquire the ability, they would take the course of direct exports as far as possible.

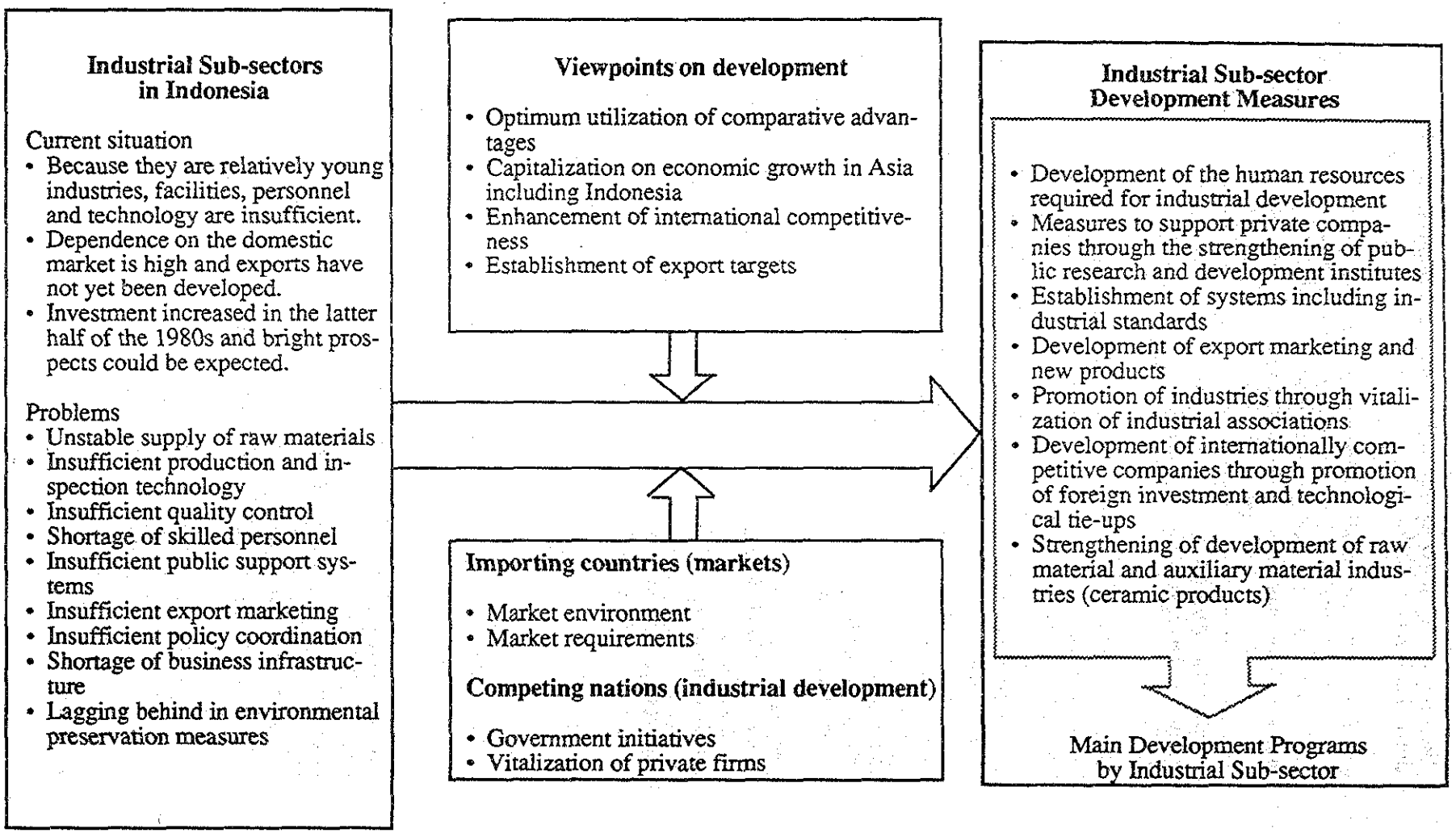
2) While studying the markets in Japan, the United States and EC countries, where demand is huge, exports to Asia, Oceania and the Middle East should be considered. In such cases, export marketing strategies should be devised to suit the competition and characteristics of the individual markets.

6. For the Indonesian sub-sectors under survey to develop amid increasingly fierce international competition and maintain stable and sustained exports of inexpensive and good quality products, they should make particular efforts to: [1] secure a stable supply of raw materials; [2] improve in production technology; [3] improve quality control; [4] train skilled personnel; and [5] introduce export marketing. General issues will be the establishment of policy coordination, the enhancement of infrastructure and the preservation of the environment.

7. We suggest the following programs as main development programs for the Indonesian industrial sub-sectors under survey.

	Ceramic products industry	Aluminum downstream products industry	Plastic products industry
Strengthening of public research and development institutes	O	O	O
Guidance by experts on technology and management	O	O	O
Vitalization of industrial associations	O		O
Export promotion measures	O	O	O
Promotion of foreign investment and technological tie-ups	O	O	O
Strengthening of raw material development and nurturing of raw and auxiliary material industries	O		
New product development		O	

Indonesian Industrial Sub-sector Development Measures for Ceramic Products, Aluminium Downstream Products and Plastic products



I. Introduction

1. Background of Survey

1) Indonesia has been suffering from a deterioration of its international balance of payments due to the fall in oil prices which began in the mid 1980s and therefore is trying to escape from its economic dependence on oil revenues. Toward this end, it has designated the promotion of non-oil and gas (non-migas) products as one of its most important economic targets.

2) Indonesia has worked hard to develop its industry through the past four five-year plans (Repelita). In the fifth five-year plan (Repelita V) begun in April 1989, it set for itself the target of an 8.5 percent annual growth rate in the industrial sector and the achievement of a 16.9 percent ratio of the industrial sector in the GDP by 1993. To realize this, it is giving priority to the development of its export industries.

An average annual growth of 15 percent in the value of industrial product exports is aimed for and this should reach more than $18 billion in the final year of the fifth five-year plan.

3) To help in this endeavor, the Indonesian government requested the Japanese government to survey industrial fields and products which could be expected to be promising in terms of future exports and to formulate a comprehensive program for promotion of exports.

In response to this, the Japan International Cooperation Agency began a two-year survey on industrial subsector promotion and development plans for Indonesia starting in August 1989. This report summarizes the results of the second year survey.

2. Objective and Scope

1) The survey has as its objective the formulation of comprehensive measures for the promotion of selected industrial subsectors with the intent of indicating how best to increase exports and proposes practical programs of action out of these comprehensive measures. The program is meant to be comprehensive and concentrated on which will lead to promotion of the export oriented industries. The aim here is a systematic method for achieving this, not an ad hoc collection of measures.

Further, the survey organizes information relating to companies in both countries interested in investment or joint ventures in the industries and products covered so as to help promote joint ventures and technical tieups between Japan and Indonesia - important elements in the promotion of export industries. Another objective of the survey was the transfer of surveying expertise to the Indonesian counterparts through the implementation of the survey.

2) The subsector industries and products covered in the second year were as follows:

• Ceramic Products Industry	—	Tableware, novelties Construction materials (tiles and sanitary ware)
• Aluminium downstream products industry	—	Die cast products Sheets, sheet formed products and foils

• Plastic products industry	—	Injection products (camera body, electric components, cassettes, automobile components, and household utensils) Sheets, films and woven bags

3) The survey had the following objectives:
   a. Obtaining a grasp of the current state of the selected subsector industries and products
   b. Obtaining a grasp of the policies and measures of the government for promotion of industry and the state of the infrastructure for promotion of the selected industries
   c. Obtaining a grasp of the current state of problems in exports in the selected industries
   d. Survey of the markets and policies for the individual products
   e. Formulation of a master plan for promotion of the selected subsector industries
   f. Organization of information for promotion of the industries, investment in the industries, and technical tieups

3. Method of Survey

1) The method used for the survey was as follows: the survey team first obtained a grasp of the problems in advance through information collected beforehand in Japan, drew up a general scenario of comprehensive promotional measures, then sought to verify this in a field survey.

In the formulation of the comprehensive promotional measures, the team obtained a grasp of the problems through the field survey, analyzed the same, determined the means which could be practically employed by Indonesia out of the general solutions for the problems, then proposed main promotional programs.

This survey comprises a survey conducted in Indonesia, and a Japanese domestic survey and surveys conducted in third countries. The surveys aimed at grasping problems faced by the selected industries and products from both the supply and demand sides. Analysis of results and the formulation of comprehensive promotion policies were done in consultation with Indonesian counterparts.

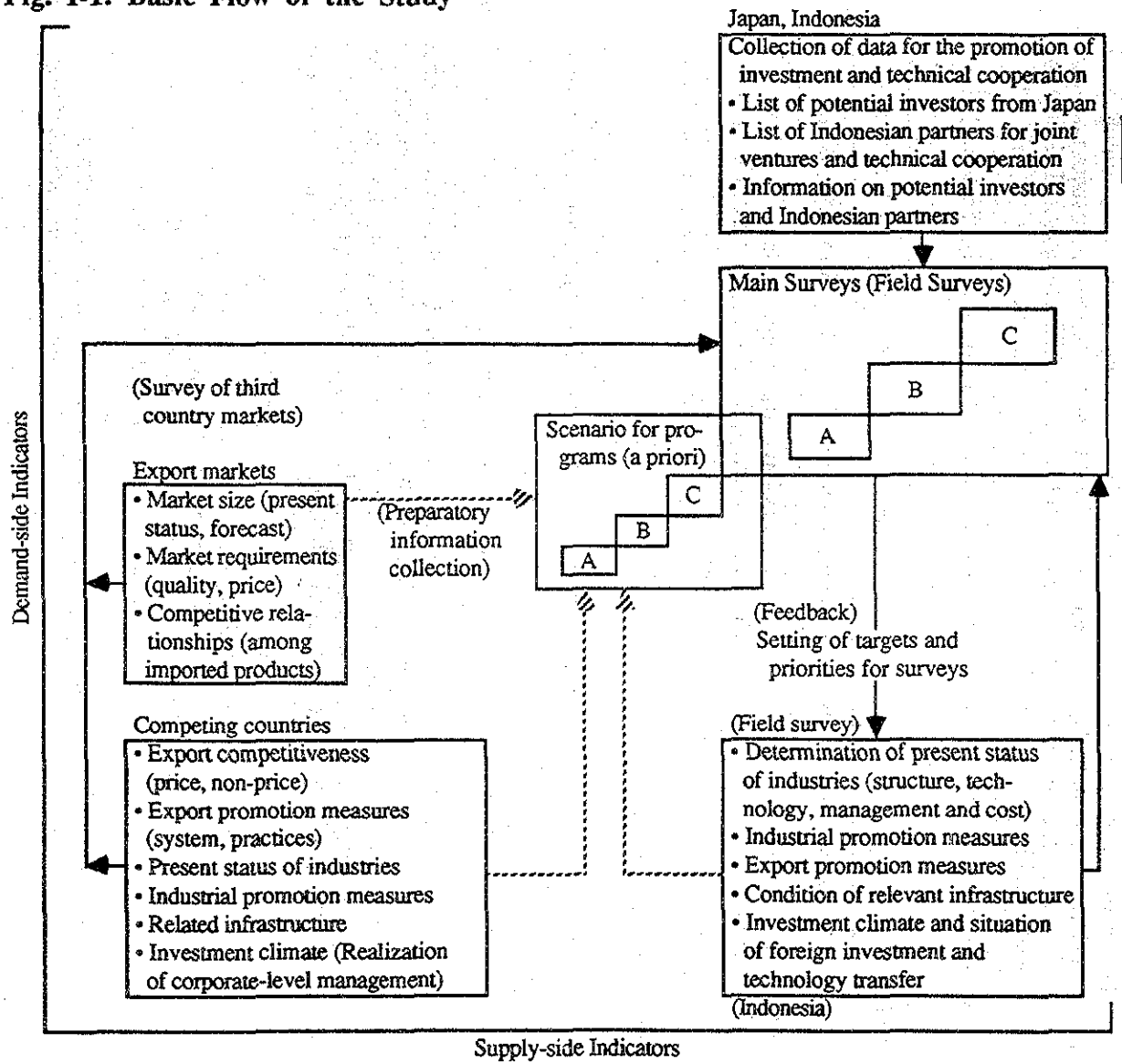
The basic flow-chart of the survey is shown in Fig. I-1.

2) Field Survey in Indonesia

The teams which undertook the study in Indonesia and which were assigned to the three different subsector industries were comprised of five to six members: JETRO personnel, directors from the Sumitomo Business Consulting Co., Ltd., industrial experts from Japan, directors of bureaux within the Indonesian Ministry of Industry, and provincial officers of the Ministry. These teams each conducted field surveys which covered the areas of Sumatra, Java, Bali, and Kalimantan.

The Indonesian study was carried out using the method of in-depth interviews which were held on a total of 169 occasions. In 112 of these cases a questionnaire was distributed to manufacturers, and questionnaires containing useful information were returned in 92 cases. A breakdown of the interviews and questionnaires according to the three particular industries covered is shown in Table I-1. Table I-2 shows the areas which were visited for each of the three subsector industries.

Fig. I-1: Basic Flow of the Study



Export Expansion
(Implementation of programs based on master plans)

A. Identification of problems by selected sub-sector
- Manufacturing process
- Technical level (machinery and technical skills)
- Product development and design
- Factory management and quality control
- Corporate management
- Raw material procurement and supporting industries (subcontractors and parts suppliers)
- Cost analysis
- Marketing strategies
- Investment

B. Setting of targets and formulation of measures for promotion programs
- Setting of target after the review of problems
  Raw materials (incl. parts supply)
  Production (machinery and technical skills)
  Exports
- General review of applicable programs

C. Formulation of industrial sub-sector master plan
- Viable programs for Indonesia
- Improvement and modification of the current policies and measures
- Improvement of manufacturing technologies
- Improvement of product development and design
- Improvement of quality and cost reduction
- Improvement of management and development of human resources
- Improvement of sales and marketing networks

Table I-1: Details of the Field Survey Conducted in Indonesia

Industry	Interviews		Questionnaires (manufacturers)		
	Total	Manufacturers	Distributed	Returned	Rate of return
Ceramic products	42	31	32	26	81.3
Aluminium products	63	43	33	24	72.7
Plastic products	64	47	47	42	89.4
Total	169	121	112	92	82.1

Notes:
(1) Most of the in-depth interviews were held with manufacturers. Additional interviews were held with various organizations such as industry associations and research institutes, and universities.
(2) The manufacturers which were included in the study were those which were considered to reflect the special features of the different subsector industries and were selected after full consultation with the relevant bureaux in the Ministry of Industry and provincial offices.

