

stresses the necessity of guidance, pointing out the need for: [1] an extension of the loan framework, [2] the securing of raw material supply, [3] the provision of marketing information, and [4] the improvement of shipment and distribution functions.

Product development requires money and the opening up of markets is risky and takes time. That is why government assistance is desired for purchasing raw materials and parts, and obtaining marketing information and job training.

**Table II-3-12: Profile of Philippine Exporters**

Value of Annual Shipments (1000\$)	Number	Firms % of Total	% of Value
100 and Less	3,277	62.2	1.3
101 - . 500	1,015	19.3	4.3
500 - 1,000	335	6.4	4.0
1,001 - 5,000	446	8.5	17.6
5,001 - 10,000	85	1.6	10.5
10,001 - 50,000	92	1.7	34.3
Over 50,000	17	0.3	28.0
Total	5,267	100.0	100.0

Source: DTI, 1987

#### (4) The Behavior of Exporters

As well as establishing a trading environment for exports and imports for the country as a whole, it is also necessary for private businesses to become stronger and for business operators to adopt a style of behavior befitting the trend towards internationalization if growth is to be achieved for the various different industries in the Philippines and its export items.

Given that problems experienced by many Philippine businesses involved in trade in regard to international trade are the same, and the present situation with which they are faced, they should be aware of the following important points outlined below.

##### 1. Competitors

When involved in international trade, businesses should always be aware of the existence of others competing with their own products, and should conduct themselves in the spirit of providing a good service for their customers.

##### 2. Knowing the target market

One should carry out research into the suitability of one's own product to the target market. An effective way of doing this is to adopt the following means of collecting information.

- 1) Write to the commercial attaches abroad
- 2) Exhibit goods and attend international exhibitions and trade fairs
- 3) Take part in sales tours and in trade missions

- 4) Take part in trade training courses

### 3. Maintaining trust

The maintenance of mutual trust and commercial ethics are important elements when engaging in commercial transactions. Therefore, when dealing with customers one should be conscious of one's position as a businessman engaged solely in trade.

- 1) Promised delivery dates are to be kept at all costs
- 2) When shipping products to meet contracts based on samples, the products should be the same as the samples

### (5) Proposals Relating to Trade Policies

The Department of Trade and Industry has conceived an economic development plan which is to take the Philippines through to the year 2000. High export targets have been set out and the aim is to promote direct exports by supplying raw materials from domestic sources and expanding production in the regions. While the direction adopted by this export strategy is good, the way in which the government carries out its economic and social policies will have a large impact on how to go about the promotion of exports. That is to say, because trade promotion is one and the same with industrial development planning, it is necessary to cultivate international competitiveness in the various industrial sectors by developing industries and commodities which specialize in exports and making full use of the vitality of private businesses.

Contained below are proposals on points relating to a desirable export promotion policy which require improvement and/or examination which have been raised in the findings of the survey carried out in the Philippines as well as through interviews held with persons in the industries covered in the survey.

#### 1) Comprehensive plan/proposal for a basic policy

As the situation stands at present it is the International Trade Group situated within the Department of Trade and Industry which formulates policy concerning trade, and the Board of Investment's Industry Group which is responsible for investment policy. Given this and the fact that the BSMBD is responsible for matters related to small and medium businesses and that the BETP is in charge of trade policy, these different departments are involved in activities concerning only the sectors for which they are responsible. But it is unclear which department is to formulate basic policy, and also monitor that policy, under the comprehensive plan affecting trade promotion throughout the country.

In regard to this point, the Export Promotion Bill presently before the Philippine parliament calls for a strengthening of the structure of responsibility for the formulation and coordination of the country's export policy. In these circumstances, the setting up of a department upon the adoption of this legislation, which would hold exclusive responsibility, would be desirable.

#### 2) Establishing an export environment

The following are tasks to be tackled in the immediate future.

##### a) Simplification of export and import procedures

Assistance in the form of answering inquiries about procedures in regions outside the metropolitan areas, as well as a simplification in procedures related to food commodities. This will require the adoption of a computer system;

b) Measures for a reduction in and exemption from tariffs imposed on materials and plant and equipment imported into the country by exporters;

c) A system for monitoring shipping conditions and transportation rates

Today, CIF is not adopted as FOB is adopted for the majority of transactions. Steps which need to be taken in order to raise the standard up to that of international transactions include greater efforts in export insurance services, increasing vessels and shipping routes, and introducing a monitoring system for shipping conditions and transportation rates;

d) The putting in place and expansion of an industrial infrastructure, which would include ports, roads and a communications network.

3) Efforts for developing new export markets

It is necessary for the public and private sectors to work together in the development of export markets. From the standpoint of the present situation in regard to Philippine exporters, the following measures need to be taken by the government and/or public organizations.

a) Stationing of commercial counsellors overseas

Commercial counsellors should be mobilized so that they become involved in providing information on the demand and supply situation related to Philippine products in target markets, compile lists of importers, and supply information to relevant industries.

b) Assistance with international expositions and exhibiting goods in trade fairs

The activities undertaken by the CITEM should be expanded so that assistance is given for exhibiting products in international exhibitions and trade fairs and with attending such exhibitions.

4) Expansion of trade training activities

The engagement of personnel who are very well acquainted with international trade is important as a means of carrying out the promotion of exports. These staff would study trends in international trade, have a deep knowledge of actual trade activities, as well as an understanding of marketing methods and business methods based on international strategies. This must then be used for cultivating the international competitiveness of businesses and industrial sectors. The well-timed training projects undertaken by the Philippine Trade Training Center, established in 1987 by the Department of Trade and Industry as a result of a technology cooperation project undertaken by the JICA, have made some progress to date and are the object of much interest and expectation from local industries.

However, increased trading activities by the Philippines have been accompanied by the need for a lot more information on markets and how to get into target markets. What is more, there has been a sharp increase in demand for training in the regions.

It is therefore desirable for both the government and the private sector to expand the training activities undertaken by the PTTC which have consisted of marketing courses

and inspection and testing of textiles, furniture, and food sectors so that guidance be given in new areas. These would consist of product development, production process management, and practical guidance and consulting for management. It is in this connection that it is necessary that the Philippines fosters personnel which may be mobilized in the near future to work in the industrial standardization system and the export inspection system which the Philippine government has been calling for. In this sense, the skills and staff of the PTTC need to be expanded as part of a medium and long-term plan. It would also be desirable to formulate measures for expanding trade training activities centered on the PTTC.

#### 5) Guidance for small and medium businesses

The majority of businesses involved in exports are small businesses which have insufficient capital with which to participate in overseas marketing activities and product development.

Although the BSMBD has come up with various different plans for providing guidance, its financial difficulties have caused delays in their implementation.

The most expedient thing to do at the present time would be the application of an export advance system and to provide a marketing information service. It is strongly recommended that a forward looking approach be adopted in regard to these measures.

## **4. A Financial System for the Development of Sub-sectors**

### **4-1 Introduction**

#### **(1) Areas of Issues**

The putting in place of an infrastructure through activities public investment and the promotion of private investment must be carried out in order to achieve steady economic growth and industrial development which will support that growth. This raises the question of whether the present financial system can satisfy these requirements for economic growth. That is, one must ask the following two questions of the present financial system:

- 1) Has the raising of funds on the financial markets been satisfactory at times when there has been active investment?
- 2) Is the system one which is able to supply the funds that are a necessary part of industrial development policies to suitable users?

It is to this end that an investigation has been made of Philippine businesses in regard to: 1) the raising of funds and the supply of funds on the part of financial markets in the Philippines; 2) the raising of funds and the supply of funds on the part of the government; and 3) loans obtained by businesses from overseas.

#### **(2) Current Situation and Directions of Financial Policy**

The course taken by the Philippines' financial policy is aimed at achieving stable and continual economic growth, and is based on the prerequisite of market principles, in other words free competition, and places emphasis on improving the efficiency of financial organizations and on strengthening the financial system. Provided below is an outline of the present situation and course being taken by the Philippines' financial policy.

##### **1) Reserve deposit requirement ratio**

Since August 1986 the reserve deposit requirement ratio for banks has been set at 21% for short-term deposits and 5% for long-term deposits. It is possible, however, that these ratios will be revised to meet future market trends. Lowering of the reserve deposit requirement ratio has the effect of expanding credit creation and increasing the supply of currency by that amount. In addition, from the standpoint of businesses this makes the supply of funds easier. While this acts to vitalize the activities of businesses and improves business conditions overall, there is also the danger that this will lead to an increase in inflation. A look at the reserve deposit requirement ratio in recent years shows that it has been steadily lowered, reflecting a trend in the policies of the central bank towards an easing of the money market. Nonetheless, if one considers that during the period from 1981 through 1983 the reserve deposit requirement ratio stood between 16-19% one cannot, in fact, call this an easing in the money market. Rather, it reflects the implementation of a cautious policy (Table II-4-1).

##### **2) Open market operation**

The treasury bills which were issued in 1988 as a means of supplementing the government's fiscal deficit were entirely taken up by the Central Bank. It is because they were taken by the Central Bank and not by the market that there has been an increase in currency supply and that there has been an acceleration in inflation. There is in the Philippines, as will be dealt with later, an immature bond market and there is little scope to increase or reduce the amount of currency through the purchase of bonds (open market

buying operations) and the selling of bonds (open market selling operations) by the government.

Balance of securities issued by the Philippine Ministry of Finance  
(Unit: 100 million peso)

1987	1988
4,260	5,850

Source: Central bank

### 3) Rediscount operations

The central bank's rediscount rate is 10.0%. The amount of loans rediscounted in 1988 was the same as the amount rediscounted in 1987. Offering rediscounts has a direct effect on the tightening or slackening of money, whereas the reserve deposit requirement ratio has an indirect effect. Since the reserve deposit requirement ratio has an indirect effect on the easing the money supply, the Central Bank is maintaining the present rediscount rate, and as such is adopting a cautious stance in regard to a full-scale easing in finance.

### 4) Interest rate

Interest rates are decided upon in line with market conditions and they are also linked to the Manila Reference Rate (MRR). Interest rates are therefore not controlled by the government or the Central Bank, but are allowed to operate freely (Table II-4-2).

In the case of the Philippines, a sharp increase in finance overall gives rise to concern about inflation as a result of the increase in the volume of money in circulation which accompanies an increase in the supply of funds. Also, if one considers putting funds on to the money markets, for example, the rise in interest rates for deposits and savings as a result of attempts to put funds into banking circles will bring about a rise in interest rates for loans as well, and will prevent the smooth supply of funds to businesses. Thus, because it is not possible to serve both interests at the same time it is necessary to adopt a comprehensive policy.

## 4-2 Tasks Related to the Raising of Funds

### (1) The Sources of Funds on Money Markets

#### 1) Banks

##### a) Present banking system

The money markets in the Philippines are divided into banks, capital markets and non-banking institutions. Included in non-banking institutions are leasing and venture capital.

The banking system in the Philippines has the Central Bank of the Philippines at the top, under which there are commercial banks, regional banks, savings banks and development banks.

## 1. Banks

One feature of the Philippines' financial system is that there are many commercial and other types of banks. However, these banks are noted for their smallness in scale and the way in which they tend to be operated by the same families, for the capital participation by overseas banks in some regional commercial banks, and for the existence of Chinese banks (Table II-4-3)

## 2. Central Bank of the Philippines

The Central Bank of the Philippines was established in January 1949 and is a special corporation which is totally funded by the government. In addition to its role of implementing financial policies and policies for the stabilization of currency value as is the practice with other central banks around the world, it approves imports, makes overseas payments, and has the authority to control and give guidance on a wide scale and in a forceful manner in regard to lending and the like. Recently, the World Bank has proposed that the Central Bank's authority in regard to institutionalized finance be lessened and that its authority be diffused. Over the past 20 years the Central Bank has strengthened its banking capital, introduced the concept of universal banking (universal banking refers to expanding the operations which commercial banks are able to undertake including being able to operate in the area of investment), and has freed up interest rates.

## 3. Commercial Banks

Commercial banks are the most powerful banks in the Philippines in regard to both the amount of deposits and the amount of loans (Tables II-4-4 and II-4-5). They handle roughly 80% of loans made to enterprises. Their services cover a wide range, including deposits, loans, foreign exchange, safety deposit boxes, and trusts. Most of the commercial banks belong to financial combines. A look at the loan balances of commercial banks according to the different industries shows that those for the manufacturing industry are the largest and that the largest growth rate in loan balances is for finance and insurance (Table II-4-6). The following methods are adopted for determining interest rates when loans are made:

$$(\text{MRR} + \text{reserve costs, etc} + \text{spread}) + 0.95$$

$$\text{or, } [\text{Treasury Bill (TB)Rate} + \text{spread}]$$

A Presidential ordinance made in September 1976 established a foreign currency deposit account for non-residents which was separate from the domestic account, authorized banking activities involving foreign currencies, and began activities for making the Philippines the financial center for the Asia Dollar. The offshore banking system is comprised of two units: the Offshore Banking Unit (OBU) for foreign banks and the Foreign Credit Development Unit (FCDU). The OBU provides services for overseas banks and for non-residents. It is not permitted to undertake peso-denominated transactions. The FCDU provides services to residents, and as well as undertaking foreign exchange transactions, is allowed to undertake peso-denominated transactions with the domestic sector. There was a fair deal of activity in the beginning as it was more advantageous from the standpoint of taxation to use the Philippines rather than leading financial centers such as Hong Kong and Singapore (compared to a rate of 5% in the Philippines for taxation at source for interest derived from offshore loans, rates in Singapore and Hong Kong were 10% and 15% respectively). However, due to the closing of this discrepancy in regard to taxation, the starting of new financial centers such as Bangkok and Jakarta, and the uncompleted nature of the infrastructure related to electricity and communications etc, the role of the offshore banking system has become somewhat diminished today (Table II-4-7).

Amount of Offshore Banking Dealings (Unit: US\$ 1 million)

	1987	1988	1989
Total resources	3,367	2,991	2,749

Source: Central Bank of the Philippines

#### 4. Development banks

Development banks in the Philippines consist of the Development Bank of the Philippines (DPB) which was set up in 1958 and is wholly funded by the government, and the Private Development Corporation of the Philippines (PDCP) which was established through cooperation between the Philippine government, USAID, and private financial organizations both inside and outside the Philippines. In addition to these two banks, there are the private development banks which are situated around the country and which operate as regional development banks. Whereas in the past the DBP mainly provided medium and long-term loans and security for the agricultural and industrial sectors, its role has recently changed as it has begun supplying medium and long-term funds to wholesale banks, commercial banks and regional banks so that these banks can provide medium and long-term finance. It borrows its funds from overseas financial institutions (the World Bank, Asian Development Bank, and the Overseas Economic Cooperation Fund). The PDCP provides medium and long-term finance for business development projects undertaken in the Philippines which have a capital participation ratio of more than 70%. The private development banks provide loans for regional development in their respective areas.

#### b) Tasks related to the raising of funds by banks

The biggest task facing banks in regard to the supply of funds is how they will be able to satisfactorily meet the need for an increase in funds in light of the small quantity of funds which they have available for loans (Table II-4-8).

Though one should not make a sweeping statement, a comparison of the GNP to asset ratios of the largest bank in the Philippines and the largest bank in Asia shows that of the Philippines' bank is approximately half of that of the largest bank in Asia. This is attributable to:

1. Banks in the Philippines cannot supply an adequate amount of funds;
2. Funds which should normally be recovered are not being recovered (the existence of capital flight).

According to estimates provided by the Morgan Credit Bank capital flight in the Philippines amounted to \$7.0 billion between 1976 and 1982 and \$2.0 billion between 1983 and 1985.

As for its funds supply, it is clear from the table that the amount of funds which the Philippines is able to supply is smaller than that of South Korea or Thailand.