Table I-2: Areas Covered by the Field Survey Conducted in Indonesia

Industry	Areas
Ceramic products	Jakarta, Cirebon, Bandung, Semanang, Surabaya, Bali, Pontianak
Aluminium products	Jakarta, Botabek,Surabaya, Bandung, Medan
Plastic products	Jakarta, Botabek, Bandung, Surabaya, Yogyakarta, Semarang, Medan

3) Surveys in Japan

The surveys outlined below were undertaken in Japan in conjunction with the field surveys which were undertaken in Indonesia.

(1) Japanese questionnaire survey

A questionnaire survey was carried out in Japan during October and November 1990. The purpose of the survey was to find out the intentions of Japanese manufacturers regarding direct investment, providing technology etc, in relation to the three subsector industries included in the second annual study. A breakdown of the number of questionnaires per industry group is shown below.

Table I-3: Details of the Questionnaire Survey in Japan

Industry	Questionnaires No. distributed	No. returned	Rate of return
Ceramic products	362	123	34.0
Aluminium products	204	85	41.7
Plastic products	100	53	53.0
Total	666	261	39.2

Note: The companies to which the questionnaires were distributed were those with experience in international business, and were selected through consultations with the relevant manufacturers associations.

(2) Surveys of third countries

Surveys covering the three subsector industries included in the second annual study were carried out during the three-month period from October through December 1990. They were conducted with the assistance of local survey organizations in competing nations in Asia and in countries which are the destination of Indonesian exports such as the United States and in European countries. A breakdown of the number of surveys conducted for the three industries is provided in Table I-4:

Table I-4: Surveys Conducted in Third Countries

Industry	Competing nations	Export destinations
Ceramic products	Sri Lanka	USA, Germany
Aluminium products	Thailand	USA, Germany
Plastic Products	Singapore	USA, Germany

(3) Analysis of import statistics

As a means of undertaking an analysis of the situation regarding the importation of products made by the three industries covered in the second annual study in Asia, including Indonesia, an analysis was made of import statistics for OECD countries by using computers. An analysis was also made of Japan's import statistics.

4. Composition of Report

The report on the second annual surveys is composed of the following five separate volumes.

Summary
I. Review of Policies Related to Industrial Sub-sector Development
II. The Ceramic Products Industry
III. The Aluminium Downstream Products Industry
IV. The Plastic Products Industry

In addition to the report, a comprehensive review report covering the first and second annual surveys is compiled.

5. Organization of the JICA Study Team

The JICA study team was a joint enterprise between JETRO and the Sumitomo Business Consulting Co., Ltd., and was comprised of the following members.

<Members of the JICA Study Team>

Team leader	Mr. Fumio Inui
Sub-leaders	
(export & investment promotion)	Mr. Kyohei Yamazaki
(industrial development)	Mr. Yasunori Fuchimoto
Members	
The Ceramic Products Industry	
Export & Investment Promotion	Mr. Norimasa Yamamoto
Business Administration	Mr. Takamaro Zaizen
Production Technology	Mr. Hachiro Miyachi
The Aluminium Downstream Products Industry	
Export & Investment Promotion	Mr. Koichi Ishikawa
Business Administration	Mr. Tatsuro Bando
Production Technology	
Sheet	Mr. Toshiharu Matsuzaki
Die cast	Mr. Hidemi Maebara
The Plastic Products Industry	
Export & Investment Promotion	Mr. Seiki Tsubura
Business Administration	Mr. Hiroshi Imai
Production Technology	Mr. Akira Kuga
Financial System	Mr. Toshio Tachibana
Market Analysis	Mr. Hiroshi Takeda
"	Ms. Kazuko Matsumoto

II. Review of Industrial Sector Development Policy

(An outline of the current fifth five-year plan and a series of policies for the relaxation of controls and measures for the promotion of investments and trade and reform of financial system were reviewed in detail by the first year report. In the second year report, accordingly, comments are made on the effects of these policies and at the same time several policies are proposed from the viewpoint of industrial subsector development.)

1. Export-expanding Factors

(1) The Fifth Five-Year Development Plan (Repelita V) started smoothly. The growth rate of the industrial sector in the first fiscal year (from April to March) of 1989/90 amounted to 8.9 percent against the targeted 8.5 percent. Export also grew 17.9 percent against the target of 15.0 percent.

(2) Since the middle of the 1980s, Indonesia has made efforts to promote export of non-migas products. To realize the object, the country has made the development of export industry one of its preferential policies. The three industrial subsectors of ceramic products, aluminium products and plastic products -- in the second-year survey -- are relatively new in Indonesia but have made a remarkable growth lately.

(3) Export of products of the three industries has grown greatly since 1987. Export of ceramic products in 1990 increased sevenfold from 1987. Exports of aluminium structual products and houseware grew forty-five fold in the same period, and exports of plastic products rose fivefold. The value of export, however, is considerably lower yet than that of Asian NIEs, and that of many items still smaller than that of China or some ASEAN nations.

(4) Factors responsible for the export growth of the products of the industries under survey are believed to include; [1] a stronger price competitiveness due to the rupiah's depreciation since September 1986, [2] effects of the export promotion policies, [3] the development of each individual industries, and [4] expansion of demand resulting from the economic growth in the industrialized nations and Southeast Asian countries. As for the factor mentioned in [3], investments by Indonesian and foreign firms, particularly those of export-oriented type, increased lately, supporting the development of industry and the expansion of export.

The increased investments are appraised as effects of activities of firms which have become livelier due to the relaxation of controls and introduction of the market competition principle by the Indonesian government. Measures for promoting investments including foreign capital introduction and export are producing effects of expanding export.

(5) Nurturing of the three industrial subsectors to be studied in the second year of this survey will continue during the Fifth Five-Year Development Plan period as well. Production and export targets of each products are as follows, with the export growth rates fixed fairly high.

Table II-1: Production and Export Targets for the Three Industrial Subsectors Covered by the Second-year Survey

(Units: thousands of tons (production), thousands of dollars (exports))

	Production			Exports		
	Final year of REPELITA IV	Final year of REPELITA V	Average annual growth rate (%)	Final year of REPELITA IV	Final year of REPELITA V	Average annual growth rate (%)
Ceramics products	138,090.0	200,000	7.7	13,240.0	51,788	31.4
Metal household goods	30.6	52	11.2	11,164.5	56,909	38.5
Plastic bags	11.3	22	14.3	3,095.4	12,447	32.1

Note: Metal household goods include steel, stainless steel, and aluminum products.
Source: Ministry of Industry, Fifth Five Year Development Plan (1989/90 - 1993/94) in the Industry Sector, January 1990

2. Policy Recommendation

(1) Achievement of the targets mentioned in (5) above are believed possible because of the development of industry during the latest few years, particularly the expansion of productive capacity of firms including foreign capital affiliates as well as the high-pitched increase of export and the results of the field survey which show the firms' strong intentions to export in the future. The possibility of development is believed high because the country is blessed with abundant raw material resources, has comparative advantage in the field of labor-intensive products, and the domestic market is expected to expand. To turn such possibility into a certainty and realize a sustained expansion of export, however, individual industries have to solve various issues each of them is faced with and strengthen their competitiveness, while the government is required to put policies supporting them into practice.

Taking severe international competition into account among Asian NIEs, other ASEAN countries, China, etc. in overseas market, Indonesian subsector industries are required to strengthen their competitiveness both in price and non-price factors for the export expansion of their products, especially.

(2) Issues the three industrial subsectors to be surveyed are faced with in expanding export, measures to solve them and overall promotion measures are to be described later by subsector industry. The main issues common to all the three industrial subsectors include; [1] strengthening of non-price competitiveness chiefly through quality improvement, [2] the introduction of export marketing, and [3] manpower training. Measures proposed to solve them include strengthening of the public support system based on the expansion of the existing related organs as well as efforts by firms. As for bigger issues, the measures call for the improvement of infrastructure and consideration of prevention of environmental pollution.

(3) Augmentation and strengthening of related R&D institutes under Ministry of Industry are proposed for each industrial subsector as a core development program of the public support system. Present activities of these R&D institutes are evaluated not sufficient enough for the development of industrial subsectors. It is recommended, therefore, that related R&D institutes augment and strengthen their functions including testing, inspection, manpower training, research and development, standardization, etc., and assistances to companies or private sectors. Existing public organizations related to investment and export promotion are proposed to strengthen their activities as well. Moreover, as one of the measures to activate operation of public agencies including governmental research and development institutes, orientation toward the introduction and strengthening of business revenue through the payment by the beneficiaries and others is suggested.

(4) Establishment of policy coordinating functions is called for as a prerequisite to measures for strengthening the public support system. In promoting Indonesian industry, it is necessary to provide unified, public support over all fields from the procurement of materials to promotion of foreign investment and export marketing. Toward this end, it is necessary to ensure cooperation and coordination among the related Ministries and agencies, such as the Ministry of Industry, BAPPENAS, the BKPM, the Ministry of Trade, the NAFED, the Ministry of Mining and Energy, the Ministry of Manpower, etc. in accordance with the content of the various public support activities.

(5) In the present government policies, there is no restriction of investment and foreign trade for three industrial subsector industries. Further, there are no differences currently with types of industry in investment promotion measures and the export

incentive system. In addition to the existing policies, this survey suggests; [1] reduction of import tariffs on raw materials, intermediate goods and machinery and equipment (aluminum sheet, for instance), [2] promotion of plant and equipment investments by the expansion of incentives, and [3] utilization of two-step loans from overseas (particularly toward export-oriented firms or small and medium enterprises).

(6) The promotion of foreign investment and technological tie-ups is an effective measure for the development of industrial subsectors and the expansion of their exports. As a result of the questionnairing in Indonesia and the study on firms in Japan concerning the three industrial subsectors, intentions of joint venture investments and technological tie-ups were confirmed by both Indonesian and Japanese enterprises. To realize these intentions, strengthening of activities focused on subsector industries is proposed to BKPM and other related agencies.

(7) To attain internationally competitive position amid the environment of severe competition, the Indonesian government and private industry have to unite their efforts. Without making efforts on their own, little hope for development could be held even with assistance from foreign nations. As for the implementation of the programs proposed here, it is important that the Indonesian side take the initiative and start the work feasible by their side through their own efforts.

III. Current Situation and Issues by Industrial Sub-sectors

1 Ceramic Products Industry

1-1 Current State and Issues as Seen from Supply Side

1-1-1 Indonesian Ceramic Products Industry

(1) Current State

1) The ceramic industry in Indonesia has recently entered a phase of rapid development. Due to the growth of both domestic and foreign demands, investment has become increasingly active, resulting in a rapid expansion of the scale of the industry.

Actual output (on a volume basis) of sanitary ware in the fourth five-year development plan period rose at an average annual rate of 8.2 percent while output of tiles rose 7.5 percent and that of tableware 4.6 percent. As a result of investments in new projects and expansion of facilities, production capacity (including plans) rose 2.2 times, 1.9 times and 2.4 times, respectively, in the past three and a half years.

2) At slightly more than $28 million (in 1990), the value of exports is still small. However, compared with 1987, when exports began to rise remarkably, the value increased 6.6 times, resulting in an increasing trade surplus year after year. The trade surplus in 1990 decreased remarkably due to a rapid increase of imports of tiles. Although exports are currently restrained under the pressure of vigorous domestic demand created by the construction boom and rising incomes, they are expected to accelerate in the near future when production capacity is expected to be expanded considerably.

Table III-1: Indonesian Exports and Imports of Ceramic Products

(Unit: $1,000)

Year	Exports	Imports	Net exports	Trade specialization index
1986	1,152	5,332	-4,180	-0.64
1987	4,319	3,380	939	0.12
1988	13,793	3,744	10,049	0.57
1989	27,227	4,486	22,741	0.72
1990	28,538	18,851	9,687	0.20

Source: Indonesia Foreign Trade Statistics

Tableware accounts for 48 percent of total exports of four ceramic products on a value basis. It is shipped mainly to the United States, Japan and Singapore. Sanitary ware accounts for 33 percent and is exported mainly to European and American countries, Japan and the Asian NIEs. Tiles and novelties account for a share of more or less 10 percent each, with the former shipped chiefly to Singapore and other Asian NIEs, Australia and the United States and the latter mostly to the United States.