The reasons for this may be summarized by the following:

1. Low propensity to savings



The income level of the majority of the Philippine population is low, resulting in a low propensity to savings.

## 2. Flight of funds

Due to the strong image of damage which has been left as a result of the moratorium which was implemented in 1983 households and businesses in the Philippines do not use domestic banks and instead save by using the following methods. These savings are not part of a structure whereby they are invested in the economy by way of the Philippine money markets.

- a. Overseas savings (capital flight);
- b. Using savings to make informal loans such as by putting them into mutual financing associations or concealing savings, forms of finance which are often seen in developing countries;
- c. Putting savings into financial systems which are maintained by overseas Chinese.

Outlined below are the measures which can be adopted for improving the situation.

### 1. An adequate inflow of funds into banks

The first thing that must be done as a means of seeing that adequate funds are put into banks is to restore confidence in the banks. To this end, it would be advisable to change the present deposit insurance system which guarantees each individual his/her deposits up to a maximum of 40,000 pesos so that the total amount of deposits are guaranteed. This would require a re-examination of the whole deposit insurance system as steps such as revising insurance fees would be needed as a means of raising financial resources.

2. There is a need to relax the conditions which are presently applied upon the establishment of a new office by financial institutions in order to encourage bank savings.

3. When considering the effect of savings, term deposits etc. on inflation, it is necessary to re-examine interest rates and create an attractive investment environment for deposits which are being taken out.

### 4. The removal of the ban on peso-finance by overseas financial institutions

Although at the present time banks engaged in offshore banking are permitted to engage in foreign currency loans, there are still restrictions affecting the operation of the system despite the gradual easing of restrictions in recent years. When considering the promotion of direct investment from overseas, it is, from the standpoint of facilitating the smooth availability of loans to foreign businesses which have set up operations in the Philippines, necessary to take another step forward and permit peso-denominated loans.

The most essential points among these are restoring of confidence in the banks and creation of an attractive interest rate conditions. These two points, however, are the ones to be examined in the course of integrated financial policy measures, and difficult to expect the outcome in a short term. Thus, the improvement of domestic fund raising seems to be hard to be realized. Therefore, the removal of the ban on peso finance by overseas financial institutions is necessary to be examined, since this may be effective as a quick remedy measure if the economic climate is improved.

## 2) Capital markets

There are two stock exchanges in the Philippines: the Manila Stock Exchange which was established in 1927; and the Macarthy Stock Exchange which was founded in 1923. Listed companies are automatically listed on both of these two stock exchanges. The government agency which has the authority to oversee security dealings is the Security Exchange Committee (SEC) which was established by the 1963 Securities Law. The Central Bank supplements the SEC by monitoring investment by foreigners.

Although the dealings of the exchanges have risen sharply in recent years, there are a number of problems which remain to be solved. These include a bias in the industries to which registered businesses belong, the small number of businesses which are registered, and the virtual absence of dealings in debentures.

The reasons why, in relation to investment markets, little household funds and business funds are used for shares or bonds are the lack of businesses listed on both the Manila and MaCarthy stock exchanges, and the bias towards certain industries such as the mining industry. In regard to the issue of shares as well, shares are often received by families and friends out of concern over the possibility of a takeover, etc. As for the circulation markets, listed companies are not very positive in regard to the circulation of shares. For bonds, the system is one which does not circulate bonds among general investors as the only types of bonds issued are treasury bills, all of which are bought by the Central Bank. As has been shown here the capital markets are undeveloped and it will be a long time before they are able to assume the role of raising long-term funds.

## 3) Non-banking institutions

There are various types of non-banking institutions, including finance companies, pawn shops, and factoring companies. Leasing and venture businesses among these, seem to be the ones applicable to the sub-sector development, and, therefore, these two measures will be examined in the following sections.

### a) Leasing

Leasing developed at a relatively early stage in the Philippines. By the early 1980s there were about 200 leasing companies. However, the economic recession which occurred in 1983 saw the number decline temporarily to about 60, but the number of leasing companies has recently climbed back to about 100. The main items handled by leasing companies are automobiles and office machinery and equipment such as photocopying machines. The leasing companies borrow funds from banks in order to lay in stock which they lease out. The interest which is charged on the loans which they take out are added on top of the leasing fees which they charge their customers. Owing to the 22-25% rate of interest which is charged on bank loans (current as of December 1989) in the Philippines, customers using leasing companies are charged an interest rate of between 30-40%. Because the effect of these interest rates is the payment of a sum equivalent to that of the principal over a 2-3 year period, it is not possible in the Philippines to enjoy the usual advantages of leasing, such as a reduction in initial costs. There is also little merit, with regard to the prevention of the out-moding of machinery and equipment, in using the leasing system because if interest of an amount equivalent to principal has to be paid in two to three years it is more economical to purchase goods instead of leasing them. Therefore, users of leasing companies in the Philippines consist mainly of persons who have difficulty in raising bank loans and those who do not wish to increase the value of their assets on their financial statements.

So long as the interest rate of treasury bills is 20% or so per annum the interest rates charged on bank loans will naturally be high as they are determined by adding a

spread on top of the treasury bill rate. As a result, leasing companies which supply articles for lease by taking out loans from banks are naturally forced to set their leasing charges at a higher rate. A re-examination of interest rate policy is required in order to improve this situation and thereby increase the number of users of leased items.

Thus, leasing is hard to be applied to the sub-sector development under the present conditions. However, leasing itself is an effective measure for the small and medium businesses, which are difficult to secure collaterals, in financing for facility modernization. It is recommended in this connection, to make further study on the possibilities to vitalize the lease for this purpose.

#### b) Venture capital

Venture capital is primarily used for the purpose of assisting businesses which are not listed on the stock exchange to be able to become listed, to make a capital gain at the time of listing, to invest in a project, and, if the project proves successful, to receive remuneration for its success. But because in the metal working and wooden furniture industries in the Philippines there have been few projects where there has been remuneration for success and because there is little advantage to be gained from being listed on the markets owing to the immature nature of the capital markets, venture capital is not widely known. In addition, there is little room for much in the way of venture capital activities as an individual company is only allowed to invest a small amount of venture capital funds (500 million pesos). The ratio of investment by the public and private sector for this 500 million peso limit on investment is 6:4, and both public and private investment are required in order to increase the amount of funds which are able to be used for investing. Although from the perspective of expanding business the private sector only moves private capital around, this is not proving successful at the present time.

Capital venture is not functioning satisfactorily as, in addition to the controls on capital which are limiting activities, there is the immature state of the capital markets, the lack of investment opportunities, and also the backlash by small businesses as a result of constraints on equity. In light of the existence of strong expanding businesses and promising projects it would, to start with, the examination of possibility for the restrictions on capital to be abolished.

### (2) Raising of Funds by the Government

#### 1) Problems faced in raising overseas funds and tasks

With the exception of 1) direct investment; and 2) assistance and loans provided by international organizations and foreign governments, the Philippine government is unable to raise funds from overseas sources. Private overseas financial institutions are, however, contemplating withdrawing their funds. The reason for this is that there is little possibility of their loans being repaid as a result of the country risk accompanying the unstable political situation and the enormity of the accumulated debt.

Although the impact of the accumulated debt on the Philippine economy has improved when looked at from the standpoint of its ratio, as is clear when viewed from the standpoint of the debt service ratio (31%) and debt/GNP ratio (68%), the country's accumulated debt is exerting pressure on the Philippine economy. As a result, it is not possible to run the economy effectively by taking steps which would normally be taken, that is, by using funds which should be moved around businesses through public projects to repay the accumulated debt. At the present time, the Philippines is adopting the following five schemes as a way of reducing its accumulated debt:

1. Debt-to-Equity Conversion Program;
2. Debt-for-Debt Scheme;
3. Debt-for-Asset Swap;
4. Peso Prepayment and Offsets and Other Reduction Scheme;
5. Relending Scheme.

In 1986 the Philippines' accumulated debt amounted to \$28.6 billion. The amount of this accumulated debt which had been reduced during 1988 was no more than 3.3%. Reduction of the debt had just got underway at this time and it is necessary for this to be done in a positive manner in the future as well (Table II-4-10).

As for the acquisition of foreign currency through trade, the easing and abolition of various import restrictions has been accompanied in a rapid increase in imports, and this has given rise to a trade deficit. Non-trade related revenue from areas such as tourism is also recording a deficit, and this is making it impossible to raise funds through both trade and non-trade (Table II-4-11).

As for the situation regarding assistance and loans from international organizations and overseas governments, Japan provides the largest amount, followed by the World Bank group. The concept of multinational assistance has led to new developments in recent years which have seen the availability of new money from European nations. Two-thirds of aid is given in the form of loans, and even though there might be a temporary transfer of capital, the end result is no more than a rise in debt and a putting off of a shortfall in capital. A comparison of the amount of overseas aid and the amount of accumulated debt shows that in 1988 overseas aid amounted to just 8% of the amount of accumulated debt.

A look at direct investment from overseas, based on the value of investment approved by the Board of Investments, shows that the low cost of wages, the high quality of labor and the expectations held of the Aquino administration has seen a gradual increase in such direct investment. However, the series of coup d'etat attempts and the failure of the Aquino administration's agricultural reforms have led to concern as to whether investment will actually take place in the future. Despite investment from overseas by foreign governments and international financial institutions, the existence of the fiscal deficit, balance of payments deficit, and accumulated debt means that the problem will never be solved as this investment has to be put to use for repaying these debts and so will not be used for raising the international competitiveness of businesses.

The largest obstacle is the accumulated debt. At the present time the Philippines has presented to the World Bank and the IMF its Medium-term Economic Plan, which has been made a condition for the "New Debt Strategy" based on the Brady Plan, and is running the economy according to this medium-term economic policy. It is also adopting 5 schemes for the reduction of its accumulated debt. Although to date these schemes have had little impact on the reduction of the accumulated debt, the amount of debt itself which has been is increasing and it will be necessary to continue with this course of action. Examination of more effective schemes would be necessary because, although some of these schemes will serve to reduce some accumulated debt, they are a double-edged sword because they are tied to inflation.

As for improving the international balance of payments deficit, the most effective means of reducing this deficit is to reduce the trade deficit, the largest deficit component. The way to do this is to follow the hard and fast rule of increasing the value of exports so that it exceeds that of imports. However, because the trade structure of the Philippines is of the processing trade type, an important point will be to raise the level of added value. The reduction of costs at the time of purchase of raw materials and capital goods, the rationalization of production and processing processes, and an increase in international

competitiveness through increased quality should be undertaken in order to achieve this. Also, it is necessary to establish an organization which will provide a supporting function by distributing marketing information.

## 2) Problems in raising funds within the Philippines

### a) Poor tax collection ratio

Until 1986 when reform of the tax system was undertaken, export taxes were used as part of a tax system used for promoting exports in the Philippines. According to this system, businesses which were engaged in exports were, from the standpoint of an increase in income, required to pay export tax levied on the value of their exports. This export tax has been abolished since the reform of the tax system in 1986. As for the situation regarding financial resources since the abolition of this export tax, there has been an increase in anticipated corporate tax which has accompanied the increase in revenue through exports. This has given rise to the need to improve and make more efficient that tax collection system used for corporate tax. Given the poor tax collection ratio in the Philippines whereby 10% or so of taxes are collected, it is possible that, in industries which are of key importance to the Philippines economy and in those which should be promoted even further in the future, the energy of these areas will be lost in a temporary bid to raise revenue in the immediate future. Two urgent tasks which must be undertaken are to raise the morale of tax collectors and to establish a system which is in touch with the actual state of tax collection (Table II-4-14).

## 4-3 Tasks Related to the Supply of Funds

### (1) The Supply of Funds through Financial Markets and Tasks

The supply of funds is related to financial markets' ability to supply the necessary amount of funds at the necessary time at reasonable interest rates. In regard to the demand for funds by small and medium businesses in particular, the timing of the supply of funds is often more important than the rate of interest at which they are supplied.

The problems which exist in the Philippines in regard to the supply of funds by the financial markets may be summarized under the four headings shown below.

#### 1) Financial organizations' attitude towards collateral requirement

Businesses which do not have the required collateral find it extremely difficult to raise funds. This inhibits the potential of businesses to grow because, if they do not have any collateral they are not able to carry out a project even though it is a project which will be very profitable and which has a very strong chance of being successful.

The reason for this problem is, in the final analysis, attributable to the high degree of financial risk. If the financial system is operated under these conditions it is natural that, even if there is an orderly supply of funds to borrowers under favorable conditions (low risk, high return), the providing of finance to small and medium-size businesses and the like (high risk, low return) will increase the cost of administering loans. This in turn creates the danger of a stop in the flow of the supply of funds. Also, even if finance is supplied, it will be supplied under unfavorable conditions, such as interest rates which are higher than those generally applied to loans. If this situation continues unchecked, the same thing will happen as happened as a result of the development policy aimed at the large-scale industrialization of the heavy and chemical industries which took place in the past, whereby the small and medium business sector got left behind. That is, this sector will again be left out in the cold. Certain pump-priming measures are required until these

small and medium businesses are able to free themselves from the effects of the past distortions in economic growth so that, under market competition, they are in a position to grow by making full use of the advantages they possess. The following steps are required in order to achieve this.

#### 1. Expansion of the credit guarantee system

Although at the present time there are credit guarantee organizations such as the Industrial Guarantee and Loan Fund in the Philippines, controls on collateral and the small volume of funds have resulted in restrictions on the amount which can be guaranteed. What is more, the guarantee system was introduced at a time in the past when there was financial aid from other countries. The lack of harsh screening for guarantees and the absence of a sufficient system for checking recovery resulted in a succession of damaging incidents in which there were "planned bankruptcies" in which funds were stolen. Thus, the system lasted only a short period of time. It is therefore necessary to examine and keep in mind the following points in regard to an expansion in the guarantee system. The measures for this purpose will be recommended in the later part of this report.

- a. Close linkage between guarantee organizations and financial institutions starting with the commercial banks which actually provide businesses with loans;
- b. The establishment of an organization whose role is solely to collect information on trends in businesses and industry;
- c. The formation of a system for making public failures on the part of businesses and the management of their investments (for example, non-payment, non-fulfillment of a contract). It is also necessary to take steps which will make it possible to prevent, for a fixed period of time (for example, two years), a business executive who has been responsible for some failure or other in the operation of his business from being able to change the name of his company and obtain a loan from another bank;
- d. An increase in the amount subject to a guarantee  
A 100% guarantee should be made available to businesses which have conducted transactions favorably in the past as well as to favorable projects. In the case of an amount below a certain level, unsecured loans should be made available and the conditions for those loans set out in a relatively detailed manner;
- e. A dual screening structure for decreasing the risks involved by having the commercial banks which deal with potential customers and the guarantee organization itself carry out screening;
- f. A check on the fulfillment of guarantee conditions made entirely by the commercial banks which report immediately to the guarantee organization. In cases where oversights have been reported, the guarantee organization refuses subrogation and thereby puts a stop to slack financial management on the part of the financial institutions;
- g. A guarantee is provided for a certain percentage of the final unrecoverable amount of a loan, thus securing the financial resources of the guarantee organization. A comprehensive policy which incorporates an insurance company is desirable in order to achieve this.

#### 2. Establishment of an information system for credit inquiries

An organization which provides an assessment on collateral and information on businesses as well as information in conditions in industries to financial institutions should be established to simplify and speed up the screening process for loans. Although there is the Credit Information Bureau, a similar type of organization which operates at the present time, easier access to information is desirable with information being provided more comprehensively and more easily than it is at present. An improvement in related

infrastructure would be advisable, such as by increasing staff numbers and undergoing computerization.

### 3. Organization of business cooperative associations

If the strict commercial banks adopt a two-step structure for loans in regard to finance for individual small and medium businesses so that there is a joint guarantee and joint responsibility for loans to business cooperative associations made up of small and medium businesses risks will be reduced and it will be easier to provide finance on a larger scale.

#### 2) Low level of management efficiency among financial institutions

A greater level of efficiency is indispensable in order to be able to cope with a huge demand for funds. It is possible to adopt measures for improving administrative efficiency which do not involve high costs, such as making improvements in administration and having an inter-bank computer system. Because this makes it possible to lower the cost of providing loans it has a secondary advantage of making it possible to lower the rates at which loans are provided to the customer.

#### 3) Insufficient availability of long-term loans

Long-term finance entails providing a guarantee to the borrower which enables him to repay the loan during the course of the term, and thereby facilitates the stable raising of funds. If the loan is paid in installments the loan can be repaid by repaying the interest and a relatively small amount of the principal. This lightens the burden on the customer and is an extremely sound method of account management if the amount repaid is similar to the depreciation amount.

Only a small proportion of finance in the Philippines is long-term as it accounts for between 10-20% of all finance. The reasons for this are:

1. The inability of financial institutions to raise long-term finance owing to the instability of the political situation and the immature nature of the capital markets;
2. The high risk in providing finance at fixed rates because of inflation;
3. The few advantages to be gained by using long-term finance due to a similarity between short-term interest rates and long-term interest rates.

At the present time the DBP acts as a wholesale bank which provides long-term finance. However, in order for this system to succeed it is necessary to provide incentives which will encourage commercial banks and the like which provide services to business customers to handle long-term finance in a more positive manner. Careful consideration must be given to the serious problem of frozen credit faced by banks handling long-term finance.

The following are examples of incentives which could be provided:

1. The introduction of a difference in interest rates for loans in line with the size of the loan;
2. The making of deposits by guarantee institutions to banks consistent with the amount of finance handled;
3. Awards for banks which excel in the manner in which they handle long-term finance;

The following points should be considered in regard to frozen credit:

1. Linking long-term finance with the guarantee system by raising the guarantee limit for banks which excel in the handling of long-term finance.
2. To develop new guarantee schemes jointly with insurance firms.

4) Insufficient availability of loans for export promotion

Although there exists the packing credit system for exports, the Central Bank is no longer handling this and in many cases businesses are not able to avail themselves of this service. The current restrictions have been applied because the unrestricted implementation of the packing credit system would increase the amount of money in circulation, lead to the danger of inflation, and because there is a limit to the amount of foreign currency the government has. Another reason why the restrictions have been put in place is that it is desirable to secure financial resources.

A feasible means of maintaining financial resources is to use funds from overseas as a pump-priming measure, and following on this to make use of the increased tax revenue derived as a result of a growth in exports.

(2) The Supply of Funds by the Government

Reforms have been undertaken in regard to the supply of funds by the government to businesses such as the use of the DBP as a bank for providing long-term finance. However, the many constraints imposed by a tightening in national finance, the accumulated debt and the like have made the management of funds supplied by the government very difficult. Demands by the financial markets have meant that the supply of funds by the government to businesses takes place in the form of rediscounts or institutionalized finance.

As for export advances made in rediscount form or through institutionalized finance, efforts to meet the targeted inflation rate which is a condition imposed by the IMF and the World Bank has resulted in the imposition of restraints in many cases. The effect of this is to restrict the use of export advances to businesses, the end users.

There is, nonetheless, institutionalized finance in the Philippines for the promotion of sectors, and some of this is linked to the guarantee system.

The following is a list of institutionalized finance made available to industry.

1. TST-SELA: Tulong Sa Tao-Self Employment Loan Assistance  
 Object: Institutionalized finance for small businesses  
 Details: Amount of finance available: 50,000-400,000 pesos  
 Maximum limit per individual: 25,000 pesos  
 Interest rate: 7%  
 Term: 1 year  
 For businesses which have been in operation for more than one year, and which have 20% equity
2. IGLF: Industrial Guarantee and Loan Fund  
 Object: Medium, small and cottage businesses  
 Details: (for very small businesses)  
 Amount of finance available: 50,000-1,000,000 pesos



It should be noted, however, that this is the amount available to the Personnel Management Association of the Philippines (PMAP). The PMAP provides its member companies with a maximum of 25,000 pesos per company.

Service charge:

10-13%

Term: 3 years

Applicants must be members of the PMAP (for small and medium businesses)

Amount of finance available:

	Cottage	Small	Medium
Secured	P. 0.4m	P. 0.4m	P.16m
Unsecured	P. 150,000	P. 150,000	P. 150,000

Interest rate: market rate

Term: 6 months-12 years depending on the scheme

3. **ULFP:** Urban Livelihood Financing Program  
**Object:** Medium, small, and cottage businesses  
**Details:** Amount of finance available:  
5,000 peso units  
Security required for total amount, and in cases of loans of more than 500,000 pesos real estate security is required  
Equity capital: 15% required  
Interest rate: 17%  
Term: within 5 years
  
4. **EIMP:** Export Industry and Modernization Program  
**Object:** Export businesses  
**Details:** Amount of finance available:  
5.0 million pesos initially. Alters according to subsequent performance  
Interest rate: 10% of balance  
Term: 5-10 years (deferred for 1-3 years)  
Security: full cover
  
5. **PHILGUARANTEE:** Philippine Export and Foreign Loan Guarantee Corporation  
**Object:** Exporters  
**Details:** Amount of finance available:  
small scale: 100,000-1,000,000 pesos  
medium scale: 1,000,000-4,000,000 pesos  
Annual interest rate: 18%  
% of security cover:  
first time: 50%  
Industry, exporters: 70%
  
6. **TUFP:** Technology Utilization Financing Program  
**Object:** R & D businesses, those engaged in inventing  
**Details:** Amount of finance available:  
up to 40% of equity for projects valued at less than 1,000,000 pesos  
Term: 1-5 years (varies according to purpose of loan)  
Security: 50-70%  
Interest rate: MRR% + 2-4%

7. DBP: Development Bank of the Philippines Financing Program for Small and Medium Enterprises

Object: Small and medium businesses  
Details: Amount of finance available:  
up to a maximum of 50 million pesos depending on the project  
Interest rate: floating rate  
Term: depends on the project period

Though some of these schemes have increased the amount of institutionalized finance they handle (e.g. TST-SELA, DBP), there are some who are now handling less (e.g. IGLF).

The number of cases handled overall reached an all time peak of 1,476 in 1988. However, this number is not sufficient when compared to the number of businesses. Efforts are therefore required to ensure that there is an increase in the number of cases handled. (Table II-4-16)

Most of the institutionalized finance provided by the government is derived from overseas government and international organizations. The conditions under which this finance is made available varies from case to case. The following are negative factors related to the conditions under which this form of institutionalized finance is used:

1. The strict loan conditions such as severe collateral requirements;
2. The lack of incentives offered to financial institutions handling loans;
3. The complexity of handling and administration (e.g. the large number of documents required)

The government is facing difficult times in regard to its supply of funds to businesses. The quickest way of resolving this problem is to promote investment by private foreign sectors and the drawing of funds which do not have interest rates attached and for which repayment is unnecessary.

Consideration should be given to the following points in order to promote investment by private overseas sectors. However, both are the tasks difficult to be achieved in a short term.

1. Measures to improve political stability and security;
2. Putting in place of incentives.

When putting in place these incentives consideration should be given to the following. However, it should be noted that all of these might cause the problems in other areas, and that further comprehensive study is necessary to take action for implementation,

- a. Under the present situation regarding the remittance of profits by overseas businesses quite a number of documents are required even when remitting \$100. This needs to be simplified;
  - b. The introduction of a tax system which gives more preferential treatment to ASEAN members;
  - c. An easing in restrictions applied to foreign business, such as an easing in the foreign investment ratio;
4. Measures for making it easier to supply funds within the Philippines by the gradual removal of the ban on peso-denominated investment by overseas financial organizations so that it is not necessary to possess a large amount of capital.

### (3) Direct Loans for Businesses from Overseas Financial Institutions

Regardless of whether a business is a joint venture or a regional business, all loans obtained from abroad must receive prior approval from the Central Bank. The enormity of the size of the Philippines' accumulated debt at the present time has resulted in the establishment of guidelines by the IMF and the World Bank regarding the annual amount of loans obtained from overseas. The Central Bank screens applicants very rigidly and approvals are granted in only a few cases. However, some improvement has been seen since the beginning of 1990, since which time a more flexible stance has been adopted towards export businesses. Many more improvements must be made from now on.

## **4-4 Recommendation on Financial Policies and System for Promoting the Development of Sub-sectors**

### (1) Introduction

Financial policies for the promotion of the selected sub-sectors must be examined from two viewpoints: 1) the raising of funds by large and medium-size businesses which will play a leading role in development of the sub-sectors; and 2) the raising of funds by the smaller businesses. The financial markets' capacity to raise and supply funds is quite limited and there is little prospect of an early improvement of this situation. Therefore, it is necessary to promote direct investment from overseas and direct loans from overseas financial institutions for large and medium size businesses. For small and medium size businesses, it is advisable to supply funds through institutional loan schemes by blending locally-sourced funds with low interest rate funds sourced through international cooperation. On top of this, it is necessary to support moves to provide supplemental means for the improvement of creditworthiness of each small and medium-sized business. What is most lacking in this regard is the absence of data regarding the credit standing of each business. In order to remedy this situation, it is necessary to : 1) use the accreditation and registration system applied to businesses as a substitute for data regarding the credit standing of each small and medium business; and 2) use information from industry associations and regional chambers of commerce and industry. From this perspective, the further study of the following is recommended as financial measures for the promotion of the sub-sectors which are composed mainly of smaller businesses.

### (2) Measures for Raising the Level of Credit of Small Businesses

1) The establishment of credit-rating criteria for loans for "qualified businesses" (businesses with excellent credit standing) and the application of preferential measures

It is recommended that the preferential measures be applied to the businesses which fulfill one of the required conditions listed below, not only for the purpose of strengthening the creditworthiness of small and medium businesses, but also to provide incentives for self-improvement in the areas of technology, management, and marketing. These are: 1) relaxing loan screening criteria; and 2) securing a certain amount of funds for preferential loans. The possibility of reducing interest rates should also be examined.

1. Businesses involved in the business accreditation system etc. for the purpose of improving their fundamental business performance ;
2. Businesses located in industrial estates which have been established for the purpose of modernizing the sub-sectors;
3. Businesses participating in cooperative projects carried out in order to improve their fundamental business performance;
4. Businesses registered with the Board of Investments;

5. Businesses recommended by industry associations which are well organized and which have a good understanding of their members.

Businesses categorized under 1-3 and 5 are related with projects for sub-sector promotion and development. All of these projects assume that the financial programs will be implemented. Thus consideration of the implementation of the programs at an early stage is desirable.

## 2) Examination of establishment of a credit supplementation system

It is recommended that the possibility of establishing a body with the function of supplying supplementary credit information on individual firms on the basis of the organization of industry associations or regional chambers of commerce and industry be studied. The information may be supplied by either a national body or regional units. At the same time, it is necessary to undertake a study of the feasibility of establishing a credit guarantee association which would base its activities on the information provided by the body recommended above.

In cases where the guaranteed firms cannot repay their debts because of a slump in business, credit guarantee associations would be required to make repayment of the outstanding debts to financial institutions. To minimize the risks involved, it is recommended that insurance companies for credit guarantee company be established. It is recommended that the cost of establishing and managing the insurance companies for credit guarantee company be born by the government. In this way, the cost of providing credit insurance would be regarded as a type of social cost for nurturing small and medium enterprises.

Following are explanations of the relationships between enterprises, financial institutions, credit guarantee companies and insurance companies for credit guarantee company in terms of procedures.

1. Small and medium enterprises which wish to have a credit guarantor apply to credit guarantee associations.
2. After examining and investigating the applications, credit guarantee associations consent to act as guarantor for the small and medium enterprises which they deem appropriate.
3. Financial institutions, which receive the notices of consent to guarantee from credit guarantee associations, lend money to the small and medium enterprises. The small and medium enterprisers pay guarantor fees to credit guarantee associations.
4. If the small and medium enterprisers default on the repayment of debts, credit guarantee associations make the repayment to financial institutions on behalf of the small and medium enterprises (a process known as subrogation).
5. In cases of subrogation, the right to demand compensation for the outstanding sum passes from financial institutions to credit guarantee associations. The credit guarantee associations collect the sum over a long period of time while making efforts to improve the financial situations of the small and medium enterprises.

Credit guarantee associations, meanwhile, take out insurance coverage with insurance companies for credit guarantee company to hedge the risk involved in the guarantees they have given. The methods are as follows:

1. At the time of consenting to guarantee (2. above), credit guarantee associations take out insurance coverage with insurance firms.
2. It is desirable that the provision of a guarantee automatically be followed by the acquisition of insurance to cover all debts, irrespective of the potential for default on the part of the guaranteed company.

3. Credit guarantee associations pay a fixed fee to insurance firms.
4. In cases where credit guarantee associations make repayment in subrogation, as stated in 4. above, insurance firms pay 70% -- 80% of the sum to credit guarantee associations.

This system whereby the consent to guarantee credit is automatically and simultaneously accompanied by the provision of insurance coverage is based on the premise that the small and medium enterprises concerned satisfy the fixed terms and conditions. The automatic insurance coverage will boost the number of insured cases and allow the dispersal of risks. Because insurance firms provide compensation of only 70% - 80% of the subrogated sum, credit guarantee associations lose the remaining 20% to 30%. Accordingly, credit guarantee associations examine applications for guarantee carefully, thereby ensuring that the guarantees they provide are sound.

Such a system would be very effective for the promotion of the sub-sectors and would be one of the most promising financial programs contemplated in the Philippines. However, it will require sufficient study in the planning stage and thus it is desirable to begin study as soon as possible.

It is recommended that the following points be studied as well:

- set up a desk for financing services in the credit guarantee association;
- establish a research section in the credit guarantee association and undertake a survey of the sectors to which businesses with excellent credit standing belong;
- develop a system to share information on problems such as bankruptcy, overdue payments, etc., among financial organizations and the credit guarantee association.

### (3) The Establishment of Loans for Sub-sector Modernization

#### 1) Objectives

Facilities in all of the sub-sectors under study are remarkably outdated, making the renewal and introduction of modern equipment a substantial problem. Due to insufficient financial and technological capability, used machinery is often purchased. Moreover, the machinery introduced is frequently inappropriate for the purposes of modernization.

It is necessary to set up a financing system which has as a main objective the solution of this and similar problems. Therefore, the establishment of a financing system with the following outlines is recommended:

#### 2) Focus and usage

The focus of the financing system should be on small and medium enterprises in sub-sectors which comply with the targets of official development programs and which satisfy the following criteria laid out in these plans:

1. Existing of appropriate committees comprising representatives of the industry and related government agencies which are able to certify used or newly constructed modernization facilities
2. Introduction of standards for certifying used or newly constructed modernization facilities and revision of these standards, if necessary.

The system would be used for supplying the funds required for the purchase of appropriate modernization machinery and equipment.

### 3) Method of financing

Although ordinary loans for purchasing may well be useful, it is recommended that a lease- or rent-to-purchase method be established. The rent-to-purchase method means that financial institutions, after lending machinery and equipment to firms for a fixed period, transfer the right of ownership to the firms. Compared with ordinary loans, the method has the following advantages:

1. With ordinary loans, it is common for the sum lent to be less than that required for the purchase of machinery and equipment and the remainder must be raised by the borrowers themselves. However, small and medium enterprises, which usually have little collateral or other concrete signs of creditworthiness, often cannot raise the funds themselves and abandon the idea of purchasing machinery and equipment. A lease-to-purchase lending scheme would solve this problem.
2. Small and medium enterprises, weak in technological ability, often cannot make appropriate selections in the purchase of machinery and equipment. Under a lease-to-purchase lending scheme, financial institutions purchase models they have chosen themselves and lend them. This means that appropriate and modern models of machinery are selected, enabling a semi-compulsory modernization of outdated machinery and equipment.