3) Because it is blessed with the following comparative advantages, the ceramic products industry, which is highly labor intensive and which requires a huge volume of raw materials, is viewed as an industry well-suited for Indonesia:

- The most abundant and comparatively cheaper labor force in Southeast Asia
- A domestic market with huge potential demand
- Abundant natural resources
- Abundant land available for industrial sites

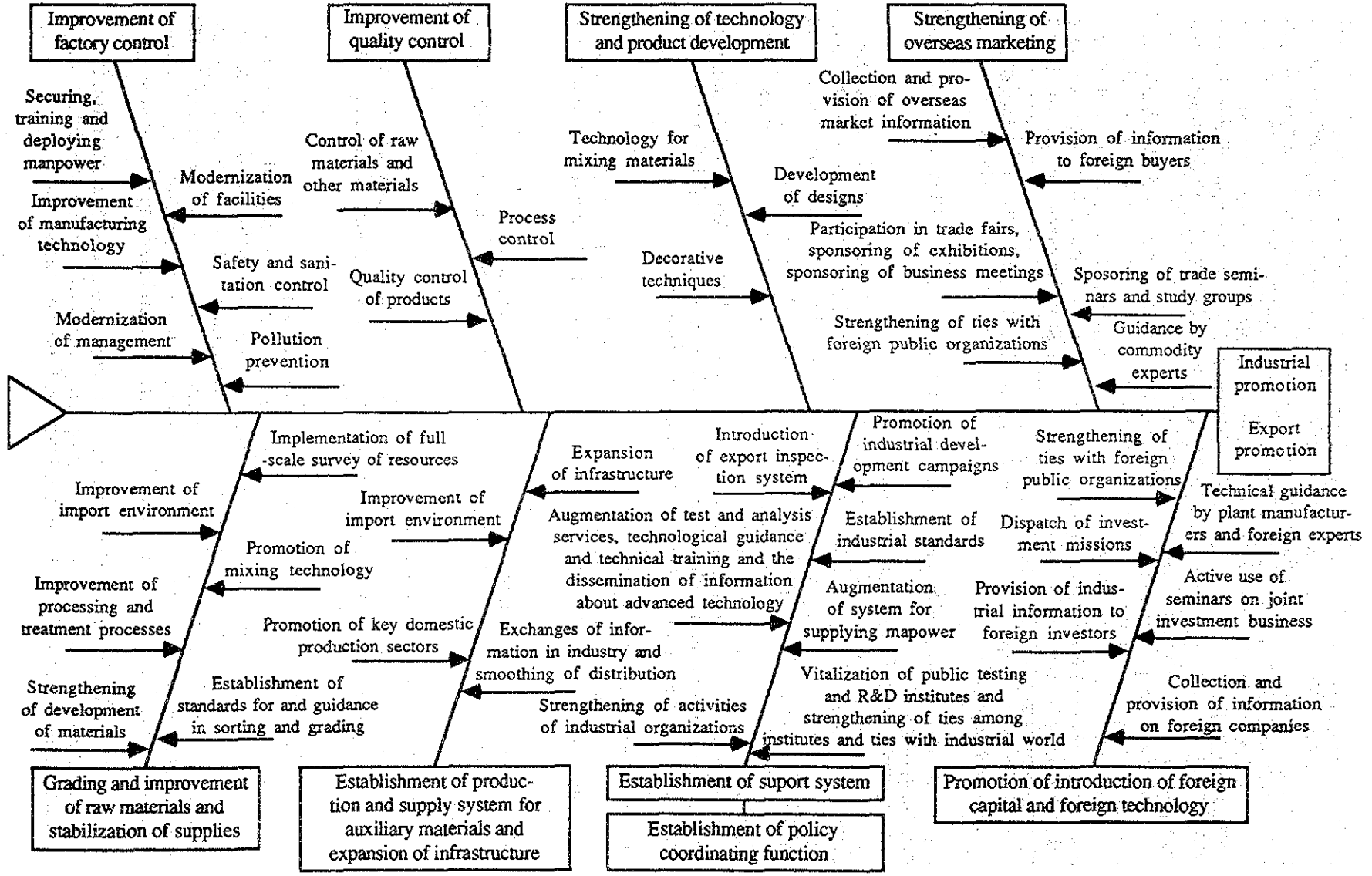
One estimate envisions domestic demand for tableware increasing at an annual rate of 4 - 5 percent, that for sanitary ware at 3 - 5 percent and that for tiles at 7 - 9 percent until 1998.

(2) Issues

1) Despite the potential for development in terms of scale, the ceramic products industry in Indonesia has many problems in the areas of industrial structure, management and quality and design of products. Currently, a limited number of firms, including joint ventures affiliated with foreign capital and enterprises which have technological tie-ups with foreign companies, are exporting. Most domestic firms, unable to enter the international market, depend on the low-priced product market within the country.

2) Main issues to the development of the industry, as observed during the field surveys, are shown in Fig. III-1. Following is a summary of the main problems and issues.

Fig. III-1: Fishbone Chart of Issues in the Promotion of Ceramic Industry



[1] Raw and auxiliary material sector and infrastructure

a. Domestically-produced raw materials are generally low in grade and of an unstable quality. This is partly due to the poor quality of raw materials but is also thought to be attributable to flaws in selection, treatment and processing.

b. Raw material producing areas are scattered all over the country, while manufacturers are concentrated on the consumer area of Java. This lengthens the distance of raw material transportation, which, coupled with a shortage of communications and transportation infrastructure, results in unsmooth distribution.

c. Domestic production of auxiliary materials lags behind and remains insufficient in both quantity and quality.

d. The above problems present heavy burdens for medium and small manufacturers who are unable to purchase raw materials in bulk. Raw and auxiliary materials must be imported for the manufacture of high-grade products for export, and this contributes to the high cost of the products.

e. Infrastructure lags behind in the areas of transportation, communications, power and fuel supply.

[2] Technological promotion and securement and nurturing of skilled workers in the manufacturing sector

A. Improvement of factory management

a. A shortage of skilled labor is common to all fields and results in the failure to make the most of existing facilities. Serious shortages of foremen who manage the work sites are found in sanitary ware, tableware and novelty factories while there is an insufficient number of engineers responsible for machinery in tile plants.

b. There is a low level of interest in safety and hygiene as well as in the prevention of environmental pollution.

c. Another factor responsible for the shortage of skilled workers is job-hopping by employees which is the result of unpleasant working conditions and low wages. The problem is especially serious at tableware and novelty factories.

B. Improvement of quality control

With the exception of a few top-ranking firms, the control of raw and auxiliary materials, management of manufacturing processes and quality control generally lag behind.

[3] Strengthening of technology and product development capabilities

Such capabilities are generally weak. Especially problematic is the development of original designs.

[4] Strengthening of overseas marketing

With the exception of a few top-ranking firms, such activities are weak. Strengthening of overseas marketing is required from the viewpoints of sales promotion and understanding market needs.

[5] Promotion of foreign capital and technology introduction

Such activities have generally not progressed, with the exception of the sanitary ware manufacturing sector. Joint venture investments and technological tie-ups are very effective for the securement of management know-how, advanced technology and marketing channels. It will be necessary to promote introduction of foreign capital and technology as one of the effective means for export-oriented industrial development. Also effective is individual guidance from foreign experts on merchandising and technology.

3) Classified by levels of production, technology and management control, for the convenience of indicating issues and proposing measures by companies, ceramic manufacturers in Indonesia can be grouped into the following categories:

Type A -- Export-oriented firms of international level including mainly foreign capital-affiliated joint ventures and enterprises having technological tie-ups with foreign companies.
Type B -- Firms currently below the international level but possibly able to start or expand exports if quality improvement and other measures are taken.
Type C -- Firms currently oriented toward the domestic market because of weak international competitiveness in terms of quality and production capacity but viewed conditionally as possibly able to export in the future.
Type D -- Domestic demand-oriented firms with slight possibility of exporting at present.
Type E -- Small factories in towns or cottage industry.

The main issues, by product, for Type A, B and C firms regarded as export-oriented or having export potentialities are shown in Table III-2. Type D and E firms are hoped to be promoted as suppliers for domestic demand. The main issues for these firms will be gradual improvement of quality and design while maintaining low product prices as well as exploitation of domestic demand.

Table III-2: Main Areas of Issues by Ceramic Products and Types of Firms

	Sanitary ware (Type A)	Tiles (Type B/C)	Tableware (Type B/C)	Novelties (Type A)	Novelties (Type B/C)
Raw Materials					
Quality	o		*	o	*
Supply	o	Δ	*	o	*
Auxiliary materials					
Quality & supply	o		*		*
Infrastructure	o	o	o	o	o
Factory control					
Manpower	*	*	*	*	*
Facilities			o		*
Technology		*	o		*
Quality control					
Materials		o	*		*
Production process		o	*		*
Products		o	*		o
Technology & product development					
Material		o	o		o
Design	Δ	o	*	o	o
Decoration		o	o		o
Overseas marketing		o	*		o
Introduction of foreign capital & technology					
New investment		o	o		*
Expansion investment	Δ	Δ	*		Δ
Technological tie-up, etc		*	*		*

* Very important area o Fairly important area Δ Important area

1-1-2 Promotional Measures for Ceramic Products Industry of Sri Lanka

1) Current situation

(1) The scale of the industry is still small, as is the value of exports. However, state-operated enterprises and foreign capital- affiliated firms are establishing themselves as export industries. A system for export-oriented industrialization was set up in the 1970s when manufacturers for export were established and official research and development organizations and material suppliers were founded.

(2) There are eight major firms at present, including four state-operated firms or their subsidiaries, three joint ventures affiliated with Japanese or Republic of Korean enterprises and one joint venture between a subsidiary of a state-operated firm and a private business. They are mainly engaged in the manufacture and export of tableware, tiles and novelties.

(3) Although the growth rate of production and exports appears to have been slowing in the past several years, the profit ratio of firms is rising. This is believed to be due to the firms' success in the rationalization of management, improvement of productivity and realization of higher added value.

2) Background of export industrialization

Sri Lanka has succeeded in export-oriented industrialization of the ceramic industry by using a state-operated enterprise (LCL) and foreign capital-affiliated firms as inseparable parts of the project. In particular, the following points may be cited as reasons for the successful invitation of foreign capital.

- Drastic measures to encourage investors and the government's own involvement in invitations.
- LCL's strengthening of the domestic supply system for raw and auxiliary materials and founding of joint ventures with domestic and foreign private firms.
- Assistance of CRDL (the Central Research and Development Laboratory) to firms in research and development and training.
- Promotion of deregulation of the import restriction
- Assistance of EDB (the Export Development Board) in overseas marketing

1-1-3 Promotional Measures for Ceramic Products Industry of Thailand

1) Current Situation

(1) The Thai ceramic products industry began to develop as a full-fledged industry in the 1960s. Today, tiles, sanitary ware and tableware are produced in large quantities using modern facilities. Although the size of ceramic products exports remains limited at present, Thailand has outperformed all of the other ASEAN nations.

(2) The tableware sector consists of ten large-sized manufacturers and 60-70 small and medium-sized factories. Most of the ten large manufacturers have introduced technology from foreign companies such a Japanese or German manufacturers for the production of mid- to high-quality tableware.

There are no large firms in the novelties sector; 90-100 small and medium businesses and cottage industries are responsible for producing a variety of items.

(3) Exports of tableware and novelties began to rise in 1987, and increased sharply in 1988. The main destinations were the U.S. and the EC including Belgium, Holland and the United Kingdom. Exports to Japan also increased.

2) Promotion Policies

Thailand's Ministry of Industry has decided to establish a Ceramic Center in the Lampang district as a showcase of its ceramics industry promotion policies. Issues concerning this project are as follows:

(1) The Center should provide a comprehensive services, from the analysis and grading of raw materials to training in production technology, research and development, training in management and marketing, and technology and information services.
(2) The Center should work to satisfy industry needs while maintaining close ties with local industry and industrial associations in particular. Furthermore, it should incorporate the principle of "those who benefit should bear the cost" as much as possible and work to secure its own income for the improvement of facilities and services.
(3) Even assuming that the Center's services are limited to the Lampang district for the time being, future operations should be expanded to cover all of Thailand.

1-2 Market Trends as Seen from Demand Side

1-2-1 World Trade

(1) World trade in ceramic products grew a great deal from the latter half of the 1980s after a period of stagnation in the first half. The value of tile imports (including paving materials) by OECD nations, which account for a majority of imports, increased at an average annual rate of 25 percent in 1986-1988, reaching $2.7 billion in 1988. The value of tableware and novelty imports combined also rose at an average annual rate of 8 percent and reached $2.8 billion (tableware accounts for more than 70 percent of the figure and novelties less than 30 percent).

The main importers of tiles were France, West Germany, the United States and the United Kingdom. Imports by these three European nations grew at a considerably fast pace. Imports by Japan increased, though on a small scale, while the growth of U.S. imports stagnated. The main importers of tableware were the United States, West Germany, France, the United Kingdom and Japan, and the main importers of novelties included West Germany, the United Kingdom, the United States, France and Japan. In the latter half of the 1980s, imports by Europe and Japan alone expanded.

(2) Although the majority of ceramic product exports to OECD nations are accounted for by member countries of the same organization, exports by the NIEs, ASEAN and China are also increasing. In the market for tiles, Asian products are slightly handicapped by the great distance to the chief market of Europe, but exports of tableware and novelties manufactured in Asia are expanding.

Tableware exports from Asian countries to OECD nations increased, centering on low-priced items. Products from China, Taiwan and Republic of Korea each accounted for a share of around 5 percent of OECD imports in 1988. Although exports from the ASEAN countries, centering on Thai products, also grew, their combined share of OECD imports was less than 2 percent.

Novelties represent a highly labor-intensive industry and thus there is a great deal of room for the entry of Asian products into the market. Products from Taiwan accounted for 17 percent, the largest share, of OECD imports in 1988, while Chinese products' share stood at close to 7 percent. Although exports of Thai, Malaysian and other ASEAN products also grew, their combined share stood at just above 2 percent.

(3) With regard to the future outlook of tableware market, it is estimated that quantity of demand will grow by the population increase ratio plus the ratio of per capita in come rise in real terms of each nation. It is predicted also that high-grade and low-priced articles will coexist in the markets of advanced nations with the orientation toward high-grade articles and product diversification spreading. In the Asian market, growth of demand, due to increases in income, will top that of the advanced nations. Demand increases are expected in the medium to high-grade product markets in the NIEs and in the low to medium price markets in the ASEAN nations where there would be a shift of demand from glass and metal tableware.

Demand for tiles depends on the level of housing construction, road paving and park construction. It also differs with the structure of demand (competition with other building materials, etc.) in individual nations. Demand in advanced nations is expected to slow down in the future. Japan's demand is likely to be a little above that of America and European nations, and is expected to grow centering on exterior wall tiles. A sustained expansion is expected in the Asian market on the basis of increases in construction demand. For the next one or two years, facilities will remain superfluous on a global scale.

Demand for sanitary ware also depends on trends in housing and office building construction. The situation is the same as that for tiles in that demand is expected to slow down in the markets of advanced nations. Nevertheless, because of greater requirements for high quality and fine design than that for tiles, growth in the value of sales can be expected to continue in the future due to increased demand for higher value added merchandise. The growth of demand in the Asian market is expected to top that of the advanced nations.

1-2-2 Main Importers

(1) U.S.

1) Domestic demand grew moderately at an average annual rate of 7 percent in 1980-1989, reaching $3.7 billion in 1989. Broken down by item, tiles and paving supplies accounted for 29 percent of the total demand, tableware and kitchenware 27 percent, sanitary ware 24 percent and novelties 20 percent. Domestic production stagnated while imports rose, resulting in higher dependence on imports. The ratio of dependence on imports in 1989 stood at 40 percent for tiles and paving supplies, 78 percent for tableware and kitchenware, 8 percent for sanitary ware and 62 percent for novelties.

2) Broken down by producing nations, the import market in 1989 displayed the following characteristics:

- Italian products accounted for close to 50 percent of all tile imports.
- Products from Canada, Mexico and other Latin American nations geographically near to the United States accounted for 83 percent of the import market for sanitary ware, a heavy and large merchandise for transportation.
- East Asian products including medium-grade articles made in Taiwan, high-grade items made in Japan and low-priced goods made in China accounted for 68 percent of tableware and houseware imports.
- Indonesian products, which had just begun to enter the market, accounted for a share of less than 1 percent in each category of imported products.

3) Industry sources say it was premature to evaluate Indonesian products. However, they say there is a possibility for expanded exports of Indonesian ceramic products to the United States because American citizens are becoming more familiar in general with Indonesian products such as clothing and others. Meanwhile, Japanese

products have lost their price competitiveness and problems of delivery time of Chinese products have caused buyers to look for alternative Asian products.

Attention should be paid to the following points:

• With tableware, lead noxiousness through glaze should be prevented. Care should be taken not only in the area of price but also in the choice of color tone and design as well as trends in fashion.
• With tiles and sanitary ware, products with color tones and designs that do not disrupt the harmony of houses and that are fit to upgrade existing houses should be supplied.

(2) Germany

1) The value of exports and imports is considerably large in comparison with output. The domestic market has taken a turn for the better since around 1987. The value of domestic demand for tiles and paving supplies in 1989 amounted to 1.2 billion marks, tableware and housewares 1.1 billion marks, sanitary ware 500 million marks and novelties less than 400 million marks. Dependence on imports for all of the items has risen lately, surpassing 50 percent in all categories except tableware and houseware. The ratio of dependence on imports in 1989 stood at 60 percent for tiles and paving supplies, 33 percent for tableware and housewares, 51 percent for sanitary ware and 64 percent for novelties.

2) Both exports and imports center on intraregional transactions with other EC countries. The trend is especially strong in tiles and sanitary ware. Although EC products account for a majority of tableware and novelty imports, a considerable volume of Asian products are imported from Taiwan, Japan, Republic of Korea and China. Imports also include products from Thailand, Malaysia and the Philippines, but only on a small scale. Imports from Indonesia remained insignificant and almost unknown.

3) Importers' advice on efforts for sales of Indonesian products is as follows:

• Products should be of good quality and low-priced.
• A rich assortment is desirable including not only mass-produced articles but also small-lot products.
• The term of delivery should be strictly observed.
• Any claims should be resolved quickly and simply.

(3) Japan

1) Domestic consumption has expanded in line with economic growth led by domestic demand since the latter half of the 1980s. The growth of imports since 1987 has been particularly large. The ratio of dependence on imports rose steadily, though it remains smaller than those of the United States and Germany. The ratio in 1989 stayed at a mere 2 percent for tiles and sanitary ware but climbed to 9 percent for tableware and 27 percent for novelties. The ceramic products industry in Japan, which once prospered as an export industry, is gradually receding from the international market due to competition from European products (high-grade articles) and Asian goods (medium and low-grade products).

2) The value of tableware imports in 1985-1990 rose 3.7 times, reaching ¥16.5 billion in 1990. The corresponding figures for novelties were 3.3 times and slightly more than ¥7.3 billion, for tiles 60 percent and slightly more than ¥4.5 billion, and for sanitary ware 8.9 times and slightly more than ¥1.8 billion.

The import market is characterized by the strength of products from the United Kingdom in tableware and the overwhelming dominance of high-grade European articles, led by Italian goods, in novelties and tiles. In contrast, products from the ASEAN nations of Thailand, Malaysia and Indonesia, centering on articles made by Japanese-affiliated joint ventures and OEM products for Japanese firms, accounted for nearly 80 percent of sanitary ware imports. In novelties, Republic of Korean, Chinese and Taiwanese products combined accounted for nearly 40 percent of imports, with imports of products from ASEAN also increasing.

3) Indonesian products have a very small share of the import market in Japan with the exception of a 15 percent share in sanitary ware. Exports to Japan of sanitary ware are expected to grow in the future as well, and novelties, which are highly labor intensive, are viewed as having very good potential for entry into the Japanese market. In contrast, it will not be easy to enter the tableware market, which is strongly oriented toward high-grade articles, or the tile market, in which domestic products are at an advantage.

In addition to the ability to supply products which meet the needs for the Japanese market, the industry points out that any firms which want to enter the highly competitive Japanese market will have to win the confidence of buyers by satisfying the following conditions:

- Sufficient quality control should be conducted.
- Term of delivery should be accurately and consistently observed.
- Products should be price competitive against those of other competing nations.

1-3 Promising Ceramic Products in Indonesia

(1) Conventional products sectors

1) Tableware

Tableware is roughly divided into stoneware and porcelain ware. In Indonesia, the field of stoneware is expected to be promising in the immediate future. Domestic materials can be used for most of the raw materials for stoneware and this will give the product an advantage in terms of cost.

However, improvement of quality and technology is indispensable for the expansion of exports. Improvement of molding and firing techniques and development of designs are required. For tableware exports, it will be necessary to recognize the importance of consistency in quality, shape and patterns and to establish a high-grade image.

The promising export markets for stoneware will be Europe and America centering on the United States and Canada.

2) Novelties

Novelties of the type suitable for Europe and America will continue to be promising.

Although only two firms produce novelties for export at present, the possibilities of development in the future are considered to be good. There will be little question of marketability because a considerably large demand for novelties exists, mainly in the European and American markets. Entry into this field is relatively easy because the scale of required plant and equipment investments is small. No advanced technology is necessary and workers can be easily secured. Even though raw materials will have to be imported, novelties may be one of the most cost-advantageous industries in that, being

labor intensive, it can utilize the abundant and relatively cheap labor available in Indonesia.

3) Sanitary ware

Two joint ventures affiliated with foreign capital and a domestic firm in a technological tie-up with a foreign enterprise account for most of the exports in this field. The products of these firms are developed, manufactured and subjected to quality control within the international networks of the respective firms so as to meet the needs of target market. Because the three firms have no significant problems with manufacturing and sales, the future expansion of their business is viewed as certain and exports, mainly to the U.S., the Middle East and Japan, are expected to maintain steady growth. With the exception of the three firms mentioned above, sanitary ware firms are oriented toward the domestic market. Their entry into the export market will not be easy without tie-ups with foreign enterprises.

4) Tiles

Because they can be manufactured using mainly domestic raw materials, tiles are products which can be very cost competitive. The outlook for their exports may be said to be bright.

Measures necessary for the expansion of tile exports will be improvement of design and color tone and establishment of a system for stable supply. The improvement of design and color tone is particularly important. It is desirable that a system for developing products to suit individual markets be quickly established while maintaining an up-to-date understanding of design trends in the main markets.

The promising export markets for tiles will be Europe and America, Asian NIEs and ASEAN member countries.

(2) New products sectors

1)Bone China

Bone china, which is made from bone ashes or recently from artificially synthesized calcium phosphate and is characterized by a soft texture, is used in the manufacture of high-quality tableware and ornaments. It has a milky white or ivory color and is characterized by a look of quality in addition to being very strong. As living standards improve, the use of bone china is increasing at ordinary households in the form of tableware for daily use in addition to hotels and restaurants.

Bone china is more expensive to produce because it uses man-made materials. Thus great demand cannot be expected from the Indonesian market. However it is thought to be well-suited for export to Europe, the United States, and Japan.

2)Reinforced Porcelain

Porcelain tableware suffers from strength-related problems; improper handling can easily result in breakage. Particularly at institutions handling large quantities of tableware at once, such as hotels, restaurants, corporate cafeterias, hospitals and schools, a great deal of tableware is lost to breakage.

A high-quality, reinforced porcelain tableware with superior whiteness has been developed. Reinforced porcelain is characterized not only by its high strength but also by an extremely white body, which brings out underglaze or overglaze decorations and

presents a high-quality image. The new variety also has excellent heat resistance, making it extremely well-suited for instantaneous heating in microwave ranges and ovens. Growing demand can be expected in a wide range of fields of use in Japan, America and European nations.

3)Oversized Tiles

The size of the tiles which can be manufactured is limited by facilities and raw materials. At present, the typical large tile has dimensions of 40 x 40 cm, with larger sizes requiring the use of oversized molding machines. Increasing the size of the tiles results in a greater sense of beauty for the interior in which they are used. Changing lifestyles have resulted in increased demand for large tiles. In the future, demand is expected for 60 x 60 cm and 80 x 80 cm sized tiles.Therefore manufacturing-related research should be embarked upon at once.

2. Aluminium Downstream Products Industry

2-1 Current State and Issues as Seen From Supply Side

2-1-1 Indonesian Aluminium Products Industry

(1) Current State

1) The Indonesian aluminium product industry is assessed as being in the initial stage of development judging from the scale of production, the product composition, level of technology, etc. Consumption of aluminium ingot is still only at a level of 70,000 tons, only one-fifth of that of the Republic of Korea.

The companies producing aluminium products are estimated as including one making ingots, 12 extrusions, 10 plate, two foil, one slabs, 10 impact tubes, 22 utensils, and nine roofing plate. Die castings are principally manufactured in-house by manufacturers of household electrical appliances and automobiles or motorcycles, with only two companies believed to be specializing in them. Low pressure die castings are made by two companies and mold castings by three.

Along with the recovery in domestic business starting in 1987, the aluminium product industry has been showing increased activity. Some products are even starting to be exported and most companies are engaged in full operation. Many companies are also planning expansion of their facilities.

2) As the country entered the late 1980's, exports of utensils, window frames, and other aluminium products began to increase. The increase of exports of these products has led to a surplus in the trade balance since 1987. The reasons behind the increase in exports are considered to be comparative advantages in labor costs plus the lower value of the rupiah, the improvement of quality due to the entry of export-oriented foreign capital, guidance by foreign experts, etc. The main export destination for structures and utensils is Japan. The establishment of joint ventures by Japanese affiliated companies and the start of OEM production helped launch exports.

Table III-3: Indonesian Exports and Imports of Aluminium Products (Structures and Household Utensils)

(Unit: US$1000)

Year	Exports	Imports	Net exports	Trade specialization index
1986	82	3,034	− 2,952	− 0.95
1987	797	2,242	− 1,445	− 0.48
1988	11,244	1,549	9,695	0.76
1989	31,297	3,628	27,669	0.79
1990	35,745	2,903	32,842	0.84

Source: Indonesian Foreign Trade Statistics

Exports of other products such as plate and foil have also begun, but the import dependence is still high. Indonesia relies completely on imports for powder, stranded wire, storage tanks, and the like.

3) Demand for aluminium features a strong income elasticity and has a large correlation with the stage of economic development. Therefore, future demand for aluminium in Indonesia is expected to grow as a general trend along with economic growth and the product industry is expected to develop further as well. In terms of exports, it is considered that Indonesia will be able to make good use of its relative superiority in utensils and other labor intensive product fields.

The domestic consumption of aluminium in Indonesia is estimated to be about 70,000 tons (1990). In the future, if the Indonesian economy grows by an annual average of 4.9 percent, the consumption may be expected to reach 110,000 tons or more by 2000. If the economy grows by 6.5 percent, the consumption would reach over 150,000 tons.

(2) Issues

1) The aluminium product manufacturers of Indonesia, with the exception of foreign affiliated joint ventures and some other firms, suffer from numerous technological problems. The products of many of the companies are mostly low quality products for the domestic market. Exports of these would be difficult with the current level of quality and production systems. Therefore, to increase exports, it is considered necessary to strengthen competitiveness in nonprice factors such as quality and marketing based on the current superiority in price position.

2) The main problems faced by numerous Indonesian companies in their manufacturing processes are inferior quality alloys, antiquated facilities, lack of testing and inspection facilities, insufficient surface treatment, and insufficient precision of dies. The problems faced in production technology may be classified by main products as follows:

Extruded shapes: [1] Soaking treatment of billets and [2] die, [3] extrusion, and [4] product surface treatment
Plate:[1] Melting, [2] rolling, and [3] preshipment inspection
Plateworked products: Quality of plate (domestic plate) and high costs (imported plate)
Die castings:[1] Dies and [2] alloys
Low pressure castings and mold castings: [1] Antiquated manufacturing facilities and [2] insufficient quality control

3) For the convenience of indicating issues and proposing measures by companies, the Indonesian aluminium product manufacturers may be classified into the following three groups according to their level of production technology and export capabilities:

Rank A: Top level companies, mostly foreign capital affiliated joint ventures and companies with technical tieups with foreign companies
Rank B: Companies currently with problems in technology, but able to export in the future by improving the quality of their products, etc.
Rank C: Companies which are considered as probably having difficulty in exporting for the time being judging from their current level of technology.

The features and issues of these ranks of companies are summarized in Table III-4 by product.

4) Factors affecting quality of products are classified into 5M, that is, Man, Machine, Measurement, Method and Material. Main causes of low quality aluminium products in Indonesia are shown by 5M fishbone chart in Fig. III-2.