The ordinary loan method may also be applied to this financing method. In this case as well, it is desirable that financial institutions select the machinery to be purchased.

### 4) Financing terms

Low-interest loans are desirable. The leasing period should be within the life of the machinery purchased. Five to eight years may be appropriate. The life of individual machines should be fixed when a list of modern machinery to be purchased is drawn up.

### 5) Raising of original funds

It is believed practical that low-interest loans based on international cooperation be mixed with domestically-raised funds. Since modern machinery will often be imported, the introduction of foreign currencies will become necessary.

### 6) Others

The financing method should be adopted on an experimental basis at first, and, when the prospects for success have become clear, it should be switched to a stage of full-scale operation. Any reduction of customs duties on the machinery imported under this loan system will decrease the burdens on enterprises and contribute a great deal to the achievement of modernization.

It is expected to be realized in accordance with the implementation of the sub-sector development programs. Securement of funds is the fundamental requirement. It is desirable that consideration be given to these projects as soon as possible.

### (4) Other Measures

The desired effects and possible methods of implementation for the various improvement measures stated in 4-2 and 4-3 will be listed below. They are all recommendations for improvement. There are many factors to be considered regarding the recommendations and thus further study is necessary.

#### 1) Withdrawal of ban on peso loans by foreign banks

1. Effects: Satisfaction of demand for funds by foreign firms.
  2. Methods: The entry of foreign banks in this area should be permitted in stages so as to avoid a shock effect on local banks.
- 2) Improvement and establishment of credit information organizations
1. Effects: Reduction of loan risks for financial institutions.
  2. Methods: The functions of the existing Credit Information Bureau (CIB) should be expanded. A new data bank should be established.
- 3) Establishment of an organization for the promotion of efficiency at financial institutions
1. Effects: Reduction of the lending costs of financial institutions.
  2. Methods: Expansion of the functions of the existing Banker's Association of the Philippines (BAP).
- 4) Improvement of know-how for credit risk assessment
1. Effects: Reduction of the loan risks of financial institutions.
  2. Methods: Addition of education and study functions to BAP.
- 5) Improvement in the deposit insurance system
1. Effects: Recovery of trust in financial institutions by both private individuals and business.
  2. Methods:
    - An increase in the sum of insurance coverage: From the current 40,000 pesos to full sum, if possible.
    - Expansion of the scale and functions of the Philippine Deposit Insurance Corporation (PDIC).
- 6) Liberalization of conditions for the establishment of new bank branches.
1. Effects: Enhancement of deposits in financial institutions by households and business.
  2. Methods: Alleviation of controls on distances between bank branches.
- 7) Review of interest rates on loans
1. Effects: Rationalization of the process of establishing interest rates on loans.
  2. Methods: Advice should be issued when financial institutions earn what appears to be, in light of their profit margin on loan interest, excessive profits.
- 8) Expansion of institutional loans
1. Effects: Facilitation of fund-raising by firms through the diversification of available financial instruments.
  2. Methods:
    - Review of the current institutional loans.
    - Establishment of preferential loans for excellent small and medium enterprises.
- 9) Improvement in efficiency of tax collection
1. Effects: Achievement of sound government finances. And this will enable the effective implementation of the government financial policy.
  2. Methods: Improvement in the tax collection system in the lower brackets.

Table II-4-1: Required Reserves on Deposit of Commercial Banks, The Philippines (1984-89)

(Unit: ₱)

	Apr.1984	Sept.1985	May 1986	Aug.1986	Dec.1986	Dec.1989
Demand Deposit	24	23	22	21	21	20
Savings Deposit	24	23	22	21	21	20
Time Deposit	24 & 6	23	22 & 6	21 & 6	21 & 5	20

Source: The Central Bank of the Philippines



Table II-4-2: MRR (Manila Reference Rate) in 1989

(Unit: % p.a.)

Item	Jan. 30 -Feb. 3	Feb. 27 -Mar. 3	Mar. 27 -Mar. 31
MRR60 (60 days)	$15\frac{3}{16}$	$14\frac{1}{2}$	$14\frac{9}{16}$
MRR90 (90 days)	$14\frac{3}{4}$	$13\frac{15}{16}$	$14\frac{9}{16}$
MRR180 (180 days)	14	$14\frac{7}{16}$	$14\frac{3}{4}$
All Maturities	$15\frac{1}{16}$	$14\frac{7}{16}$	$14\frac{9}{16}$

Source: Philippine Financial Statistics, The Central Bank of the Philippines

Table II-4-3: Number of Financial Institutions as of End 1988 and 89, The Philippines

	1988	1989
Commercial Banks	1,774	1,788
Thrift Banks	664	674
Specialized Government Banks	76	76
Rural Banks	1,048	1,040
Non-Bank Financial Institutions	3,354	3,579
Total	6,916	7,157

Source: The Central Bank of the Philippines

Table II-4-4: Outstanding Deposits of the Banking System as of End 1988 and 89, The Philippines

	(Unit: billion pesos)					
	1989			1988		
	Total	Demand Deposit	Savings Deposit	Total	Demand Deposit	Savings Deposit
Commercial Banks	246	30	130	199	24	110
Saving Banks	14		10	12		9
Private Development Banks	5		3	5		2
Stock Savings & Loan Associations (SSLAS)	3		1	2		1
Specialized Government Banks	3		1	4		2
Rural Banks	6		4	5		4
<b>Total</b>	<b>277</b>	<b>30</b>	<b>149</b>	<b>227</b>	<b>24</b>	<b>128</b>

Source: The Central Bank of the Philippines

Table II-4-5: Outstanding of Loans and Funds, The Philippines (1989 and 88)

(Unit: billion pesos)

	Outstanding Amounts of Loans		Outstanding Amounts of Funds	
	1989	1988	1989	1988
Commercial Banks	290	129	420	342
Savings Banks	19	14	33	25
Specialized Government Banks	13	10	14	14
Rural Banks	9	8	12	11
<b>Total</b>	<b>331</b>	<b>161</b>	<b>479</b>	<b>392</b>

Source: The Central Bank of the Philippines

Table II-4-6: Loans Outstanding of Commercial Banks by Industry,  
The Philippines (1988 and 89)

(Unit: billion pesos)

	1988	1989	Growth Rate (1989/1988) (%)
Agriculture, Fisheries & Forestry	13	21	62
Mining & Quarrying	8	16	100
Manufacturing	47	114	143
Construction	2	5	150
Financing, Insurance, Real Estates and Business Services	10	29	190
Others	49	105	114
<b>Total</b>	<b>129</b>	<b>290</b>	<b>125</b>

Source: The Central Bank of the Philippines

Table II-4-7: Philippine Offshore Banking System  
(1987-89)

	Amount (million US\$)
1987	3,367
1988	2,991
1989	2,749

Source: The Central Bank of the  
Philippines

Table II-4-8: Relative Sizes of The Largest Banks in Selected Asian Countries, 1986

Country/Bank	Total Assets (million US\$)	Ratio to GNP
Bangladesh/Somali Bank	1,343	0.091
India/State Bank of India	32,666	0.168
Indonesia/Bank Negara Indonesia	7,383	0.085
R.Korea/Bank of Seoul	18,485	0.209
Malaysia/Bank Bumiputra Malaysia	6,730	0.211
Pakistan/Habib Bank	5,091	0.141
Thailand/Bangkok Bank	10,163	0.241
Philippines/PNB (Government)	1,705	0.052
Philippines/Bank of the Philippines Island (Private)	1,135	0.035

Source: The Banker, September 1987

Table II-4-9: Flow of Loanable Funds (M2/GDP)\*

	The Philippines	Korea	Thailand
1965	21.4	12.1	28.2
1970	23.5	34.8	30.6
1980	25.6	33.1	36.8
1983	29.4	38.5	48.4
1984	22.5	36.8	54.8

Note: \*M2 = MONEY + QUASI-MONEY; GDP = Gross Domestic Product

Sources: 1. For Korea and Thailand - IMF International Financial Statistics  
 2. For the Philippines - Central Bank of the Philippines

Table II-4-10: Accumulated Outstanding Foreign Debt, The Philippines (1980 and 1985-88)

	Outstanding Foreign Debt (million US\$)
1980	17,422
1985	26,643
1986	28,330
1987	30,052
1988	29,448

Source: World Debt Table, Vol.2, 1989-90 (IBRD)

Table II-4-II: Balance of Payment, The Philippines (1986-88)

(Unit: million US\$)

	1986	1987	1988 (preliminary)
Current Account Balance	1,022	-444	-373
Trade Balance	-202	-1,017	-1,085
Non-trade Balance	783	0	-77
Transfer	441	573	789
Foreign Exchange Reserves	2,459	1,959	2,059

Source: Philippine Statistical Yearbook 1989, NEDA

Table II-4-12: ODA Commitments to the Philippines by Country

(Unit: \$ million)

Donor	1988	Component ratio (%)	Aggregate in 1978-88 (A)	Including credit commitments (B)	B/A (%)	Including grants, technological (C) cooperation, etc.	C/A (%)
Multilateral	916	100.0	6,789	6,497	95.7	292	4.3
World Bank	506	55.2	4,171	4,169	99.9	2	0.1
Asian Development Bank	384	41.9	2,257	2,246	99.5	11	0.5
U.N.	9	1.0	192	—	—	192	100.0
EC	10	1.1	81	—	—	81	100.0
OPEC	7	0.8	48	48	100.0	—	—
IADF	—	—	40	34	85.0	6	15.0
Bilateral	1,319	10.0	6,589	4,074	61.8	2,515	38.2
Japan	881	66.8	3,750	3,123	83.3	627	16.7
USA	88	6.7	1,800	361	20.1	1,439	79.9
West Germany	39	3.0	262	170	64.9	92	35.1
Canada	20	1.5	129	—	—	129	100.0
Australia	17	1.3	128	—	—	128	100.0
Italy	90	6.8	93	60	64.5	33	35.5
Spain	75	5.7	91	91	100.0	—	—
Holland	57	4.3	63	43	68.3	20	31.7
Belgium	8	0.6	56	42	75.0	14	25.0
France	1	0.1	53	50	94.3	3	5.7
Switzerland	40	3.0	40	40	100.0	—	—
Others	3	0.2	124	94	75.8	30	24.2

Source: National Economic Development Authority (NEDA) of the Philippines.

**Table II-4-13: Direct Investment Approved by BOI  
(1986-89)**

	Approved by BOI (million pesos)
1986	3,146
1987	8,359
1988	16,944
1989 (Jan.-Oct.)	40,520

Source: The Central Bank of the  
Philippines

**Table II-4-14: National Government Cash Operations, The Philippines (1986-89)**

(Unit: billion pesos)

	1986	1987	1988	1989 (preliminary)
Revenues	79.2	101.2	112.9	152.7
Tax Revenues				
Non-tax Revenues	65.5	85.4	90.3	122.4
Others	13.7	15.8	22.6	30.3
(Of which U.S. Economic Assistance)	(6.2)	(3.1)	(2.0)	
Expenditures	110.5	121.2	136.1	171.7
Surplus/Deficit	-31.3	-20.0	-23.2	-19.0

Source: Ministry of Finance of the Philippines



**Table II-4-15: Weighted Average Interest Rates on Secured Loans  
Granted by Sample Commercial Banks, The Philippines  
(1988 and 89)**

(Unit: %)

Term	Dec.1988	Dec.1989
Within 60 days	16.889	25.436
61-90 days	17.982	24.248
91-180 days	16.338	23.090
181 days - within 1 year	15.637	23.018
Over 1 year - within 2 years	18.604	21.780
Over 2 years	17.939	22.611

Source: Philippine Financial Statistics, The Central Bank of the Philippines

**Table II-4-16: Financial Assistance/Loans Grated to Small and Medium  
Enterprises by Major Financing Programs, The Philippines  
1987-89)**

(Unit: million pesos)

	1987		1988		1989	
	No.	Amount	No.	Amount	No.	Amount
TST-SELA *1	2	0.5	110	31.3	158	93.3
IGLF *1 *2	158	322.7	555	1,528.4	394	1,239.7
ULFP *2	562	38.0	1,384	44.0	n.a.	81.0
EIMP *2	57	110.5	39	68.6	n.a.	196.0
PHILGUARANTEE *2	10	25.6	11	25.7	8	12.9
TUFP *2	19	9.4	9	4.4	n.a.	4.0
DBP *2	535	159.4	1,476	938.5	1,338	1,434.3

Notes: \*1 For micro-enterprises

\*2 For cottage, small and medium enterprises

Source: Bureau of Small and Medium Business Development, Department of Trade and Industry

### **III. Metal Engineering (Die Making for Metals)**

### **III. Metal Engineering (Die Making for Metals)**

#### **1. The International Development of the Parts Processing and Machinery Assembly Industries and the Die Making Industry**

##### **1-1 Introduction**

###### **(1) The Die Making Industry**

Only in a very few countries has the die making industry been officially recognized as an independent industrial sector in terms of statistics -- namely, Japan and nations such as the Republic of Korea and China which followed Japan's lead. In the United States, for example, dies are grouped together with jigs, fixtures, and specialized equipment under the heading of "tooling" (code SIC 3544) in Department of Commerce statistics. This group of products is then combined with precision processing equipment to form a single industry sector. In West Germany, dies are classified together with cutting tools and measuring tools under the heading of "machinery and tool manufacturing industries."

These differences in statistical definitions make it difficult to accurately compare die making industries around the world. Internationally-accepted terms do exist, however, in the form of special tooling classifications drawn up by ISTA (the International Special Tooling Association), a worldwide organization of die making associations (see Table III-1-1). The term "special tooling" itself is used in contrast to standard tooling and signifies special tools which are for use in mass production and for which standard items cannot be prepared in advance. The present survey will cover metal engineering-related products falling under the classification of dies and molds in the above Table.

###### **(2) Overview of the World Die Making Industry**

Based on production figures submitted by ISTA members, the membership ratios for industrial associations in each country, and the estimated production shares of association member firms, worldwide production of dies and molds was estimated at approximately US\$39 billion in 1988, with annual growth of at least 10% recorded each year since.

Japan is the leading producer among the ISTA member countries, followed by the United States, West Germany, and R. Korea (Table III-1-2. Production data on Italy, which was in the 4th position until 1986, are not available for 1988.). ISTA estimated Japan accounted for 28% of world die/mold production, the United States 16%, and ISTA member countries in total 58%. Among the EC nations, production by Spain and Portugal has been growing rapidly.

World industrial production in general is concentrated in three major regions -- North America, Europe, and Southeast Asia (including Japan). In the case of dies and molds, the production ratios for these regions are roughly 2 : 1.5 : 2, with other areas such as Eastern Europe and Central and South America estimated responsible for another 1.5 (Shoichi Kuroda, *Die Technology*, January 1990).

###### **(3) The Die Making Industry and the Processing and Assembly Industries**

Table III-1-3 shows the ratio of die production in Japan classified by use. More than 50% of the dies produced are for metal processing and about 40% of these are dies

for press processing. Another 40% is for plastic molding, and the remaining 10% for molding glass, rubber and other materials. The users of the processed metal materials and metal parts produced through metal processing are the automobile, electric appliance and industrial machinery industries. Among these, the automobile industry accounts for a large share. The die making industry can develop only if it is supported by the development of such user industries. At the same time, from a technological viewpoint, the user industries including processed metal materials, parts manufacturing and assembling can develop only if they are supported by the die making industry. If the die making industry is weak, the user industries are forced to rely on imported parts or dies, making it impossible to develop well-balanced industries.