Table III-4: Characteristics and Issues by Aluminum Products and Ranks of Companies (Extruded Shapes)

	A	B	C
Manufacturing processes and level of technology	One company 1. Capacity of extrusion machines: 1,800 tons and 2,200 tons. 2. All lines comprised of latest Japanese equipment. 3. Guidance provided by Japanese engineers and training provided to employees in Japan as well. 4. Use of Japanese work standards for all processes. 5. Fabrication of dies at same level of technology as in Japan. 6. Export of 80 percent of products to Japan. Quality also first rank even by world standards.	Three companies 1. Capacity of extrusion machines: 1,800 tons. 2. Experience with guidance from foreign engineers. 3. Dies fabricated by latest machine tools from Japan. Heat treatment is insufficient, however, resulting in short lifetime. 4. Use of some imported billets. 5. Insufficient analysis of composition of billets made in-house and insufficient deoxidation and degasification. Temperature control during homogenizing treatment also insufficient. 6. In surface treatment, anodizing films are thin and insufficient attention is given to work standards, checks of the film thickness, and adjustment of color. Composite film treatment cannot be formed. 7. Overall process control is insufficient, so resultant quality is unstable. 8. Extrusion machines are antiquated. 9. Manufacture of aluminum frames for domestic buildings.	Four companies 1. Specialization in materials for display showcases used in domestic market and small extruded materials of a maximum diameter of 5 inches for use as building parts. 2. Products need only be roughly shaped to a certain extent. Low price is demanded over quality. 3. Introduction of Taiwanese made melting and casting facilities and extrusion machines. Facilities are antiquated. 4. Adjustment of composition of billets is done completely by experience and intuition, with no control exercised by analytical equipment for each lot. 5. In surface treatment, anodizing films are thin and insufficient attention is given to checks of the film thickness and adjustment of color. Composite film treatment cannot be formed. 6. Dies are insufficient in terms of precision, durability, and design.
Factory control and quality control	1. Start from complete emphasis on work safety and steady improvement thereafter. 2. Understanding and resolution of problems through comparison with Japanese model factory. 3. Use in Indonesian factories of procedures based on quality control in Japan. Inspection facilities for various processes the same as in Japan. 4. Thorough preparation of work manuals and manuals on inspection processes.	1. Proceeding with advice from overseas engineers. 2. Machinery and equipment are ageing and there are limits to the mechanization and automation being performed.	Products are merely shaped right. There is insufficient factory control and quality control.
Product development	Developing products designed for Indonesian market		
Development of human resources	Periodic dispatch of certain number of workers to factory in Japan and effort made to teach up-to-date quality control and level of technology.	Guidance and training from foreign engineers.	

(Aluminium Plate)

	A	B	C
Manufacturing processes and level of technology	One company 1. Can produce aluminium plate of widths up to 1,240 mm. Monthly production is reaching 2000 tons. 2. By application, company is producing not only general utensils, but also plate for Teflon coating, building materials, and foil. 3. There are plans to increase monthly production to 4000 tons. 4. Level of technology close to that of R. Korea and Taiwan. 5. Refurbishing of used equipment of the U.S. and other advanced countries.	Two companies 1. Plate width is less than 600 mm. 2. Use is made of old fashioned equipment of 20 years' age. No improvements have been made in that time. 3. Applications are for utensils for domestic market. 4. Probably would fall into difficult straits if tariff protection were removed or type of products in demand changed.	4 products 1. Production by rudimentary rolling technique of manual pull-over. 2. Application is for in-house production of utensils. 3. Low productivity, plate size of less than 1000 mm longitudinally and laterally, and numerous problems in precision, flatness, surface finish, and other aspects of quality.
Factory control and quality control	1. Limited types of products produced (three types) 2. Anticipatory production 3. Relatively good process control through introduction of testing machinery, automation, etc.	1. Limited types of products produced (one type, for utensils, only) 2. Anticipatory production 3. Control of melt by instinct, rolling by hand, visual inspection of products, and other insufficient process control and quality control methods.	1. Limited types of products produced (one type, for utensils, only) 2. Anticipatory production 3. No testing and inspection facilities at all, large amount of manual work, etc. for completely unsatisfactory process control and quality control.

Quality Control

A			B			C		
Process	Main control items	Current state	Process	Main control items	Current state	Process	Main control items	Current state
Melting	Control of composition	Analysis for each lot	Melting	Control of composition	Work based on experience	Melting	Control of composition	Work based on experience
	Melt filter	Facilities exist		Melt filter	No facilities		Melt filter	No facilities
Casting	Control of temperature of cooling water/melt	System exists	Casting	Control of temperature of cooling water/melt	No system	Casting	Control of temperature of cooling water/melt	No system
Slab cutting	Dimensional precision	Facilities exist	Slab cutting	Dimensional precision	No facilities	Rolling	Rolling by machine	No
Surface grinding	Removal of defective surface defects	Facilities exist	Surface grinding	Removal of defective surface defects	No facilities		Automatic control of shape and thickness of rolled plate	No
Heating/ soaking	Soaking treatment and uniform preheating	System exists	Heating/ soaking	Soaking treatment and uniform preheating	Partial system	Finishing	Thickness of products	Yes
			Rolling	Rolling by machine	Yes	Annealing	Control of temperature by program	Yes

	A			B			C	
	Rolling	Rolling by machine	Yes		Automatic control of shape and thickness of rolled plate	No	Injection of atmospheric gas	No
		Automatic control of shape and thickness of rolled plate	Yes	Finishing	Thickness of products	Yes		
	Finishing	Thickness of products	Yes	Annealing	Control of temperature by program	Yes		
	Annealing	Control of temperature by program	Yes		Injection of atmospheric gas	No		
		Injection of atmospheric gas	Yes					
	More advanced inspection required for export products.							
Product development	There are no competing companies domestically and products are protected by high import tariffs. There is no need to aggressively take up risk of new product development since sufficient profit margin can be enjoyed with current domestic demand.			In view of level of technology, antiquated facilities, and pressure to meet current domestic demand for utensil use plate, cannot be expected to develop new products.			Since the products are rolled by the manual pull-over system, development of new products would be impossible in terms of quality and precision.	
Development of human resources	Guidance from foreign engineers.							

(Plate Products (Aluminium Foil))

	B
Manufacturing processes and level of technology	One company 1. Company produces foil using eight used foil rolling machines. 2. Tariff protection is enjoyed, so supply of original foil of over 7 microns thickness is monopolized. 3. Cannot roll foil of less than 7 microns thickness or produce laminated foil. 4. Insufficient deoxidation and dehydrogenation of raw material aluminium coil, so there are problems in purity and precision of aluminium coil. 5. The degree of cleanliness of the melt, the shape during rolling, and the prevention of strain are insufficient due to the rolling machines being used ones. 6. Due to use of cold rolling machines provided with automatic fine control (AFC) units recently introduced, some improvement in these respects can be expected.
Product development	1. Along with the improvement of the quality of the foil, production of foil of less than 7 microns may become possible. 2. Exports of added value products produced through labor intensive processes such as foil trays and gas range mats are possible. 3. If it becomes possible to produce foil with accurate thickness and sufficient flatness, production of foil laminates with paper and vinyl will also become possible.
Development of human resources	Guidance and education by overseas engineers.

(Plate Products (Utensils))

	A	B	C
Manufacturing processes and level of technology	Two companies 1. Production of cheap products for domestic market and simultaneously production and export of Teflon coated products, alumite products, and other high class utensils. In particular, OEM production for Japanese supermarkets. 2. Various types of presses for utensils and alumite processing facilities or Teflon coating facilities owned. Technical staff available able to operate these in companies. 3. Poor quality of raw material aluminium plate. When used for production of high class products for export, yield is low.	Three companies 1. Two companies use plate manufactured on their own by pull-over system. 2. The presses are old types or else Chinese or Taiwanese makes. 3. The quality of the raw material aluminium plate is poor and alumite finishing is not possible.	Two companies 1. Small amount supplied to local market. 2. Use made of plate made by companies themselves by pull-over system or plate supplied from domestic manufacturers. 3. The quality of the raw material aluminium plate is poor and alumite finishing is not possible.
Factory control and quality control	For OEM production for Japanese supermarkets, total inspection is performed for final products so as to try to stabilize quality.	The quality of the raw material plate is poor, so production of high quality products is difficult.	The quality of the raw material plate is poor, so production of high quality products is difficult.
Product development	Production of new products by OEM etc. possible.	Development of new products is difficult, considering state of currently owned facilities and technical staff.	Development of new products is difficult, considering state of currently owned facilities and technical staff.
Development of human resources	Lack of staff able to develop new products and need for development of human resources able to provide guidance on effective quality control.		

(Plate Products (Roofing Plate))

Manufacturing processes and level of technology	1. Work is simple, involving single roll forming process, so there is no difference in technical level. 2. If precision of thickness and flatness of raw material aluminium coil are insufficient, precise forming becomes impossible. The raw material coil is supplied on a monopolistic basis by a single company. This company is a competing manufacturer also making roofing plate. Therefore, the quality of the raw material coil cannot be expected to be improved. The quality of the raw material coil is one just barely enabling use.
Product development	1. The light weight enables the framework for supporting the roof to be built at low cost. The formability is excellent and the heat reflectivity is good. Further, the appearance is good. Making use of these features of aluminium, aluminium roofing has increased in demand beating out such competing products as colored steelplate, slate, etc. 2. In the field of roll forming, new products may be expected to be developed such as siding materials for walls, stormdoor materials, and other building material products.

(Plate Products (Impact Tubes and Cans))

	A	B	C
Manufacturing processes and level of technology		One company 1. Vertical production from aluminium metal and sale of some slabs to other manufacturers. 2. Overwhelming share of domestic market. 3. Use of used West German machines and receipt of technical guidance from West German manufacturer whenever needed. 4. Poor quality of slabs. 5. Problems in precision of printing machines, printing plates, and paints.	Four companies 1. Used machines are used and the quality of the material is inferior, so productivity is low. 2. There is considerable trouble at the printing stage. Several workers station themselves around each machine to deal with problems.
Product development		1. In the advanced countries, aluminium toothpaste tubes compete with plastic laminates and aerosol cans compete with tin cans. Demand has been slow to grow. 2. By improving the forging technology, it should be possible to advance into the fields of electrical components (capacitor cases, copy drums), automobile parts, and optical parts.	

(Die Castings)

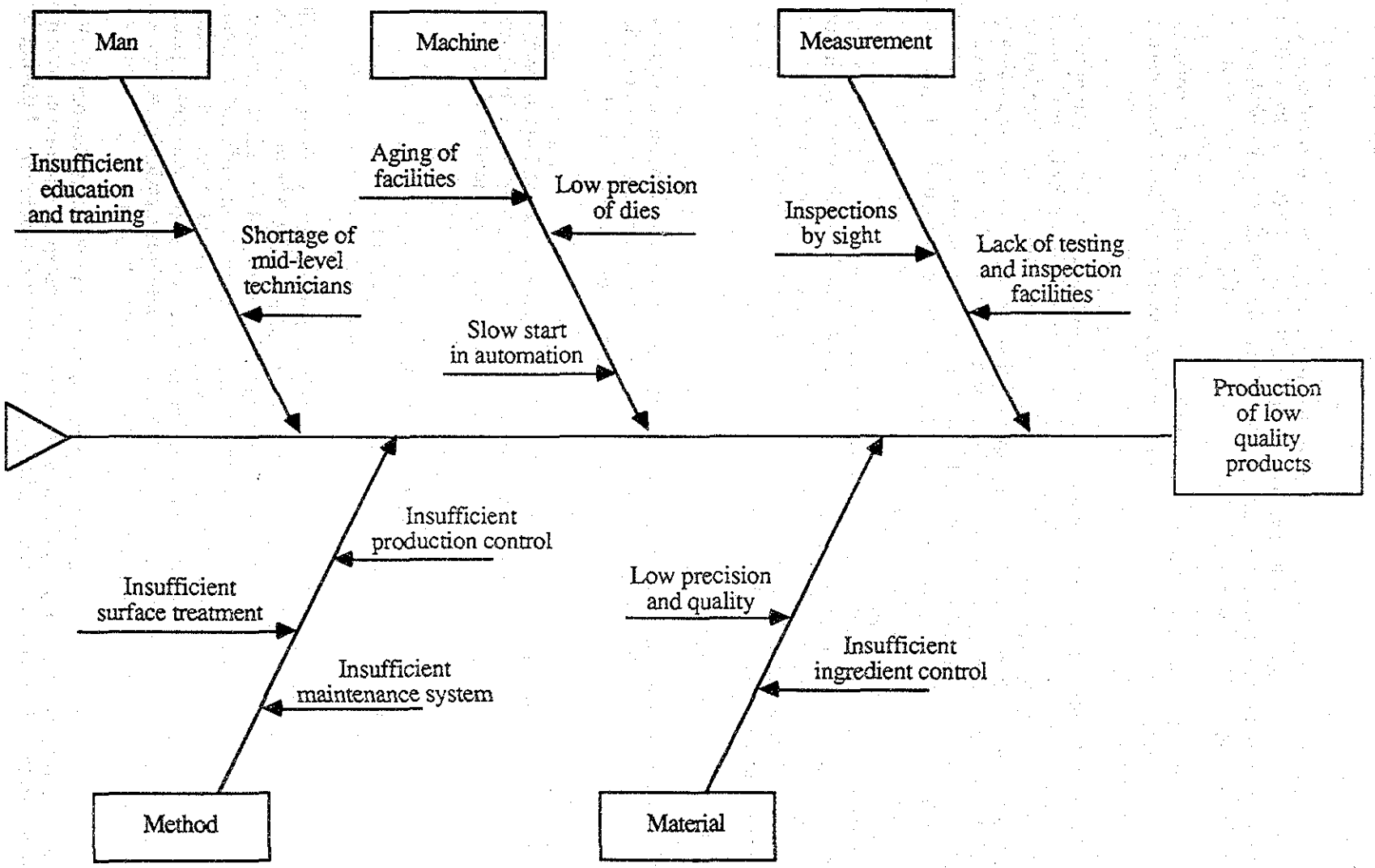
	A	B	C
Manufacturing processes and level of technology	Six companies In-house production of foreign affiliated motorcycle and home electrical equipment manufacturers. Introduction of foreign facilities and technology. Guidance received. Corresponding to B class of Japan. 1. Insufficient automation in casting Only one company using melt feeder and spray. Others mostly doing work manually. 2. Dies [1] Die design and fabrication technology is immature and while simple dies can be made, complicated, high class ones cannot and imports are therefore relied on. [2] Insufficient measures taken to increase durability of dies. Insufficient heat treatment and surface treatment of dies. 3. Die casting machine and die maintenance. System of control is insufficient. Strong tendency to deal with problems after they occur. Weak measures to prevent problems in advance. 4. Insufficient measures to prevent porosity defects, i.e., die measures and machine measures. 5. Quality of domestic aluminium alloy is low in reliability and therefore imports are relied on.		One company 1. Lack automation in casting. Completely relies on manual labor. 2. Dies [1] Die design and fabrication technology is immature and while simple dies can be made, complicated, high class ones cannot and imports are therefore relied on. [2] Insufficient measures taken to increase durability of dies. Insufficient heat treatment and surface treatment of dies. [3] Unsuitable maintenance and storage of dies. 3. Die casting machine and die maintenance. Strong tendency to deal with problems after they occur. Weak measures to prevent problems in advance. 4. Insufficient measures to prevent porosity defects, i.e., die measures and machine measures. 5. Quality of domestic aluminum alloy is low in reliability and therefore imports are relied on. 6. Factory layout is bad. Cold chamber machines adjoin facilities and problems occur of intermixture of wrong materials. 7. Unsuitable temperature control For example, no thermometer provided in holding furnace. 8. Rough storage and handling of products In the deburring work, products are laid on the ground and the burrs removed one by one by a tool. Handling marks and scratches are easily caused.