## **1-2 International Development of the Processing and Assembly Industries**

### **(1) International Development in the Assembly Industry**

Until recently, production of automobiles, motorcycles, home electrical appliances and agricultural equipment was concentrated in North America, Western Europe and Japan, and even today this situation has remained basically unchanged. A large number of developing countries, however, have been very active in promoting local production of these products. Furthermore, in their strategies to secure markets in these nations, the world's leading manufacturers of such products have begun shifting their production operations to these nations.

Until recently, the typical pattern by which developing countries began with knock-down production of automobiles, motorcycles, home electrical appliances, or agricultural equipment was as follows:

1. CBUs (Completely Built-up Units) are imported and widely distributed.
2. The local government adopts a policy of local production in accordance with the increase in imports. Typical methods used include a ban on imports or the introduction of tariff barriers.
3. Local production is begun by a foreign-affiliate corporation (a whole subsidiary, joint venture, or technical tie-up). Initial SKD production is gradually phased into CKD, and local content is increased.

In the past, this type of production targeted only local demand in the host country and was not intended for export to other nations. Recently, however, Japan and other industrialized nations have begun moving production operations to developing countries, and the ASEAN region in particular, with the objective of exporting all or most of production.

During the five years from 1980 to 1985, the Japanese electronics industry established an average of 4.5 production affiliates per year in the Asian region, while for 1986 and 1987 the figure jumped to 19.5. The same two averages for the auto parts industry were 6.0 and 17.5. Thus not only is new investment increasing, but existing production affiliates are upgrading their facilities. The following are among the factors responsible for this situation:

1. The Asian region can provide a significant cost advantage in the form of low labor costs, etc. due to the depreciation of local currencies with respect to the yen and European currencies.
2. The investment climate in the Asian region has improved due to improved technological standards and the expansion of infrastructures including human resources for the processing and assembly industries.
3. Bolstered by the activities of foreign firms, local governments have been active in promoting the development of technology-intensive industries, which until recently

had lagged behind their counterparts in other nations, and linkage sector such as the parts industry.

The most remarkable international development was achieved by the home electrical appliance (white goods) and consumer electronics (brown goods) industries. In the past, these industries had been responsible for the production of air conditioners, washing machines, refrigerators and other home electrical appliances for sale on local markets, but in a short period of time the following movements emerged: 1) a shift to production for the international market centering around audio equipment and other low- and mid-range products; 2) a shift away from audio equipment to color television sets and VTRs; and 3) a shift away from consumer electronics equipment to copiers, facsimile machines, and other commercial and industrial equipment (See Table III-1-4).

Furthermore, in advanced electronics sectors such as semiconductors, cellular telephones (for use in automobiles), and floppy and hard disk drives, production was intended expressly for export from the beginning. As a result, the U.S. semiconductor industry moved virtually all of its production bases to overseas such as NIEs and ASEAN countries, to an extent that today assembly plants can no longer be found in California's famed Silicon Valley.

In the case of the automobile industry, production continues to rely heavily on local demand, with a heavy dependence on imported parts from such countries as Japan. This situation stems from the fact that demand in these countries is seldom adequate to meet the minimum required per-vehicle production volume of 100,000 units for the four-year model change cycle. It is interesting to note that in countries such as R. Korea and Malaysia, where local demand has reached significant levels, production affiliates are now in the process of developing export strategies.

Furthermore, the NIEs, thought at one time to be the most suitable locations for the establishment of assembly affiliates, have been hit by rapidly increasing labor costs and unfavorable exchange rate fluctuations in recent years. Consequently, an increasing number of firms which initially gave strategic precedence to the NIEs are now shifting their operations to ASEAN countries. This trend can be found not only among foreign affiliates which located in the NIEs but among companies from the NIEs as well. Although the investment climate in the ASEAN countries lags behind that of the NIEs in terms of infrastructure, they offer an important advantage mainly in the area of labor costs.

## (2) International Development in the Parts Industry

These kinds of changes in the environment surrounding the assembly industry are applicable to the parts industry as well. In the past, the U.S. parts industry boasted the largest production volume of any in the world. From around 1980, however, the U.S. economy began to lose its previous robustness, and the relative strength of the machinery industries began to decline. In particular, the period 1977-1980 saw a rapid drop in production levels due to the efforts of Japan and the Asian NIEs. A large number of skilled workers were lost during this process, making it difficult for the industry to resume prior levels of production even after prosperity returned. In West Germany and other Western European nations, production levels have either remained at previous levels or fallen slightly.

Development of parts industries in the Asian NIEs was hindered by the factors indicated below, resulting in a heavy dependence on imports:

1. In their efforts to achieve industrialization, these countries emphasized high-added-value sectors in their investment programs to the detriment of backbone industries such as the parts sector.

2. The parts industry suffered from a low profit ratio with respect to capital investment, making investment difficult.
3. Due to these reasons, the parts industry found it difficult to attract superior manpower.

In response to the changes in the economic environment noted above, however, efforts by the NIEs have brought about the following changes:

1. Local production of parts and components and procurement from neighboring countries are both increasing, replacing imports from the advanced nations.
2. An increasing number of companies are viewing Asia as the most attractive parts supply base in their global strategies and thus establishing their procurement centers here.
3. Efforts to develop an organic linkage among heretofore independent production operations in Asia are emerging. As can be seen in Figs. III-1 to III-4, for example, automobile and auto parts manufacturers having a wide range of tie-ups across Asia are studying the possibility of mutually complementary division of labor systems such as the so-called "Brand to Brand Complementation Scheme." Similar movements can be seen in the home electrical appliance and electronics fields.

One important future topic will be the reorganization of overseas production bases. It is thought that moves to put all world regions under the management of each relevant regional HQ and link production bases in consideration of individual production elements and markets will become more evident.

Drawing special attention in these efforts towards international development in the parts industry are Japanese parts manufacturers. As described above, even parts manufacturers in the NIEs have yet to achieve adequate levels of technological sophistication. As a result, Japanese firms, with a reputation for superior technology and responsiveness to small-lot orders and short delivery schedules, are increasingly being requested by Japanese assembly firms to accompany them in establishing overseas operations and supply parts locally. Typically this type of situation involves small and medium-sized parts manufacturers with little experience in foreign investment. In the past, these firms seldom undertook such projects unless the country in question could offer a favorable investment climate. In the future, though, the number of such cases is expected to increase.

### 1-3 Trends in the Die Making Industry

Demand for dies is expected to increase further in the future. Reasons for this, in addition to the growth of the processing and assembly industries, are as follows:

1. The model change cycles for automobiles, home electrical appliances, and electronics products are becoming shorter and production lots smaller and more diverse, resulting in a larger number of product models.
2. The international development of the processing industry has brought about an increase in the number of production operations, resulting in small-lot production by multiple manufacturing bases. Consequently, more dies are needed than in the past.

Compared with the assembly and parts industries, international development by the die making industry in developing countries has lagged considerably behind. Development in this industry requires not only improved processing technologies but better design technologies, the securing of suitable die materials, and the resolution of production-related problems, including establishment of the production management technologies required to maintain strict delivery schedules, as well as economic problems stemming from insufficient production volume, and so on.

Very few of the die manufacturers in the NIEs are capable of making dies of high enough accuracy to satisfy the needs of processing and assembly firms producing for the export market. The supply source of large dies and high-precision dies remains limited to Japan and Western Europe.

In the United States, most dies, together with auxiliary equipment and parts, used to be fabricated for in-house use by large assembly firms. This was because outside suppliers could not be trusted in terms of delivery schedules, quality, and maintenance. As a result, although there are some medium-sized companies specializing in die making, their number is limited and they lack sufficient production capacity. Furthermore, the owners of these companies are typically unenthusiastic about investment. Overall, it appears that the U.S. industry has lost its previous vitality.

The past experiences of development of die making industries in Japan, the NIEs and the developing countries suggest that the development of die making industries can be roughly broken down into the following three stages:

1. First stage: Beginning of local production of simple parts by direct investment or joint ventures and technical tie-ups with assembly firms from the industrialized nations. Beginning of in-house fabrication of processed materials. Dies are imported from the parent firm, and a die and jig division is set up for the maintenance and partial in-house fabrication of dies. Local engineers are sent to the parent firm for training and engineers dispatched from the parent firm to aid in the transfer of die design and fabrication technologies to the local partner.

2. Second stage: As the assembly industry grows, parts subcontractors for the parent company establish operations in the country and local parts subcontractors are established, thereby promoting development of the parts industry. In this stage, most dies are produced in-house. Technology is transferred from the newly-relocated parts manufacturers.

3. Third stage: Development in the assembly and parts industries promotes the transfer of die making technology. Engineers and technicians who have mastered die making technology often break off to form their own companies, either alone or together with partners. Higher-quality facilities, more advanced technology, and higher standards of training for workers are required. The function of in-house die making shop becomes one of makeshift measures (including in-house fabrication and maintenance), and the industry focus shifts to the new independently-established specialized firms.

Japan is currently in the third and final stage of development. The NIEs and ASEAN countries can be found in each of the three stages, according to the development of their assembly and parts industries. Companies in the Philippine die making industry tend to fall in one of the first two stages of development, but a small number of firms have already entered the third stage.

#### **1-4 Structural Changes in the Die Making Industry in Japan**

##### **(1) Structural Characteristics of the Japanese Die Making Industry**

The history of die making industry in Japan goes back further than in the NIEs or ASEAN nations, but full-scale development began only in the late 1950s. At the time, firms engaged in the mass production and assembly of home electrical appliances, automobiles, motorcycles, and electronics equipment were experiencing rapid development, and the die making industry grew correspondingly. Japanese die manufacture was dominated by products for in-house use when the assembly and parts industries were in the early stages of development. According to a 1957 survey, 65% of

all dies produced at the time were destined for in-house use. This ratio fell steadily, however, and by 1988 had dropped to 18%.

Increasing specialization brought with it a trend towards smaller manufacturers. According to 1987 industrial statistics, 79.3% of the 11,656 die manufacturing companies in Japan, or 9,240 firms, had nine or fewer employees.

This situation is true not only of Japan but of the world in general. In the United States, the average die manufacturing plant has 12 employees, while in the EC the figure is 17. This is due to the fact that die manufacturing technology is accumulated on a personal experience basis. 10 is the greatest number of employees that an owner versed in fabrication technologies can manage at once; any more and intermediate management becomes necessary, creating a barrage of economic and management-related problems.

On the other hand, the reliance on facilities and equipment is increasing. The move in recent years towards NC and CNC machine tools, specialized equipment, FMS, and FA has increased the cost of facilities and the burden of capital investment. On the design front, there have been remarkable developments in the area of CAD and CAM. This is the result of factors such as the following:

1. The diversification of products at customer firms, the shortening of product development cycles, and corresponding demands for the shortening of die delivery times
2. Increasingly complex die shapes and requirements for higher precision
3. A shortage of engineers and technicians with die making expertise coupled with rising labor costs

One other important characteristic of the Japanese die making industry is its access to highly-developed supporting industries. The first of these is the sector responsible for supplying die materials. Dies normally involve the use of special high-grade alloy steels, and quality materials can be found in only a handful of the industrialized nations, including Japan, the United States, West Germany, and Sweden. In Japan, desired raw materials can be easily acquired. The second important supporting sector is heat treatment and surface treatment. Heat treatment, hard chromium plating, and other sophisticated surface treatment technologies are used to extend the lifetime of dies. Japan is blessed with an abundance of firms specializing in such techniques, and it is easy for die manufacturers to contract their services. The third area is the progress made in standardization of die components. As a result, components can be easily acquired, eliminating the need for in-house fabrication of all parts.

In conclusion, the Japanese die making industry is characterized by a high degree of division of work, specialization, and sophistication.

As a result, the industry continues to maintain its superiority over industries in other nations. Following are some of the more important advantages held by Japanese die manufacturers.

1. High labor productivity: Sales per employee in 1988 were slightly less than three times the average for ISTA member countries.
2. Short delivery times: Delivery times of only half the world average have been accomplished through worker diligence and sophisticated facilities and equipment.
3. A high degree of mechanization and aggressive owner investment in mechanization.
4. High quality standards supported by quality control activities.
5. An excellent reputation, resulting from strict observance of delivery dates and good service.

## (2) Government Policies for Promotion of the Japanese Die Making Industry



As described above, joint promotion activities by government and the private sector have played an important role in promoting the development of the Japanese die making industry. (Annex III-3 contains a review of Japanese machinery industry-related policies and programs from 1955 through the early 1970s. The Japanese machinery industry of this period had numerous similarities to the current situation in the Philippines, and this report may be of reference.) With the objective of promoting the machinery industry, the government in 1956 established the Machinery Industry Promotion Act and, based on this act, formulated basic rationalization plans and corresponding implementation plans for each of the designated industry sectors, including the die making industry. During the formulation of these plans, a die and mold committee consisting of representatives from die manufacturers, various die user industries, academia, and technical guidance organizations was formed with the objective of promoting participation by these groups. The nationwide Japan Die & Mold Manufacturers Association (JDMA) was established based around this committee and later made significant contributions to upgrading industry standards.

The basic rationalization plans were characterized as follows:

1. At the time, a high percentage of the dies produced were intended for in-house use. Based on the recognition that future production would require the purchase of high-priced, high-precision machine tools, the promotion of a system for specialized die making was given as one of the policy objectives.
2. Based on this objective, the specialization of the die making industry according to product grade and the promotion of facility modernization resulted in improved die quality and reduced manufacturing costs. Government assistance for the modernization and rationalization of die making facilities included assistance for facility investment in the form of easily-repayable loans. This basic policy was later continued under other related legislation. The application of small business-related promotion policies was also continued in light of the large number of small and medium-sized firms in the die making industry.

JDMA members included not only companies specializing in die manufacture but also (as supporting members) user firms, machine tool manufacturers, tool makers, and material suppliers. The committee was and is engaged in the following types of activities: 1) acting as a liaison with government agencies concerning such matters as financing, taxation, and import duties for the modernization and rationalization of corporate operations; 2) continuous surveys of the production structure; 3) market research, export promotion, and activities to promote the adoption of modern management techniques, such as cost analysis, at member firms; and 4) activities to promote the adoption of modern technologies, including market and industry surveys for Europe and the United States, the holding of study sessions on new technologies, skills certification programs, and the preparation of industry standards. Recently, the committee has also been engaged in international technical cooperation activities.

### (3) Future Problem Areas

Die user sectors in Japan have been expanding their overseas operations. Since they are not satisfied with technological levels in the host countries, an increasing number of them are requesting that Japanese die manufacturers accompany them when they locate abroad.

In the past, the Japanese die making industry was characterized by high quality, high levels of labor productivity and short delivery schedules. These were mainly

achieved by competent craftsmen. Since many of the die manufacturers are small and medium-sized companies, they have been especially hard hit by the general labor shortage currently facing the Japanese economy. As a result, it is becoming extremely difficult to continue local production of all dies. Production of those dies with low value added is rapidly losing its feasibility.

In the future, therefore, the Japanese die making industry will be forced to adopt an international strategy in which production of high value added products such as high-precision dies and sophisticated dies is concentrated in Japan and other production relocated overseas; or in which products are processed to a certain degree overseas and then sent to Japan for final finishing only.

#### (4) Opinions of Japanese Die Manufacturers Concerning Overseas Development

JICA Study Team conducted a survey of 249 Japanese manufacturers and users of dies during June-August 1990. Of the 32 firms which responded to the questionnaire, 12 had already established overseas production operations (eight of the 12 manufactured dies for outside sale; two, for use in-house).