	A	B	C
Factory control and quality control	1. Layouts are generally good. The working environment is orderly and good. 2. The standards used for work is not clear in many cases. 3. Quality control systems have been established, but the actual activities are not very energetic. 4. The flow of products is good.		1. Ageing of machinery. 2. Rough work methods. 3. Unsuitable control of work in progress, with semifinished products piled up on the floor. 4. Insufficient standardization of work, with work varying among workers. 5. Work environment is poor, with organization, orderliness, and cleanliness being ignored.
Product development	1. With the exception of simple shapes, products are designed overseas. 2. Energetic development is not possible due to lack of manpower.		1. Lack of manpower. 2. Insufficient facilities. 3. Difficulty in independent R&D activities. Lack of public organization for supporting same. 4. Difficulty in obtaining technical information.
Development of human resources	1. Lack of middle level engineers. 2. Insufficient use of educational and training organizations		1. Lack of middle level engineers. 2. Lack of consciousness of workers of quality control. 3. Lack of use of educational and training organizations. 4. Insufficient education in principles of "organization, orderliness, and cleanliness"

(Low Pressure Die Castings)

	A
	Two companies 1. Introduction of foreign (German and Japanese) technology and high level of technology. 2. Spare dies are prepared. One company designs and makes dies, while other imports from technical tieup partner. 3. Complete work standards are prepared and production system is fully set up. 4. Main defects are porosity, leaks, and remaining black film.

Fig.III-2: Fishbone Chart of Main Causes of Low Quality Aluminium Products



2-1-2 Promotional Measures for Aluminium Products Industry of Thailand

(1) Current State

1) The aluminium product industry of Thailand began growing as an import substitution industry, but began increasing its exports as well in the late 1980's. Thailand relies completely on imports for the metal and its imports (including alloys) doubled in the 1980's, exceeding 100,000 tons in 1989.

The consumption of aluminium tends to be proportional to the level of economic development. With the recent high growth being experienced by Thailand, this industry has also been expanding in the scale of production.

2) Looking at the number of production companies by end use, there are 14 companies making products for the construction industry, 12 making components for home electrical appliances and utensils and other household goods, and five making electrical conductors. In addition, aluminium products for the transport equipment industry and food packaging materials are being produced. Production of the former, in particular, has been growing rapidly. Production of building materials has also been increasing due to the boom in construction activity by the strong economy and the replacement of wood materials with aluminium ones.

3) Thailand is exporting rods, shapes, and other building materials and also electrical conductors, plate, foil, and pipe. Exports reached 7000 tons in 1989, the majority of which was building materials. The most important building material being exported is aluminium window and door frames, made by a Japanese affiliated company and exported primarily to Japan.

(2) Policies and Prospects

1) There are no investment or export incentives targeted solely at the aluminium industry, but four of the aluminium building material manufacturers are receiving preferential treatment from the Board of Investment. Further, the import duty on ingot is set to a low 6 percent.

2) The aluminium product industry of Thailand may be expected to continue to grow in the future. Increased demand is expected for the transport equipment, electrical machinery, and electronics industries. Further, increased exports and increased demand for substitution of domestic lumber are expected in building materials.

2-2 Market Trends as Seen From Supply Side

2-2-1 World Trade

(1) Demand for aluminium is characterized by a large income elasticity. The countries in advanced stages of economic development consume large quantities. The trend seen is for an increase in demand along with economic growth. Of the 24.22 million tons of aluminium consumed by the world in 1988, North America accounted for 34 percent, Europe for 26 percent, and Asia for 19 percent, with the advanced regions of the West and the growing economies of Asia thus accounting for 80 percent of total consumption. The biggest consumers in Asia are Japan, whose consumption is steadily growing, and R. Korea, whose consumption has grown 2.6 fold in the past 10 years.

Looking the recent demand in Japan, the U.S., and Western Europe (U.K., France, Germany, and Italy), by end use, the share of transport equipment was the highest, followed by construction, packaging, and electrical machinery. Looking by

region, the biggest demand sector in Europe was construction, in the U.S. was packaging, and in Japan was frames and other building materials.

(2) About 80 percent of the world trade in aluminium products is accounted for by the OECD nations. A look at the import trends of the OECD nations shows that imports of plate, sheet, and strips totaled US$5 billion in 1988, imports of foil US$1.9 billion, imports of household goods over US$400 million, imports of pipe over US$300 million, and imports of pipe couplings less than US$100 million. Compared with 1980, these represent two-fold increases for all products except for pipe, which grew 5.7-fold.

Among the OECD countries, the countries of Europe do much of their trade with each other. The U.S., on the other hand, not only trades with Canada, but also does much more business with Japan, R. Korea, and Taiwan. Japan is displaying the same tendency and has been increasing its imports from Asia in recent years.

(3) The most important products exported from the Asian countries to the OECD in terms of value are household goods. The biggest importers in the OECD are Japan, which has been increasing its imports in recent years, followed by the U.S. and Germany, in that order.

The main exporters to Japan are R. Korea and Taiwan. Indonesia stands as the fifth largest supplier. The U.S. also imports much from Taiwan and R. Korea, while the European countries mostly import from each other.

The largest exporter of household goods to the OECD has been Italy since 1980, followed by France in second place. Among the Asian countries, the NIE's have been steadily increasing their exports. Indonesia and Thailand have also been boosting their exports in recent years, though not yet reaching the level of the NIE's.

2-2-2 Main Importers

(1) U.S.

1) The U.S. is the world's largest producer and consumer of aluminium. The market is characterized by a large share of plate products, the main end use for which is packaging use beverage cans (about 50 percent of shipments of plate and just under 30 percent of aluminium).

Domestic demand had been recovering since 1987, but declined in 1989 due to the slump in shipments to main users such as the transport equipment and construction industries. Domstic shipments have also fallen, except for plate products, but exports have been increasing. Further, the rate of use of aluminium for automobiles is expected to rise, so shipments are seen as growing by about 12 percent a year until 1994.

2) In foreign trade, due to the depreciation of the U.S. dollar and the increase in overseas demand, principally from Europe, Japan, and the Pacific Rim countries, exports have been growing, while imports have been declining. As a result, looking at the trends from 1986 to 1989, the trade balance in plate products, foil, rod and shapes, and pipes is changing from net imports to net exports. Further, the ratios of import dependence to domestic demand in 1989 were 10 percent for plate products and 6 percent for foil, maintaining the levels of 1986, but fell to the 1 percentile range for rods and shapes and for pipes.

3) Looking at the imports of aluminium products from the Asian countries, Japan accounts for the overwhelming share of the same. Other importers are R. Korea, Hong

Kong, and Singapore, i.e., the NIE's, and India and Thailand. There has been no imports from Indonesia. Conversely, the U.S. is exporting aluminium products to Indonesia.

(2) Germany

1) Germany (former West Germany) is the world's fourth largest consumer of aluminium after the U.S., Japan, and the Soviet Union and is the biggest consumer in Europe. Domestic demand has been increasing as a general trend along with the increase in demand in the automobile industry (plate products and die castings) and the recovery in the construction industry since 1987 (extruded products). Production is increasing due to domestic demand and increased exports and imports are growing as well. Germany imported 260,000 tons of plate products in 1989 and 190,000 tons of extruded products. The percentages of imports in domestic demand stand at 34 percent and 40 percent, respectively.

2) The main exporting countries in 1989 were the other European countries, with the EC countries accounting for about 70 percent of the imports. In addition, plate products are imported from Japan, Bahrein, Venezuela, etc. Germany began importing extruded products from India and Taiwan as well in 1989, but the volume of these was very small.

3) No imports can be confirmed from Indonesia, and industry experts did not have any information on Indonesian products either. According to the experts, Indonesian export to the German market would require to overcome the problem of the extra freight charge and also to meet DIN standards of technology and quality.

(3) Japan

1) Japan is the world's second largest consumer of aluminium after the U.S. and is the world's largest consumer in terms of per capita consumption. Domestic demand has been growing rapidly, with demand in 1988 standing at 3.26 million tons (of which rolled products accounted for 62 percent, die castings 18 percent, and castings 10 percent), equal to 8.6 times the level of 1965.

Main features of domestic demand, by end use, are as follows:

- The share of household goods, which was once the largest demand sector, has now fallen to the 1 percentile range.
- Instead, the share of transport equipment, using aluminium for reducing weight, has risen to 29 percent, while that for housing and building frames and other building materials has risen to 26 percent.
- Aluminium for the food and beverage industry, primarily for beverage cans, has also grown to an 8 percent share.

2) Japan relies almost completely on imports for its new metal, but imports of aluminium products have also been soaring. Imports exceeded 110,000 tons in 1988 and rose in the share of domestic demand to the 3 percentile level.

The main suppliers are the countries of Eastern Europe and the U.S. for plate and strip and the U.S. and the Western European countries for alloy plate and strip. From Asia, Taiwanese products are prevalent. In foil, the three biggest countries of origin are the U.S., Taiwan, and R. Korea. There are some imports from Indonesia as well, but these are still small.

3) As opposed to this, recently there has been a surge in imports of Indonesian made structures and household goods, with Indonesia becoming a major supplier. Imports of aluminium window frames and other structures from Indonesia reached about 2.5 billion yen in 1990, the second largest figure after Thailand. Further, over 1.7 billion yen worth of Indonesian household goods were imported, the third highest figure after those of R. Korea and Hong Kong.

The growth in imports of these two groups of products is due to local production by Japanese affiliated manufacturers and to OEM production. It is a prime example of how investment and technical tieups lead to growth in exports.

2-3 Promising Aluminium Products in Indonesia

Aluminium plate and extruded products are widely used in the advanced countries. A large demand exists in the fields of construction, civil engineering, components for electrical equipment, and general machinery. Diecasting products, on the other hand, are widely used as parts for transportation equipment. Considering the state of demand in these countries, the following products may be expected to enjoy large demand in the future in Indonesia and in overseas markets. In this section, the promising aluminium products are discussed by end use.

[1] Aluminium products for construction use

Aluminium products for construction use have many advantages over conventional materials and thus the usage in advanced countries has increased very rapidly. Some of the advantages are light weight, resistance to corrosion, heat resistance, easy processability, good reflection of light and heat, and good in prevention of microwaves.

Window and door frames, doors, and other building materials made of extruted products are already being produced in Indonesia by foreign affiliated (Japanese) joint ventures and being imported into the Japanese market. Such products requiring a relatively greater degree of manual labor represent fields where Indonesia has potential competitiveness due to its relatively low labor costs, even compared with the other ASEAN nations.

[2] Aluminium products for civil engineering use

Aluminium products for civil engineering use include road signs, guard rails, light posts, sound dampening walls, scaffolding plates, etc. Among these, road signs, guard rails, and light posts are materials used for public works, so large demand in Indonesia could be expected if the government and local autonomous bodies were to make use of such aluminium products.

In Japan and other advanced countries, wide use is made of aluminium sound dampening walls and scaffolding plates. In general, labor costs account for a high percentage of the total production cost of these products. Production of internationally competitive products, thus, is possible, utilizing relatively cheap labor costs in Indonesia. Promising markets would be Asian NIEs as well as Japan and European countries.

[3] Aluminium products for use in electrical appliance

As more electrical appliance assemblers set up their factories in Indonesia, it is inevitable that they will attempt to purchase as many domestically produced parts as possible.

Promising product fields would include general decorative plate and shapes, condenser cases, semiconductor heat radiating plates, fins, etc. Busbars and cable sheaths would be other products for which demand could be expected.

[4] Aluminium products for general equipment use

Name plates and printing plates are other major applications of pure aluminium plate. High quality plate can be immediately used for materials for sinks, bathtubs, etc., so large demand could be expected in the fields of household equipment as well. In the short term, such products would substitute for imports, but development of new products could be expected to lead to exports as well to Asian and Middle and Near Eastern countries.

Other countries make use of large amounts of aluminium materials for automobile coolant containers, truck flatbeds, frames, etc. These are being produced in some factories in Indonesia as well, but in the future it is projected that there will be a rapid rise in use of aluminium materials in automobiles due to their light weight, from the viewpoints of improvement of fuel economy. While direct exports of these aluminium products to the overseas markets might be difficult for the time being, exports of aluminium products as assembled in automobiles would be possible.

[5] Aluminium products for packaging use

Aluminium products for packaging use include packaging and also caps, aluminium cans, LPG containers, etc.

The production of aluminium cans is considered to require a sophisticated level of production technology, and the latest machinery and equipment.

As for packaging, as the quality of the aluminium foil produced and the volume of domestic production rises, gradually domestic products will replace imported ones.

[6] Aluminium household utensils

Almost all aluminium household utensils made in Indonesia at present use poor quality plate made by pull-over rolling and are shipped out with just buffing as the final finish. Such products lack competitiveness in the international markets, though not in the domestic market, where the stress is less on quality and more on price.

In the future, Indonesian household utensil companies should exert effort into higher value added products as export commodities, for example, Teflon coated frying pans and anodic oxide film coated, colored pots and kettles. The development of such products would require product adaptation in accordance with the consumer needs in design, color, etc. in the target markets including advanced countries and Asian NIEs.

[7] Aluminium parts for automobiles

Improvement of fuel consumption and reduction of weight are two of the major issues automobile manufacturers are tackling today throughout the world. Development of fuel efficient engines as well as thinner steel for use in bodies is being carried out and, as the next step, automakers are seeking to replace the present materials, most of which are steel or iron casting, with new materials. Corresponding to such movements, further application of plastic and aluminium materials to automobiles is being attempted.