11 firms had completed a total of 21 investment projects in the Asian region. A breakdown of these projects by country is as follows: the Philippines and Malaysia, four each; R. Korea, Singapore, and Thailand, three each; Taiwan, two; Hong Kong and Indonesia, one each.

The most common reason given for investment in Asia was "access to local markets," noted by 12 firms (57.1% of total 21 projects), followed by "to counter the effects of the strong yen," by eight (38.1%), "labor" and "exports to third countries," each by seven (33.3%), and "labor costs," by five (23.9%). (Since multiple responses were allowed, the total exceeds 100%)

In response to a question concerning the future establishment of Asian production bases and plans for exchange with local die making industries and companies, five firms (15.6% of 32 firms) indicated that they were "currently studying the possibility," 12 (37.5%), that there was "room for study in the future," making 17 (53.1%) saying that future investment and exchange were "possible." 12 of the responding firms (37.5%) answered that they had "no such plans."

The 19 firms 17 indicating possibilities and two others were then asked which country in the region they were considering. Five each answered the Philippines and R. Korea; three, Thailand; two each, China, Malaysia, Singapore, and Indonesia; and one, Taiwan. Concerning the type of investment, six firms (27.3%) answered "independent investment"; five firms (22.7%), in coordination with the investment projects of parent companies, affiliates, or customers; and 11 (50.0%), "other types of technical cooperation, etc." It is interesting to note that fully half of the firms answered that even if they did undertake investment projects they would limit themselves to technical cooperation.

The countries and types of investment being considered by the five firms currently studying plans are shown in Table III-1-5.

Company B is engaged in the manufacture of dies for die casting and forging, and for the past several years has been accepting trainees from R. Korea. Exchanges with die making industries in various Southeast Asian nations have provided this company with a firm understanding of current technological standards in these nations and convinced

management that it was still too early to consider a relocation of operations to countries such as the Philippines, Thailand, Singapore and Malaysia.

Company E is a producer of diecast products whose subsidiary is engaged in the manufacture of dies. Its plans for investment in the Philippines have already entered the implementation phase, and operations are scheduled to begin by 1991. Having long ago decided that the hiring of laborers and engineers would become increasingly difficult in Japan, this company made the decision that sooner or later it would shift production operations abroad and began studying the current plan five years ago. Concerning the reasons behind this decision, the company indicated that it had chosen the Philippines because, based on a variety of surveys and a long-term perspective, there would be "no other firms investing in the Philippines." With no investment by competitors, it would be possible to take advantage of this early start and gain a foothold on the future local market, even if the project required a sizeable initial investment. In addition, the firm predicted that, sooner or later, production in Japan would run into supply-related difficulties.

Table III-1-1: Field of Special Tooling Defined by ISTA

1. Dies			
1.1 Dies for Pressing, Stamping, Punching			
1.1.1 Single Operations			
1.1.2 Progression			
1.1.3 Compound			
1.1.4 Transfer			
1.1.5 Blanking			
1.1.6 Fine Blanking			
1.1.7 Piercing			
1.1.8 Shearing			
1.1.9 Notching			
1.1.10 Bending			
1.1.11 Drawing			
1.1.12 Turret Punch			
1.1.13 Other			
1.2 Dies for Forming			
1.2.1 Swaging			
1.2.2 Coining			
1.2.3 Deep Drawing			
1.2.4 Hydraulic Bulging			
1.2.5 Explosion			
1.2.6 Stretch			
1.2.7 Hammer			
1.2.8 Other			
1.3 Dies for Forging			
1.3.1 Hot			
1.3.2 Cold			
1.3.3 Trimming			
1.3.4 Other			
1.4 Dies for Extruding			
1.4.1 Metal			
1.4.2 Plastics			
1.4.3 Other			
1.5 Dies for Wire Drawing			
1.5.1 Hot			
1.5.2 Cold			
1.6 Dies for Powders			
1.6.1 Metallic			
1.6.2 Non Metallic			
1.7 Other Dies			
	2. Molds		
	2.1 Molds for Plastics		
	2.1.1 Injection-Thermoplastic		
	2.1.2 Injection-Thermosetting		
	2.1.3 Compression-Thermosetting		
	2.1.4 Transfer-Thermosetting		
	2.1.5 Blow		
	2.1.6 Vacuum		
	2.1.7 Rotational		
	2.1.8 Laminating		
	2.1.9 Encapsulation		
	2.1.10 Casting		
	2.1.11 Other		
	2.2 Molds for Rubber		
	2.2.1 Injection		
	2.2.2 Compression		
	2.2.3 Transfer		
	2.2.4 Casting		
	2.2.5 Encapsulation		
	2.2.6 Other		
	2.3 Molds for Mineral Materials		
	2.3.1 Glass		
	2.3.2 Ceramics		
	2.3.3 Concrete		
	2.3.4 Other		
	2.4 Molds for Casting		
	2.4.1 Pressure		
	2.4.2 Low Pressure		
	2.4.3 Gravity		
	2.4.4 Investment (or Lost Wax)		
	2.4.5 Other		
	2.5 Molds for Other Materials		
	2.5.1 Food		
	2.5.2 Packaging Materials		
	2.5.3 Compound Materials		
	2.5.4 Composite Fibers		
	2.5.5 Other		
	3. Patterns		
	3.1 Metal		
	3.2 Wood		
	3.3 Plastic		
	3.4 Other		
	4. Jigs and Fixtures		
	4.1 Machining		
	4.2 Assembling		
	4.3 Welding		
	4.4 Testing		
	4.5 Gauging		
	4.6 Other		
	5. Standard Parts		
	5.1 For Dies		
	5.2 For Molds		
	5.3 For Jigs and Fixtures		
	5.4 Other		
	6. Precision Machining		
	7. Special Purpose Machines		

Source: "Kata-Gijyutsu" (Die and Mold Technology), Jan., 1990

**Table III-1-2: Die/Mold Production in ISTA Member Countries, 1988**

	Production (Million US\$)	% of Total	% of ISTA Total
1 Japan	10,753.5	27.5	47.3
2 U.S.A.	6,359.0	16.3	28.0
3 West Germany	1,835.3	4.7	8.1
4 Republic of Korea	985.1	2.5	4.3
5 France	713.4	1.8	3.1
6 Spain	625.2	1.6	2.8
7 U.K.	527.1	1.3	2.3
8 Switzerland	376.7	1.0	1.7
9 Sweden	140.4	0.4	0.6
10 Belgium	126.2	0.3	0.6
11 Portugal	115.2	0.3	0.5
12 Finland	92.2	0.2	0.4
13 Netherlands	74.4	0.2	0.3
14 Italy	n.a.	-	-
15 Denmark	n.a.	-	-
ISTA Total	22,723.7	58.2	100.0
Others	16,338.8	41.8	
Total	39,062.5	100.0	

Source: ISTA

**Table III-1-3: Production of Dies/Molds by Type in Japan, 1989**

	Share (%)
Dies and Molds for:	
Pressing	40.6
Forging	4.3
Casting	3.2
Die Casting	5.3
Plastics	38.2
Glass, Rubber & Others	8.4
Total	100.0

Source: Year Book of Machinery Statistics of Japan

**Table III-1-4: Worldwide Trends in Electronic and Electrical Equipment Exports (1984, 1988)**

	1984		1988		Growth Rate 1984-1988 (% per year)
	Value (US\$ million)	Share (%)	Value (US\$ million)	Share (%)	
For Household Use (white goods)					
World	8,510	100.0	16,240	100.0	17.5
U.S.A.	344	4.0	764	4.7	22.1
Japan	2,089	24.5	2,026	12.5	- 0.8
Southeast Asia	1,610	18.9	3,898	24.0	24.7
Republic of Korea	286	3.4	1,355	8.3	47.5
Taiwan	387	4.5	659	4.1	14.3
Hong Kong	662	7.8	1,060	6.5	12.5
Singapore	208	2.4	445	2.7	21.0
Asian NIES Total	1,543	18.1	3,519	21.6	22.9
EC	3,497	41.1	7,506	46.2	21.0
West Germany	1,047	12.3	2,702	16.6	26.8
For Household Use (brown goods)					
World	23,422	100.0	44,065	100.0	17.1
U.S.A.	512	2.2	991	2.3	18.0
Japan	14,704	62.8	16,764	38.0	3.3
Southeast Asia	4,042	17.3	16,050	36.4	41.2
Republic of Korea	1,373	5.9	4,821	10.9	36.9
Taiwan	361	1.5	2,919	6.6	686.6
Hong Kong	1,067	4.6	2,404	5.5	22.5
Singapore	1,035	4.4	4,559	10.3	44.9
Asian NIES Total	3,836	16.4	14,703	33.3	40.0
EC	3,142	13.4	6,875	15.6	21.6
West Germany	1,392	5.9	2,538	5.8	16.2
For Computers, Office Machines					
World	30,479	100.0	74,781	100.0	25.2
U.S.A.	7,623	25.0	11,569	15.5	11.0
Japan	9,641	31.6	26,825	35.9	29.2
Southeast Asia	2,746	9.0	15,064	20.1	53.0
Republic of Korea	352	1.2	2,790	3.7	67.8
Taiwan	854	2.8	5,304	7.1	57.9
Hong Kong	891	2.9	2,040	2.7	23.0
Singapore	622	2.0	4,019	5.4	59.4
Asian NIES Total	2,719	8.9	14,153	18.9	51.0
EC	8,212	26.9	15,994	21.4	18.1
West Germany	2,365	7.8	3,769	5.0	12.4

Notes: White Goods: Air conditioners, washing machines, refrigerators, etc.

Brown Goods: Television receivers, VTR, radio receivers, etc.

Source: "JETRO Sensor (Japanese language)", Sept. 1990

**Table III-1-5: Overseas Investment by Japanese Die Manufacturers  
(Results of a Questionnaire Survey)**

	Classification	Investment Site	Type of Operations	Annual Sales	No. of Employees
Company A	Manufacturer and user	Republic of Korea	In coordination with Japanese customer	US\$26.9 Mil.	90
Company B	Manufacturer	Republic of Korea	Independent	US\$11.5 Mil.	82
Company C	Manufacturer	Singapore	Technical cooperation, etc.	US\$61.5 Mil.	410
Company D	Manufacturer	Taiwan	Independent	US\$192.3 Mil.	700
Company E	User	The Philippines	Independent	US\$23.1 Mil.	120

Source: JICA Study Team

**Table III-1-6: Training Facilities for Mold and Die Engineers in the Republic of Korea**

Facility	Department/Course	Training Period	Student No.s/yr.	Remarks
Kyeonggi Industrial Open University	Mold and die design	4 years	40	covers 1980
Pusan Industrial Open University	Mold and die design	4 years	40	established 1985
Yuhangule Industrial University	Mold and die design	2 years	80	established 1985
Cheonun Industrial University	Mold and die design	2 years	80	established 1985
Taeyu Industrial University	Mold and die design	2 years	80	established 1985
Central Occupational Training Institute	Technician course	2 years	30	covers 1968
Handouk Occupational Training Institute	Technician course	2 years	30	covers 1973
Hanbaek Occupational Training Institute	Technician course	2 years	20	covers 1978
KIMM	Tool design	2 years	100	

Source: Minutes from the meeting of the special committee of the Korea and Japan Medium and Small Enterprise Association

**Table III-1-7: Summary of Job Certification System of Republic of Korea**

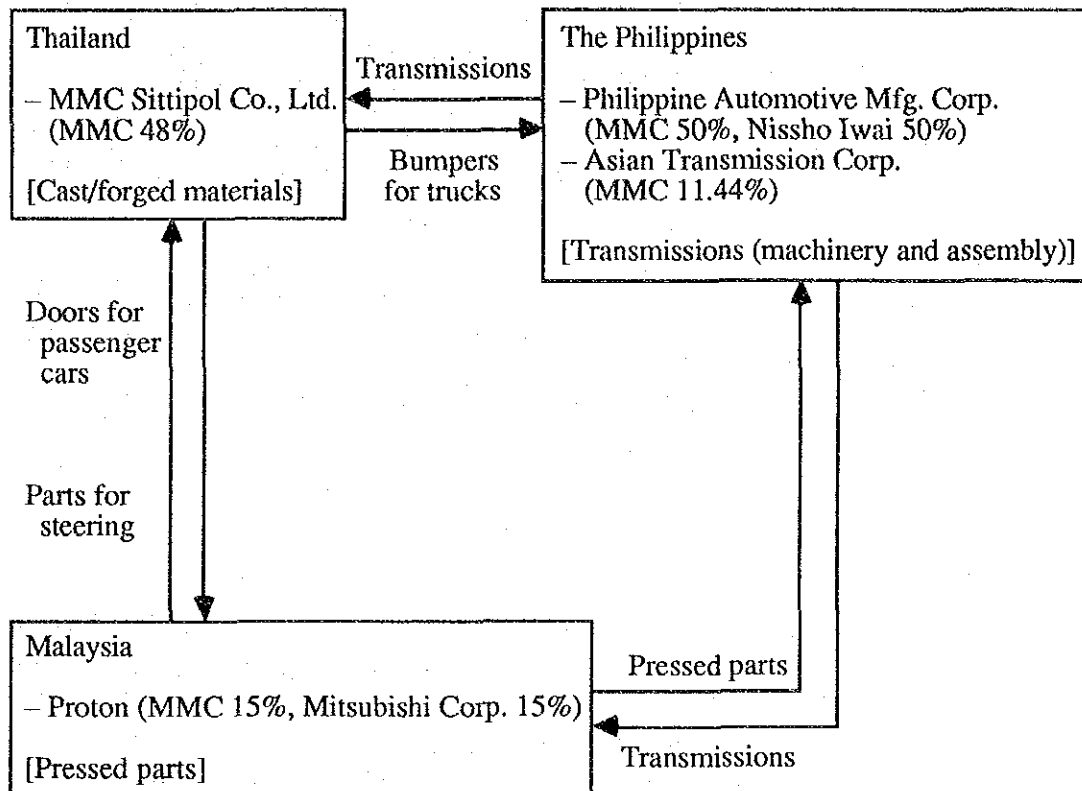
Class	Technical qualification	Job qualification	Standard of certification
Leader	Chief engineer	Chief technician	Person having the highest class of skill in job and ability to provide guidance in work control and supervision of skills.
Class 1	Engineer class 1	Technician class 1	Person having high class of skill in job and ability to perform work control and guidance.
Class 2	Engineer class 2	Technician class 2	Person having medium class of skill in job and ability to perform work control and related work.
Assistant	-	Assistant technician	Person having lower class of skill in job and ability to assist higher level work and perform work under guidance from superiors.

Source: Korea Vocational Training & Management Agency



Fig. III-1-1: Automaker Brand-to-Brand Complementation Schemes (1)

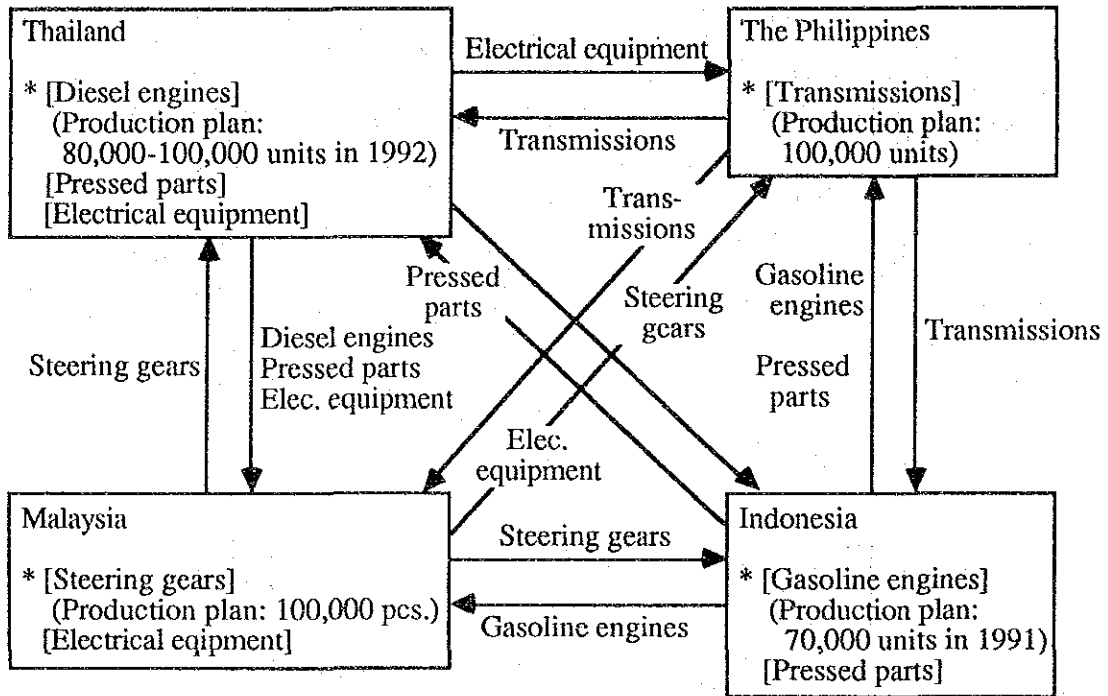
Mitsubishi Motors Corp.



Note: Accepted by COIME/ASEAN in Feb. 1989  
 Source: "Kokusai Keizai" (International Economy), No. 322, 1990

Fig. III-1-2: Automaker Brand-to-Brand Complementation Schemes (2)

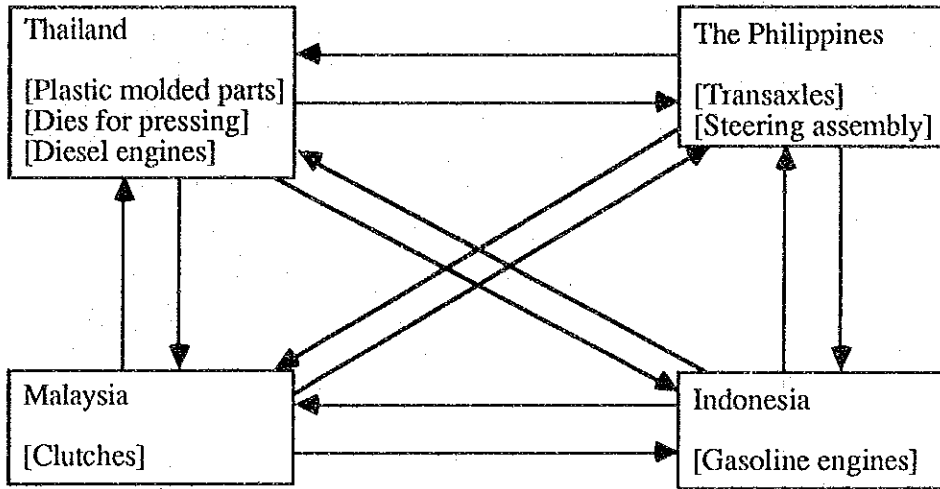
Toyota Motor Corp.



Notes: Estimated total investment: 300 million yen  
 \* Selected for the establishment of centralized production system  
 Sources: "Kokusai Keizai" (International Economy), No. 322, 1990  
 "Jidosha Kogyo" (Automobile Industry), June 1989

Fig. III-1-3: Automaker Brand-to-Brand Complementation Schemes (3)

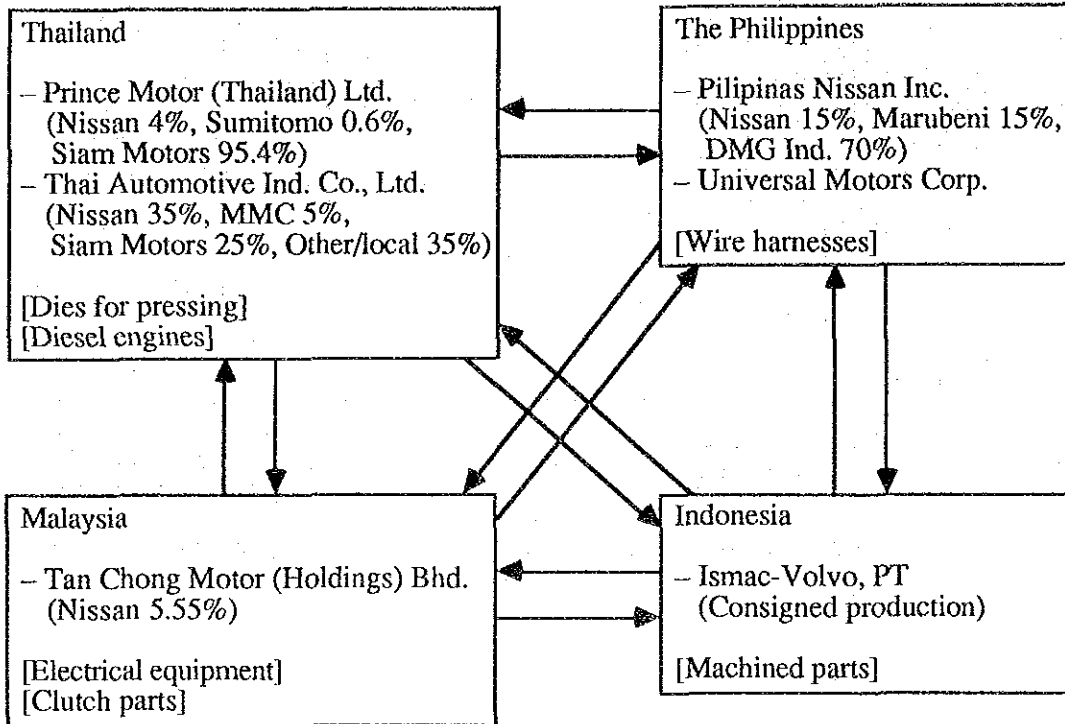
Nissan Motor Co., Ltd. (1)



Source: "Kokusai Keizai" (International Economy), No. 322, 1990

Fig. III-1-4: Automaker Brand-to-Brand Complementation Schemes (4)

Nissan Motor Co., Ltd. (2)



Source: "Jidosha Kogyo" (Automobile Industry), June 1989, and others

## 2. Die Making Industry Development in Neighboring Countries

### 2-1 Outline

Following is a description of the policies thought to have been effective in 1) improving technological standards and 2) promoting the die making industry in East and Southeast Asian countries other than Japan.

The foundations for the die making industry in R. Korea and Taiwan were laid in the 1960s, and by the latter half of the 1980s both nations had established their positions as bases for export to other nations. Neither of these countries, however, is yet able to supply all types of dies. R. Korea remains dependent on imports for more than 20% of its dies (average from 1983 to 1987, based on value); Taiwan, for 12% (average for 1988 on a value base). In both cases, Japan is the main supplier. Both countries are aware of the gap in die technologies with Japan and have been engaged in efforts to modernize since 1987.

Singapore has also been active in promoting die making technology since the late 1960s, but here the emphasis has been placed on precision metal dies for use in the production of electronic components. Singapore remains dependent on imports for a large portion of its dies.

The die making industries of Thailand and Malaysia have experienced remarkable growth in recent years. As a result of booming domestic demand, die manufacturers in Thailand currently lack the necessary capacity for exports, although they did export in the past. Most of Malaysia's die sales are to electronics firms located in export processing zones, while exports consist mainly of simple dies. In both countries, foreign-affiliate firms are the main producers, and a large technological gap exists with local die manufacturers. In addition, these countries remain dependent on imports for large and precision dies, with most of these dies still being imported. Both governments, however, are aware of the importance of developing local die manufacturers.

In summary, the development stages of the die making industries in Thailand and Malaysia differ from those in the NIEs, and characteristics resulting from overall industrial development conditions in each country can also be seen. The following points should be kept in mind when discussing future policies for the Philippines:

1. In each of these countries, development of the die making industry was led by local user industries. In none of the countries, including Japan, did the die making industry develop with the direct objective of exports. Singapore's focusing of efforts on exports of precision dies to electronics firms located in Malaysia, and Malaysia's shipments of precision dies to electronics companies located in export-processing zones, should be of interest to the Philippines, which is also characterized by a highly-developed electronic components industry.
2. It should be kept in mind that even for countries such as R. Korea and Taiwan in which the die making industry has a fairly long history of development, operations must be re-evaluated in light of recent developments in die technology. This is closely related to the fact that the Japanese die making industry, the world industry leader, is now finding itself forced to expand its overseas operations and cut back on domestic production because of 1) overseas investment by customer firms and 2) a local shortage of labor. Considerable technological innovations will be necessary in order for these countries to procure locally the metal dies which in the past were imported from Japan.

3. In each of these countries, foreign-capital firms have played a major role in the development of the die making industry. In Thailand and Malaysia, rapid growth of the die making industry has resulted in a significant technological gap between foreign- and local-capital companies, and improvement of the technological standards at local firms is now a pressing topic for future development.
4. Die making industry promotion policies adopted by each of these countries can be divided into two phases. In the first phase, there were no promotion policies specifically targeting the die making industry; instead, they were part of policies aimed at the metal and machinery industries or small business in general. In recent years, however, the policies adopted by R. Korea, Taiwan, and Thailand have targeted the die making industry specifically and have as their objective increased technological sophistication. Singapore has set the same goal for industry as a whole, and promotion policies are focused on the following areas: 1) the promotion of facility modernization using tax exemptions, special deductions, low-interest loans and special write-offs; 2) the development of the firms by the subsidies and guidance in technology and management techniques; and 3) the training of engineers and technicians.
5. Each of the countries has established numerous organizations and programs for the training of engineers and technicians. However, in countries such as Thailand and Malaysia, in which nurturing of local firms is of special importance, these programs have begun only recently and it is difficult to evaluate their effectiveness yet. In countries such as R. Korea, Taiwan, and Singapore, a variety of training programs have been developed based on and in combination with the basic technical education courses provided by universities and vocational secondary schools. These programs are also carried out in combination with programs for the improvement of companies themselves. Moreover, Singapore is implementing these programs as a part of its technology transfer efforts with cooperation from the governments and corporations of industrialized nations. This has been possible because of the potential for advanced technological/industrial development seen in Singapore by many countries.

## 2-2 Singapore

### (1) Outline

According to the Economic Development Board (EDBC), approximately 600 companies are engaged in such activities as die making, metal stamping, and the manufacture of plastic and rubber components. Production by these firms was valued at more than S\$12 billion in 1989. Dies, tools, and jigs were produced by 64 firms (a two-fold increase over the previous year) with 2,775 employees (a 2.1-fold increase) and production amounting to S\$140 million (a 2.2-fold increase). Most of these companies were small and medium-sized operations, and according to industry sources there are more than 400 die making-related firms in existence.

The Singapore government considers the die making industry to be a crucial element to all mass production sectors, and since the late 1960s has been promoting metal die making technology as a key element to develop the manufacturing industry.

Since the economic recovery of 1987, industry as a whole has suffered from a chronic labor shortage. Holding that labor-intensive industries are unfit for Singapore, the government is putting its efforts into the attraction of high-tech and automated industries. In accordance with this policy, the government established a fund for the promotion of automation and robots in 1989 and has begun providing small businesses with loans for the purchase of automated equipment and robots.

Because Singapore has no automobile industry, the main sources of demand for dies are the electronics, electrical equipment, and light industry sectors. U.S. semiconductor manufacturers were early to establish operations in Singapore and Malaysia, with which it forms a borderless economy, and as a result there is especially large demand in the electronics sector for semiconductor molds and lead frame dies, a type of precision press die. Healthy economic recovery was accompanied by increased demand for metal dies, and superior processing facilities can now be seen in the metal engineering sector, with local die manufacturers replacing outdated equipment with modern facilities such as NC EDMs, wire cut EDMs, and machining centers. Rates of operation, however, remain low.

Under these conditions, the government has focused its sights on precision metal dies, and improvements in production technology can be seen for certain types of metal dies. Because of the short history of the local die making industry, however, local-capital firms, despite adequate training in fundamentals, suffer from a lack of experience and expertise, and in many cases dies cannot be produced as scheduled on the specifications sheet. Immaturity is especially notable in those areas in which improvements can be achieved only through experience, including 1) design (roughly twice the time needed in the industrialized nations is required) and 2) production management (e.g., arrangements to procure components and other post-processing steps are begun only after completion of the design stage). In addition, most of the dies produced are single-action, and there are few progressive dies. Even with government automation assistance, there have been no moves towards the development of the needed progressive dies.

The leading characteristic of Singapore's die making industry in terms of technology is the presence of numerous engineers who are graduates of die training institutes and who work primarily in design divisions, thereby forming the nucleus of die manufacturers. There are also numerous other graduates of these training institutes. Since these individuals have received ample training in the foundations of die making, it is hoped that supplementing this training with experience will make dramatic growth a very real possibility.

## (2) Imports and Exports

Exports of locally-produced metal molds (Molds for Metal Foundry etc. excl. Ingot Molds: SITC 7491000, HS 848010009) amounted to S\$42.42 million in 1988 and S\$41.24 million in 1989, a decrease of 2.8%. Malaysia was the leading export destination in 1989, with S\$12.41 million (30.1% of the total and a 17.8% decrease over the previous year), followed by Australia with S\$5.55 million (13.5%, up 125.6%), the United States with S\$6.08 million (14.7%, up 98.0%), India with S\$2.81 million (6.8%, down 54.5%), and Thailand with S\$2.79 million (6.8%, up 15.8%). Japan was ninth on the list with S\$1.53 million (3.7%, up 47.3%). Most shipments by local-capital firms are for the domestic market, but direct exports and exports through Singapore-based multinational corporations are increasing. The past few years have seen a shift towards high-precision dies. Following are some of the types of dies being exported (including related services):

- Design and manufacture of connector molds and stamping dies
- Machining of precision engineering parts
- Progressive trim/form dies
- CNC EDM services
- IC encapsulation molds
- Tools and dies for metal stamping
- Precision machine and computer parts
- Die insert and molding parts
- Parts for the electronics, electrical and plastics industries

- Embossing dies
- Project and auto-insertion machine for semiconductor and connector industries
- Injection molds for telecommunications equipment, television, auto and audio-visual equipment, and medical disposables
- Individual needs for custom-made stampings

On the other hand, imports totaled S\$179.44 million in 1988 and S\$183.39 million in 1989, up 2.2%. The leading suppliers in 1989 were Japan, with S\$127.34 million (69.4% of the total, up 1.5% over the previous year), Taiwan with S\$12.12 million (6.6%, down 21.0%), Malaysia with S\$10.72 million (5.8%, up 7.2%), Hong Kong with S\$9.33 million (5.1%, down 4.8%), and the United States with S\$6.99 million (3.8%, up 16.5%).

### (3) Promotion Policies for the Die Making Industry

#### 1) Introduction

The following has been playing a major role in the promotion of Singapore's die making industry: 1) government assistance in the form of various incentives and programs; 2) activities at the industry level; and 3) a variety of training programs.

#### 2) Government Incentives

There are no incentives intended expressly for the die making industry. As a supporting industry composed of numerous small and medium-sized companies, however, the die making industry is frequently in a position to take advantage of government incentives.

##### a) Tax Exemptions and Reductions

###### 1. Tax exemption for pioneer status:

Firms having been granted pioneer status are exempted from the corporate income tax for a period of 5-10 years. At present, roughly 60% of all die making manufacturers are eligible for this exemption.