So far, in the automobile industries of the advanced countries, many parts and components have been made of aluminium. As the rate of domestic production of

automobiles increases in Indonesia, the demand for these parts made of aluminium is expected to increase.

3. Plastic Products Industry

3-1 Current State and Issues as Seen From Supply Side

3-1-1 Indonesian Plastic Products Industry

(1) Current State

1) The Indonesian plastic products industry was first established around the middle of the 1950's, but continued to remain as a fledgling industry in what may be called the inchoate stage until the 1970's. It began to grow rapidly in the late 1980's, however, and by 1990 encompassed over 650 factories, had investments of US$600 million, consumed an annual 500,000 tons of raw materials, and employed over 90,000 workers, making it one of the leading industries in Indonesia.

2) Along with growth of the industry, exports of plastic products have also increased. While the absolute value is still small, it has increased about 4.5 times from 1987 to 1990, resulting in a change to a surplus in the trade balance in 1989.

Table III-5: Indonesian Exports and Imports of Plastic Products

(Unit: thousands of US dollars)

Year	Exports	Imports	Net exports	Trade specialization index
1986	6,778	24,325	- 17,547	- 0.56
1987	9,121	17,208	- 8,087	- 0.31
1988	16,151	20,312	- 4,161	- 0.11
1989	28,286	25,626	2,660	0.05
1990	41,431	40,708	723	0.01

Notes: Figures are for those products falling under the SITC 893 classification.
Source: Indonesia Foreign Trade Statistics

The main export destinations are the advanced industrialized nations such as the U.S., Australia, Japan, and the EC countries, which account for over 50 percent of the exports. The remaining less than 50 percent of the exports go to the developing countries of Asia, such as the countries of Southeast Asia, Southwest Asia, and the Middle East. The recent growth in exports has been due in large part to the increase in exports to the Asian Pacific Region. By products (SITC893), household goods etc. account for just under 80 percent and packaging and conveyance materials for under 20 percent.

3) The annual demand for raw materials by the Indonesian plastic product industry is expected to increase by 5 to 10 percent in the 1990's. There is the following good factors in terms of the future prospects of the industry:

- Production capacities of facilities are growing along with recent increased investment.
- Indonesia is an oil producing country and is making progress in the domestic production of raw materials, with an olefine center scheduled to be completed during REPELITA V.
- Labor costs are relatively low.
- There is a large domestic market and the national income is expected to increase.

- Indonesian industry as a whole is accelerating in growth and demand can be expected to rise due to the economic growth of the Asian Pacific Region.

(2) Issues

1) The current state of the Indonesian plastic products industry is assessed as follows:

- The industry relies almost completely on other countries for it's production from raw materials (PVC, PE, PP, etc.), auxiliary materials (additives, modifiers, etc.), molding facilities, dies, testing equipment, etc. to product design and production technology.
- The industry has not reached the stage where market surveys, product development, product design, manufacture, and sales activities are performed in a balanced manner (most companies merely mold products).
- The foundation for industrial development remains fragile (the domestic user industries and the consumer goods industries cannot be said to be sufficiently developed and competition in the overseas market is severe).
- There are some companies even now which have levels of technology close to the international level, but most of the companies are in the development stage.

2) For the convenience of indicating issues and proposing measures by companies, the Indonesian plastic products manufacturers may be classified into the following four groups according to their level of production technology and export capabilities:

Level A:	Top level companies, mostly foreign capital affiliated joint ventures and companies with technical tieups with foreign companies
Level B and Level C:	Companies currently with problems in technology, but having a chance to export in the future by improving the quality of their products etc.
Level D:	Companies which are judged as probably having difficulty in exporting for the time being judging from their current level of technology.

3) The issues involved in promoting the Indonesian plastic products industry are summarized in Fig. III-3 based on the problems faced by the industry.

Further, the issues are summarized by product and by company level in Table III-6.

Fig. III-3: Fishbone Chart of Issues for the Promotion of Plastic Products Industry

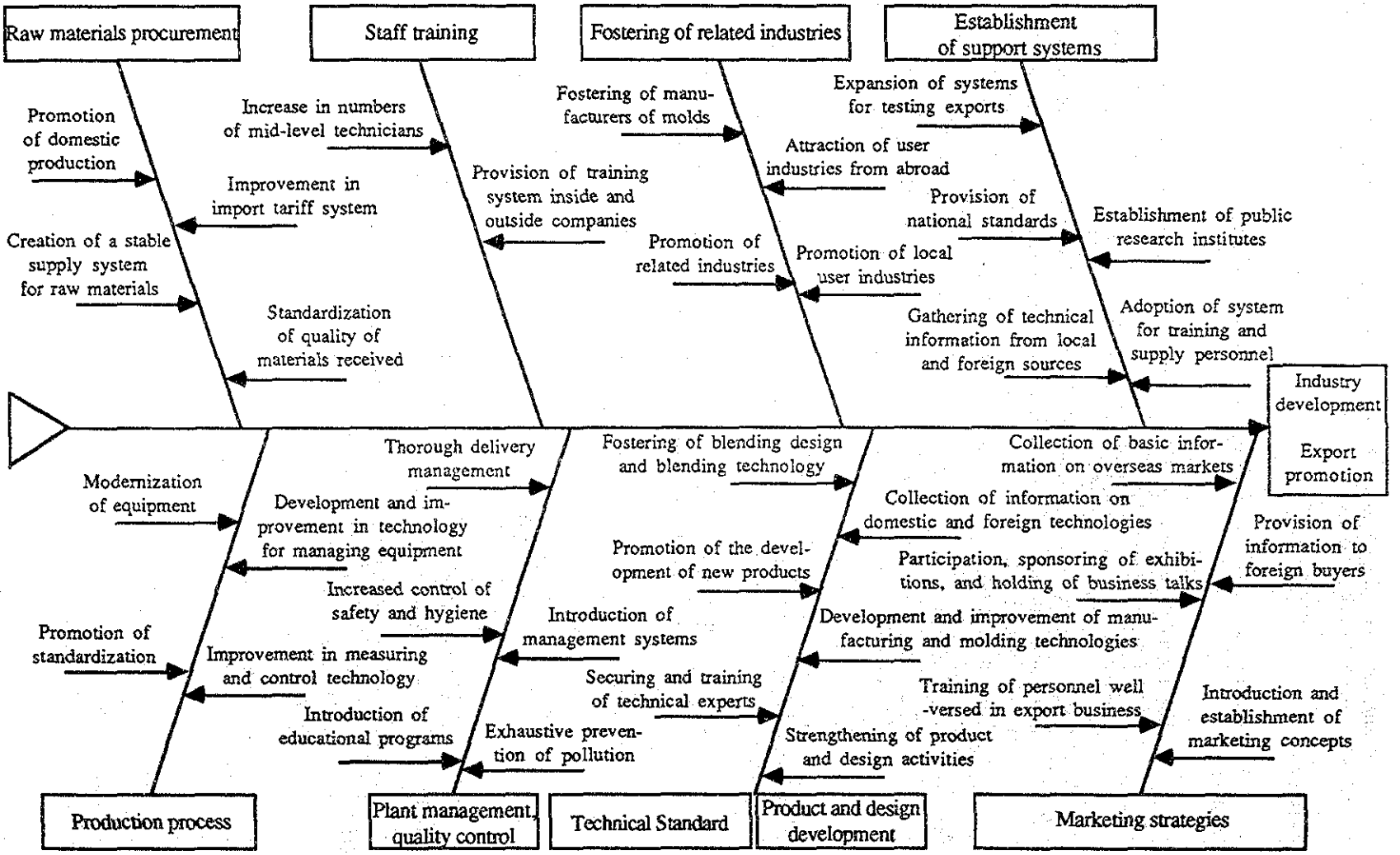


Table III-6: Issues by Plastic Products and Company Levels (Injection Molded Products)

	Level A	Level B	Level C	Level D
Raw materials procurement	• High raw material costs	• High raw material costs • Difficulty in obtaining a stable supply of high-quality raw materials	• Difficulty in obtaining a stable supply of high-quality raw materials	• Difficulty in obtaining a stable supply of high-quality raw materials
Production process	• Automation required for further improvements in quality	• Inadequate systems for raw material measurement, blending and transport	• Inadequate systems for raw material measurement, blending and transport • Large losses during the metal die exchange operation • Numerous lot variations, need for finishing • Insufficient accumulation of objective inspection data	• Lack of basic molding technologies
Technical standards (facilities, technology)	• Lack of independent efforts to improve productivity and product quality • Lack of owner enthusiasm for investment to improve technology and productivity • Lack of metal die repair and maintenance technologies	• Lack of independent efforts to improve productivity and product quality • Lack of owner enthusiasm for investment to improve technology and productivity • Lack of metal die repair and maintenance technologies • Inadequate technical standards and a shortage of production technicians	• Lack of independent efforts to improve productivity and product quality • Lack of metal die repair and maintenance technologies • Inadequate technical standards and a shortage of production technicians	• Inadequate mechanical design standards • Inadequate technical standards and a shortage of production technicians
Product and design development	• Molding dependent on one-sided product design by assemblers (industrial molded products) • Shortage of industrial designers (daily-use molded goods)	• Molding dependent on one-sided product design by assemblers (industrial molded products) • Shortage of industrial designers (daily-use molded goods) • Lack of product and design development expertise	• Lack of basic product and design development expertise	• Unawareness of the importance of product development

	Level A	Level B	Level C	Level D
Plant management, quality control	• Inadequate delivery management system	• Insufficient data collection and statistical analysis • Lack of inspection equipment • Lack of thorough plant standards	• Lack of inspection equipment • Variations in inspection standards • Lack of plant standards	• Unawareness of the importance of quality control
Fostering of related industries	• Dependence on imports and customers for high-quality metal dies • Qualitative and quantitative shortage of metal die design technicians	• Dependence on imports and customers for high-quality metal dies • Qualitative and quantitative shortage of metal die design technicians	• Dependence on imports and customers for high-quality metal dies • Qualitative and quantitative shortage of metal die design technicians	• Dependence on imports and customers for high-quality metal dies • Qualitative and quantitative shortage of metal die design technicians
Staff training	• Shortage of mid-level technicians and managers	• Shortage of mid-level technicians and managers • Insufficient in-house and external education programs	• Low skills levels among ordinary machine operators • Insufficient in-house and external education programs	• Low skills levels among ordinary machine operators
Establishment of support systems	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level
Marketing strategies	• Lack of information on foreign markets • Limitations on product variations and added value	• Lack of information on foreign markets • Lack of marketing concepts • Insufficient marketing strategies	• Lack of information on foreign markets • Lack of marketing concepts	• Lack of marketing concepts

Films and sheets

	Level A	Level B	Level C	Level D
Raw materials procurement	• High raw material costs	• High raw material costs • Difficulty in obtaining a stable supply of high-quality raw materials	• High raw material costs	
Production process	• Difficulty in manufacturing high value-added products • Inadequate production environment for manufacturing foodstuff packaging material	• Difficulty in manufacturing high value-added products	• Need for more advanced equipment and facilities	• Inadequate levels of basic manufacturing technology
Technical standards (facilities, technology)	• Inadequate capability for developing new technologies	• Inadequate capability for developing basic technologies	• Need for improved facility management	• Inadequate machinery and facilities
Product and design development	• Limited market scale and technical standards in user industries • Inadequate research structure for high value-added products	• Limited market scale and technical standards in user industries • Difficulty in competing in foreign markets in terms of cost and performance	• Limited market scale and technical standards in user industries • Difficulty in competing in foreign markets in terms of cost and performance	• Unawareness of the importance of product development
Plant management, quality control	• Inadequate delivery management system	• No effective utilization of inspection results	• Insufficient quality control	• Unawareness of the importance of quality control
Fostering of related industries	• Insufficient development of user industries	• Insufficient development of user industries	• Insufficient development of user industries	• Insufficient development of user industries
Staff training	• Shortage of research personnel	• Shortage of mid-level technicians and managers • Inadequate in-house and external education programs	• Shortage of mid-level technicians and managers • Inadequate skills levels among ordinary machine operators	• Numerous problems which must be resolved at basic levels
Establishment of support systems	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level
Marketing strategies	• Lack of information on foreign markets • Limitations on product variations and high added value	• Lack of information on foreign markets • Insufficient marketing strategies	• Lack of information on foreign markets • Insufficient marketing concepts	• Complete lack of marketing concepts

Woven bags

	Level A	Level B	Level C	Level D
Raw material procurement	• High raw material costs	• High raw material costs • Difficulty in obtaining a stable supply of high-quality raw materials	• Difficulty in obtaining a stable supply of raw materials	• Difficulty in obtaining a stable supply of raw materials
Production process	• Difficulty in manufacturing high value-added products	• Inadequate systems for raw material measurement, blending and transport	• Variations in temperature conditions of drawing machines • Slow production speed for some of the circular looms	• Inadequate levels of basic manufacturing technology
Technical standards (facilities, technology)	• Lack of independent efforts to improve productivity and product quality • Lack of owner enthusiasm for investment to improve technology and productivity	• Shortage of production technicians and inadequate technical standards • Lack of owner enthusiasm for investment to improve technology and productivity	• Shortage of production technicians and inadequate technical standards	• Inadequate machinery and facilities
Product and design development	• Inadequate activities by industry and companies to promote new products	• Inadequate capability for developing new products	• Inadequate capability for developing new products	• Unawareness of the importance of product development
Plant management, quality control	• Inadequate delivery management system	• Shortage of technicians well-versed in plant management and quality control	• Lack of facilities and equipment for plant management and quality control • Variations in inspection standards • Lack of thorough plant standards	• Unawareness of the importance of quality control • Lack of plant standards
Staff training	• Shortage of research personnel	• Shortage of mid-level technicians and managers • Inadequate in-house and external education programs	• Shortage of mid-level technicians and managers • Inadequate skills levels among ordinary machine operators	• Inadequate skills levels among ordinary machine operators
Establishment of support systems	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level	• Numerous problems which cannot be resolved at the individual corporate level
Marketing strategies	• Lack of information on foreign markets • Limitations on product variations and added value	• Lack of information on foreign markets • Insufficient marketing strategies	• Lack of information on foreign markets • Insufficient marketing concepts	• Complete lack of marketing concepts

3-1-2 Promotional Measures for Plastic Products Industry of Singapore

(1) Current State

1) Production in the plastic products industry stood at 500 million S$ in 1980 to over 1.2 billion S$ in 1988, representing an average annual growth of 12 percent from 1980 to 1988. Exports exceeded 248 million S$ in 1989, for an average annual growth of 11 percent from 1980 to 1989. The two biggest export destinations were Malaysia and the U.S., but Singapore also exports to Southeast Asia, Japan, and the EC.

2) Singapore is losing its comparative advantage in labor intensive products in all industrial product fields, not only plastic products. The government is therefore going pushing a policy of greater sophistication in the industrial structure, including a transition to high tech product fields.

(2) Investment Incentive System

Under the policy of promoting greater sophistication in industry, the following tax and financial investment incentives have been devised:

- Tax exemption for pioneer industries
- Tax exemption for expansion of existing companies
- Tax reduction for export-oriented products
- Tax exemption for foreign loans for production facilities
- Tax abatement for payments of royalties, technical assistance fees, etc.
- Investment deduction system
- Tax reduction for research and development expenditures
- Shortening of depreciation term for promotion of mechanization in plant

3-2 Market Trends as Seen From Demand Side

3-2-1 World Trade

(1) Global production of plastic materials is believed to have exceeded 95 million tons in 1989. The five major producers are the U.S., Japan, Germany, the Soviet Union, and France, which supply 60 percent of world production. In Asia, Japan produces an annual 12 million tons, followed by the Republic of Korea, Taiwan, and China, which produce over 2 million tons.

(2) Global trade (imports) of plastic products (SITC893) is growing steadily and exceeded US$16.7 billion in 1987. Of these, imports by the OECD accounted for 86 percent.

Looking at exports to the OECD by producing countries, Germany is in the lead, followed by the U.S., Italy, France, the Netherlands, and the U.K., with products of the western nations thus prevalent. Further, the value of exports of products of the NIE's, i.e., Taiwan, Hong Kong, and the R. Korea, is large, with Taiwanese products showing especially high growth.

(3) Compared with the NIE's, the exports of the ASEAN countries are still small in value, but they have been growing at a higher rate in the late 1980's.

Exports of Indonesian products to the OECD countries are still small, but have been doubling in recent years from US$1 million in 1986 to US$2 million in 1987, and US$4 million in 1988.

3-2-2 Main Importers

(1) U.S.

1) Domestic shipments of plastic products have grown by a steady 5 percent a year in the past 10 years, in particular growing by 7 to 8 percent from 1987 to 1989. The prevalent opinion is that the growth rate will slacken off in the next one or two years due to the business slowdown, but it is expected that shipments will grow by about 4 percent a year after that due to strong demand for packaging and building materials, household electric appliances, automobiles, and household goods.

Imports of plastic products are also continuing to increase. They grew by close to 6 percent in 1990 and probably reached over US$3.8 billion. This corresponds to about 6 percent of the domestic shipments for that year. A 5 percent or so growth is projected in imports in 1991 as well.

2) The main suppliers of plastic products to U.S. market are Taiwan, Canada, Germany, Japan, France, Hong Kong, the Republic of Korea, Mexico, Italy, and the U.K., with these 10 countries and regions accounting for the majority of the products in the U.S. import market. The imports from the ASEAN countries, including Indonesia, are still low in level.

3) While there has been little experience with imports up to now, the number of buyers interested in imports from Indonesia are increasing for the following reasons. To answer their interests, marketing activities are necessary, including PR of Indonesian products and obtaining a grasp of U.S. market trends.

- The plastic processing industry is expected to develop along with the development of the petrochemical industry.
- Labor costs are soaring in the Asian NIE's, while Indonesia has a relatively inexpensive and abundant labor force.
- The benefits of the GSP are available.

(2) Germany

1) Looking at household goods, sales of German companies have been rising along with the increased demand in the domestic market. Production increased over 1.2 billion marks in the past five years and exceeded 5 billion marks in 1989. Of this, household and gardening goods accounted for 40 percent, followed by office and school goods at 16 percent and toys and sporting goods at 13 percent.

2) On the other hand, imports have also been rising. A look at table and kitchen ware and household goods, which account for the majority of the imports, shows the value of imports in 1989 increased 12 percent from the previous year to reach 437 million marks. The leading suppliers were the Netherlands, France, the Benelux countries, Italy, and other nearby countries. In Asia, Taiwan stood as the fifth largest supplier, with imports also coming from China, Hong Kong, R. Korea, and Thailand. There were also 100,000 marks worth of imports from Indonesia in 1989.

3) Plastic household goods importers commented as follows:

- If trying to enter the German market, reasonable prices, qualities, and delivery schedules are essential.
- Among the products of the Asian countries, those of Taiwan and Hong Kong are first level, while those of R. Korea and China are usual. Deliveries are

made in about four months in the case of China and about three months in the case of others.

- Thai melamine table and kitchen ware are good in both quality and design.
- If Indonesia is interested in the German market, it would be effective to exhibit products in international trade fairs.

(3) Japan

1) Japan is second in the world after the U.S. in the production of plastic raw materials and is number one in the world in terms of the total sales of the plastic processing industry. While shaken by the past two oil crises, the plastic products industry is entering a period of stable growth due to increased demand from user industries, such as agriculture, packaging, machinery and equipment parts, and building materials and the improvement of the national income. Production in 1988 exceeded 5 million tons and domestic shipments broke through the 9 trillion yen mark.

2) On the other hand, in the late 1980's, imports of plastic products soared as well due to the changes in conditions of competition arising from the yen appreciation and the growth in domestic demand in the Japanese economy. In 1985, imports stood at only US$153 million, but tripled in 1988. Imports of primarily plate, sheets & films, conveyance and packaging materials, floor coverings and wall and ceiling coverings, table and kitchen ware, and other household goods have been growing, but the ratio of imports of plastic products to domestic shipments is still a small several percent.

3) Imports of higher value-added plastic products have been growing from the EC, U.S., etc. and imports of low and medium grade products have been growing from the NIE's and ASEAN. In 1989 and 1990, in Asia, imports of products of the NIE's were overwhelming large, but the growth rate of those imports slackened off. As opposed to this, the growth rate of imports of ASEAN products grew larger, while the value of the imports was still small.

Imports from Indonesia in 1990 were doubled against 1989, reaching over one billion yen, but Indonesian products are not yet well-known in the Japanese market.

3-3 Promising Plastic Products in Indonesia

(1) Nature of The Industry

There are two aspects to the plastic products industry. In one sense it is a supporting industry which supplies products to the automobile industry, electric machinery and equipment industry, housing material industry, and the packaging material industry. In another sense it is a consumer goods industry which directly supplies the general consumer with household products.

As for its role as a supporting industry, this has to a great extent been reliant on the expansion and development of user industries such as the automobile industry and the electric machinery and equipment industry. It is difficult to think that the plastic products industry would have developed had it not been for the growth of these user industries.

With regard to the industry as a consumer goods industry, growth can be expected in both volume and quality, at a rate proportionate to the increase in the standard of living of the general consumer. However, given the constraints imposed as a result of the consumer's main requirement being price, with quality coming behind in second place, even if an increase in quantity can be expected in the future, this will be a temporary phenomenon. Thus, it is thought that the plastic products industry's advance into international markets will be slow.

(2) Plastic Products as Industrial Materials

As has already been mentioned above, the development of plastic products which are used as materials for industry has been closely linked to the development of industries such as the automobile industry, electric machinery and equipment industry, housing materials industry, and the packaging materials industry.

However, because most of these user industries in Indonesia at the present time are based on foreign capital, it is considered that the rapid development and expansion of Indonesian capital user industries will be accompanied by many difficulties.

Conditions, therefore, for encouraging the development of plastic products for industrial use are, with regard to these user industries, firstly enticing foreign companies in the short term, forming domestic markets, and then taking steps to expand these markets.

In taking these kinds of conditions into account, it is thought that the user industries with the greatest potential for growth are the light electric appliance and the packaging material industries. As a result, markets for plastic materials such as these are also thought to have a relatively high potential for growth.

(3) Plastic Products as Consumer Goods

The market for plastic products as consumer goods targets the average consumer, and as such the key to the growth of this market lies in making products which are favored by the consumer. At the present time, the Indonesian plastic products industry is still young and consumer goods made from other materials are gradually being replaced by products made from plastics.

In regard to the domestic markets in particular, due to the large size of the country's population and the high level of its future potential, it is anticipated that it will not be difficult to expand the market rapidly, providing that products are developed whose price and functions make it possible to substitute for products made of other materials. There are, however, many problem areas which must first be resolved. These include the domestic production of main raw materials, metal mold manufacturing technology, improving maintenance technology, and the establishment of a production management system.

(4) Taking the Japanese market for an example, imports of plastic products have been increasing from Asian countries including NIEs and ASEAN countries since 1985. Products of which imports have been on the rise are such housing materials as carpets, floorings and boards , and packaging/conveyance materials including plastic boxes, cases, sacks and films/sheets in the field of industrial materials. As for consumer products, tableware, kitchenware and other household goods have been increasing as well. Imports from ASEAN countries have outpaced those from Asian NIEs in increasing rate, mainly in the field of price conscious products, while import values of ASEAN countries are still much smaller than those of NIEs.

There has been growing a severe international competition in overseas markets. This situation being considered, Indonesian exporters are required to strengthen their international competitiveness in price and non-price factors including quality and delivery for the expansion of their exports. Only through such efforts, a better prospect for the export opportunity of Indonesian plastic products to the U.S. and the EC markets and the expansion of exports to South East Asian and Middle East countries, could be created.

IV. Recommendation on Industrial Sub-sector Development Measures and Main Programs

1 Ceramic Products Industry

1-1 Issues and Measures

The issues involved in the export promotion of the ceramic industry stretch over a wide range. It is necessary to make repeated comprehensive and continuous studies and develop a proper grand design. Further, it would be desirable to tackle the issues simultaneously and in parallel by selecting high priority, short term action programs and starting them quickly and commencing studies for the realization of the important long term programs. The main goals in terms of export industrialization are [1] the ensuring of stable supplies of good quality raw materials and auxiliary materials, [2] technological promotion and development of human resources in the product manufacturing sector, [3] the strengthening of overseas marketing for sales promotion and the gathering of information, and [4] the introduction of foreign capital and foreign technology aimed at technical innovation and expansion of exports.

(1) Raw Material and Auxiliary Material Sector and Infrastructure

The ensuring of stable supplies of good quality raw materials and auxiliary materials is extremely important for the ceramic product manufacturing industry, which is a material type industry. In particular, there are many problems to overcome in the sanitary ware, tableware and novelty manufacturing industries. There is a common need for construction of the infrastructure in all fields.

[1] The MTDC and the IRDCRI are hoped to jointly establish quality grading standards and provide guidance in sorting and processing technology of raw materials.
[2] Indonesia should start with promotion of investment, including promotion of foreign investment in the field of kiln furniture and other auxiliary materials so as to improve quality and strengthen supply capacity of the same.
[3] The means of communication and transportation should be augmented in order to smoothen distribution of raw materials. In the long term, it would be desirable to construct a collection and delivery center for raw materials and auxiliary materials in the products manufacturing area.
[4] Aside from the above, an important measure in terms of the infrastructure would be to establish a system of supply of natural gas, the most suitable fuel. This would have a wide range of effects such as the improvement of quality of product, the improvement of heat efficiency, and prevention of pollution.

(2) Technological Promotion in Product Manufacturing Sector and Securing and Training of Manpower

Along with the rapid development of industry, the shortages of engineers and skilled workers has become increasingly severer. As a result, the improvement of technology, such as factory control, quality control, and technology and product development, has been slow, further, the improvement of productivity and efficient operation of new facilities has been blocked. The augmentation of technical guidance and employee training is an urgent task. Further, public research and development institutes on the service side are also suffering from shortages of manpower and poor facilities and equipment. It will be necessary to start by augmenting the capabilities of the public institutes.

1) Improvement of Factory Control

[1] The system for development of human resources and retraining of workers at public institutes such as the IRDCRI should be augmented.
[2] Similarly, roving guidance to factories should be strengthened. The emphasis should be placed on the permeation of TQC method.

2) Improvement of Quality Control

[1] In addition to the above-mentioned roving guidance and retraining of workers, the testing and analysis service functions of raw materials of the public research and development institutes should be augmented. The possibilities of technical guidance by foreign experts should also be considered.
[2] SII should be completed for primarily tableware and tile. Further, consideration should be given to the introduction of an export inspection system aimed at preventing shipment of poor quality products, covering novelties in addition to the above two products.
[3] The industrial organizations should take the lead and push forward with a campaign to promote technology. This would mainly cover tableware, novelties, and tile.

3) Strengthening of Technical and Product Development Capabilities

Designers should be trained and joint research with public research and development institutes should be strengthened. Consideration should be given to development of specifications aimed at the ASEAN market in the case of sanitary ware, independent decorations for tiles, and use of traditional designs tailored for the tastes of the target markets in the case of tableware.

(3) Strengthening of Overseas Marketing

[1] Cooperation should be sought from the NAFED and other related organizations and effort made to stimulate marketing activities by the industry as a whole. The industry should start with the preparation of PR materials and then broaden its activities to collecting information on target markets such as buyers' lists, sponsoring and participation in trade fairs and business meetings, and dispatch of market survey teams.
Acquisition of guidance for improving products from foreign commodity experts should also be delved into.
[2] The products emphasized should be tableware and tiles, in which many companies expressed interest in marketing, and the markets emphasized should be the U.S., the EC, and Japan for tableware and the U.S. and ASEAN for tile.

(4) Promotion of Introduction of Foreign Capital and Foreign Technology

[1] ASAKI should serve as the administrative office and tackle activities to promote investment, technological tie-ups and hire experts. In doing so, cooperation should be sought from the BKPM, Ministry of Industry, and other related organizations. The industry should start with the preparation of PR materials and then broaden its activities to the collection of information regarding foreign investors and the dispatch of investment promotion missions.
[2] The fields emphasized should be tableware and tile, where there is great industry interest, and novelties, where there have been few cases of foreign investment etc. (for tiles the stress should be on technical tieups and hiring experts). The main partners will probably be companies from Japan and the Asian NIE's (with a stress on Italian companies as well in the case of tile).