###### 2. Tax exemption for expansion by existing companies:

When increased production of a given product is certified by the competent minister to be beneficial to the Singapore economy, the producing firm is designated an "Expansion Company" and receives a maximum five-year tax credit equal to the additional income amount rose by expansion.

###### 3. Tax exemption for royalties, fees, and development costs:

A program under which withholding tax credits equal to the amount spent on royalties, technical assistance fees, and R&D are granted.

###### 4. Tax exemption on foreign loans for production facilities:

When foreign loans are taken out by the non-resident for the purchase of production facilities, a withholding tax credit equal to the interest on said loans is granted, provided there is no burden in the home country of non-resident.

###### 5. Incentives for R&D:

An investment deduction program providing for three-year depreciation of R&D-related equipment and facilities in order to improve product quality and promote R&D activities. In addition, R&D outlays can be deducted twice, and up to 50% of capital investment for R&D can be deducted from taxable income.



6. Shortening of depreciation period to promote automation:

When purchasing automation facilities or computer equipment, the entire cost may be depreciated in the first year.

b) Financial Assistance

1. SIFS (Small Industry Finance Scheme):

A financing assistance program for the modernization of facilities and equipment.

2. SITAS (Small Industries Technical Assistance Scheme):

A program covering up to 70% of fees paid to outside consultants for the improvement of corporate activities and management. Only small and medium-sized companies are eligible.

3. PDAS (Product Development Assistance Scheme):

A program covering 50% of direct costs incurred in the improvement of products and designs, the development of new products, and market research. All companies are eligible regardless of size.

c) Incentives for Imports of Raw Materials and Capital Goods

1. Import Tax Rebate System:

When importing taxable raw materials, companies are eligible to receive a rebate equal to the import tax upon the export of the finished product.

3) Industry Systematization and Activities

The Singapore Tool and Die Association, or STADA, was formed in 1982 as an industry association for the die making industry. The organization changed its name to the Singapore Precision Engineering and Tooling Association, or SPETA, in 1988 to reflect the growing importance of precision engineering and tooling within Singapore's die making industry. The organization has a total of 170 member firms, representing about 40% of all firms in the industry, and 90% are local-capital companies. SPETA has no financing schemes of its own, but it provides indirect financial backing to member firms in the form of financing from the Enterprise Promotion Center (EPC; established in May 1990), which in turn receives funding from the EDB.

SPETA provides training assistance in close cooperation with PEI (the Precision Engineering Institute), a training organ under the jurisdiction of EDB, including assistance in the coordination of PEI's curriculum.

4) Vocational Education Programs

Lacking in natural resources, Singapore has placed the highest priority on the development of human resources and is working to promote vocational education and training in addition to ordinary education. In Singaporean society, which is characterized by high job turnover rates, qualifications and licenses are the primary means of providing an objective assessment of an individual's abilities. Those persons who choose vocational education and training courses can master technologies and knowledge through more advanced training, and the acquisition of high-level qualifications or licenses serves as proof of the individual's ability. For such people, the government has provided a variety of qualification and licensing programs. Singapore is working to improve the skills levels of engineers and technicians through the establishment of a variety of full- and part-time training courses for acquisition of said qualifications and licenses together with subsidies to encourage in-house training by private corporations.

The government provides training for the mastery of more advanced skills and other specific objectives in a form designed to meet industry needs. At the center of these efforts are 1) VITB (Vocational and Industrial Training Board; Ministry of Education); 2) joint training centers set up by and between EDB and foreign corporations/governments and 3) NPB (National Productivity Board).

VITB boasts 17 training facilities as of 1989 and provides a variety of training to approximately 16,000 students in addition to supporting in-house training programs by private companies. Among the joint centers being operated with cooperation from EDB are the following: 1) the French-Singapore Institute of Production Technology (offering diploma courses in electronics technology); 2) the German-Singapore Institute of Production Technology (diploma courses in production technology); 3) the Japan-Singapore Technical Institute of Mechatronics (diploma courses in a field combining electronics and mechanics); 4) the Precision Engineering Institute (diploma courses in precision engineering); and 5) the Philips-Government Training Center.

The term "job hopping" has become a synonym for the character of Singaporean laborers, reflecting the extremely high rates of job turnover in the country. Partially because of this situation, in-company training is less common than in Japan. On the other hand, working from the viewpoint that increasing the absolute number of skilled laborers is a national priority for the advancement of industry, the government makes companies pay 1% of the monthly salary of each worker as a tax for the Skills Development Fund (SDF) and uses this money to subsidize a portion of training expenses at those companies conducting in-house training programs for their employees.

Die making technology training in Singapore depends heavily on training centers for the training of craftsmen. Most owners and production technology specialists at die making firms are in fact graduates of these centers. Some of the training centers are listed below. All were established with the cooperation of major foreign corporations.

1. Brown Boveri Government Training Center; reorganized as the Precision Engineering Institute (PEI) in October 1988
2. Tata Government Training Center; reorganized as the Jurong campus of PEI
3. Philips Government Training Center

All of the courses offered at these centers are incorporated into the EDB training program. The program lasts four years (the first two are conducted at the Center; the second two at factories), of which three years are devoted to theory and the remainder to actual practice. At the end of the first and second years of study, students are eligible to receive third- and second-level National Trade Certificates (NTC), respectively. Those who complete the four-year course are given a second-grade Craftsman Certificate.

Applicants to the training centers must be 16-25 years of age. The center offers courses in precision machining, machining, consumer and industrial electronics equipment, measurement and control technologies, industrial equipment maintenance, metal die tooling, and precision engineering. In addition to these training centers, the following organizations have been established to provide more advanced training in specialized skills:

1. Computervision-EDB CAD/CAM Training Unit: Established in February 1983 with the cooperation of Computervision, a U.S. firm. Provides training in metal die design using CAD/CAM.
2. Japax-EDB CNC Laboratory: Established in October 1983 with the cooperation of Japax, Ikegai Corporation, and Hamai Sangyo. Provides training in CNC machining.
3. ASEA-EDB Robotics Training Unit: Established in June 1983 with the cooperation of ASEA, a Swedish firm. Provides training in robotics technology.

4. Nixdorf-EDB Centre for Advanced TPP and Die-making
5. Mitsutoyo-EDB Metrology Laboratory
6. Ikegai-EDB CNC Laboratory
7. Bridgeport-EDB CNC Laboratory
8. Sodick-EDB CNC Laboratory
9. Autodesk-PEI CAD/CAM Unit

The main organizations responsible for the training of engineers and technicians with extremely specialized technologies are NUS (National University of Singapore), NTI (the Nanyang Technological Institute; scheduled to be promoted to university status and renamed the Nanyang Technological University in 1991), the Singapore Polytechnic, and the Ngee Ann Polytechnic. All of these organizations provide die making courses as part of their curricula.

Although the courses differ from school to school, the general characteristics of training in Singapore are as follows:

1. During the training period, salaries are paid by the government.
2. Long-term practical training at private companies is incorporated into the curriculum, and during this period salaries are paid by the host company.
3. The government holds strong authority over the employment of graduates; for example, prospective employers are required to submit applications to the government when hiring graduates.
4. The trainees are extremely diligent and enthusiastic.

## 2-3 Thailand

### (1) Outline

#### 1) Number of Companies

As of 1989 there were 1,260 die making firms registered with the Department of Industrial Works, Ministry of Industry, an increase of 119 over the previous year.

According to a 1990 survey distributed to 60 die making firms in Bangkok and surrounding areas by the Metal-Working and Machinery Industries Development Institute (MIDI), three out of four firms had been in existence for less than 20 years. In a 1987 survey individually-owned companies accounted for 55% of the total and limited-liability companies for 26.7%, while in 1990 the latter group had grown to a figure exceeding 60%. This is seen as evidence of the increasing awareness among entrepreneurs that improved product quality requires the formation of a proper management structure within the company organization.

The BOI has provided investment incentives to 20 die making manufacturers for metals since 1987. All of the recipients were joint ventures between local-capital firms and corporations from Japan, Taiwan, the United States, etc.

Die manufacturers in Thailand can be roughly divided into the following three categories:

#### 1. Companies producing metal dies for in-house use

Most of the firms in this group produce products for export using mass production systems requiring precision dies. When first established these firms imported dies, but over the years have switched to in-house fabrication in correspondence with the quality and quantity of their products. In the 1990 MIDI survey described above, 17 out of the 60 firms fell into this group.

## 2. Companies producing dies for outside sale

Most of the firms in this group are small businesses with fewer than ten employees, and in general they carry out subcontracting of ordinary machining as well as die fabrication. Many of the owners of these firms gained experience at other die manufacturers and then left to form their own companies. In the MIDI survey, 14 of the 60 firms fell into this category.

## 3. Companies producing dies for both in-house use and outside sale

The number of firms in this group grew more than four-fold during the period from 1987 to 1990. 36 of the 60 firms in the 1990 MIDI survey, or 60% of the total, fell into this category and were also engaged in forming works such as stamping and injection molding.

## 2) Dies

11 of the 60 die firms in the 1990 MIDI survey were engaged in the production of dies for use in metalworking.

Manufacturers of dies for use in metalworking can be broken down according to the types of dies they produce as follows: simple blanking/forming dies, 35 firms (58.3% of the total); compound dies, 25 firms (41.7%); and progressive dies, 18 firms (30.3%). In addition, the number of firms producing transfer dies, which require complex and sophisticated technologies, had risen to four from only one in the 1987 survey.

Recent years have been characterized by an increase in the number of plants using die sets in reflection of increased demand for precision dies and in order to improve productivity. The number of firms producing dies for metalworking which had installed die sets rose from 14 in 1983 to 23 in 1987 and 26 in 1990.

Industrial applications for dies included: automotive parts, 35 firms (58.3% of the total); electrical equipment components, 25 firms (41.7%); and home electrical appliances, 12 firms (20.0%). In recent years an increasing number of firms have been producing dies for use in the manufacture of electrical equipment components.

## 3) Facilities and Technology

Virtually all of the companies are in possession of basic facilities such as lathes and shapers, though they are often outdated. Recently, a growing number of companies has been introducing modern facilities such as cylindrical grinding machines (14 out of 60 firms in the 1990 survey), copy milling machines (17 firms), EDMs (24 firms), and wire cut EDMs (12 firms) with the aim of improving die quality. These developments are confined to only a handful of manufacturers, however.

Concerning future equipment purchasing plans, EDMs and wire cut EDMs were the most often-indicated types of equipment scheduled for future purchase. Because of the high cost of precision equipment, however, raising the necessary funds is proving difficult for many of these companies.

In the 1987 survey, more than half of the manufacturers relied on designs supplied by their customers. By 1990, however, a majority of the firms were relying upon designers for their designs. This is evidence of a recognition that design quality and engineering capabilities have a major impact on the final product. Most of the companies utilizing designers, however, were large firms making dies for in-house use, while smaller manufacturers continued to rely on customers or the experience of owners. The

number of companies with no draftsmen on their payrolls also fell from 38 in 1987 to 21 in 1990, indicating a growing awareness of the importance of design and drafting.

At present, Japanese commercial die manufacturers are capable of dimensional precision on the order of 0.02-0.04 mm; precision of 0.01 mm is difficult to achieve. Even wire cut EDMs, which are listed in the catalogs as being capable of processing precision on the 1-micron level, cannot actually provide such precision because of vibrations in the wire electrode and the discharge-induced formation of a molten layer on the surface of the workpiece. On rare occasions, special dies with dimensional precision of 2-3 microns can be produced, but they require special measurement technologies and environments. Ordinarily, accurate measurement of 0.01 mm precision requires a device with a measurement sensitivity of 1 micron. In this sense, not only processing techniques but the limits of precision measurement technology act as a major barrier to the fabrication of dies with precision higher than 0.01 mm.

In a 1987 MIDI survey on the dimensional precision of precision metal dies, 46.6% of the responding firms were reported to be producing metal dies with precision exceeding 0.01 mm. When added to those firms producing dies with dimensional precision of at least the 0.05 mm which is the industry standard in Japan, this amounts to 73.3% of all die manufacturers in Thailand. These findings, however, conflict with reports by various fact-finding missions dispatched by Japan which state that even Japanese-affiliate firms concentrating their efforts on die fabrication were capable of only 0.02-mm precision on a commercial basis.

This discrepancy is due to the fact that many of the companies mistakenly believe the precision (i.e., the smallest unit reading) of the calipers and micrometers used during fabrication of the dies represent the precision of the finished die. In general, Thai die manufacturers are not particularly concerned with or aware of the importance of inspection and measurement.

For relatively simple dies, a sizeable portion of Thai manufacturers are thought to be capable of precision approaching the 0.05-mm mark. In addition, at least one manufacturer is capable of producing dies with dimensional precision on the 1-micron level.

## (2) Imports and Exports

Although certain types of die exports are increasing, export considerations have been pre-empted by booming growth in domestic demand. Domestic production is insufficient to meet this demand, and as a result imports of dies far exceed exports. The rapid but temporary growth in exports was the result of activities by foreign-capital corporations, and even these firms, hard-pressed to meet local demand, do not have the extra production capacity needed for exports. There has been a great deal of investment in the local metal engineering and machinery industries, and for the time being domestic demand is expected to remain healthy, preventing any sizeable growth in exports.

Nine of the 60 companies in the 1990 MIDI survey were engaged in exports of dies for use in metalworking. They can be broken down as follows: blanking/forming dies, eight firms; compound dies, six firms; progressive dies, six firms; and transfer dies, one firm. The exported dies are used in the production of auto parts, electrical parts, machinery parts, kitchen utensils, etc.

Thai import and export figures for 1988 and 1989 are as shown below.

### 1. Molding Boxes for Metal Foundry; HS 848010

Expansion and new establishment of local factories has resulted in increased domestic demand. Consequently, 1989 imports recorded a more than 2-fold increase over the previous year, to 200 million baht. Exports amounted to less than 1 million baht.

## 2. Molds for Metal or Metal Carbides

### a. Injection or Compression Types; HS 848041

While exports dropped from 63 million baht in 1988 to 12 million baht in 1989, imports increased four-fold during the same period, from 14 million baht to 65 million baht. The drastic drop in exports and increase in imports from 1988 to 1989 was due to the fact that in 1988 large die manufacturers began production and were able to export, but in the following year demand from domestic auto parts manufacturers increased suddenly. Local production was insufficient to meet this demand, and as a result firms had to rely on imports to make up the difference.

### b. Others; HS 848049

Imports remained virtually unchanged at approximately 140 million baht in 1988 and 1989, while exports increased 2.5-fold, from 21 million baht to 53 million baht. The leading export destinations were Japan (4.8% of total exports), ASEAN countries (12.9%), and other Asian nations (66.18%).

## (3) Die Making Industry Promotion Policies

### 1) Introduction

During the past several years, Thailand has seen a remarkable expansion of investment centered around foreign investment. As a result, the infrastructure has lagged behind, the country suffers from a chronic labor shortage, and job hopping and the headhunting of technicians are rampant.

Investment promotion policies are shifting from policies which welcome all investment to ones which give selective priority to those investment projects thought to be of value to the country. The die making industry, however, has yet to come under these restrictions.

Together with development achieved by die user industries, the die making industry is gradually achieving improvements in terms of both quantity and quality. There remains a sizeable technological gap between foreign- and local-capital firms, however, and the government has established the promotion policies described below with the objective of reducing and ultimately eliminating this gap.

The most serious problem at present is the shortage of trained die engineers. Although various programs are being implemented (see below), they remain in the initial phase, and real results are expected only after another two to three years.

At present there are no government policies specifically targeting the die making industry. The government does, however, view the industry as a supporting industry indispensable to export sectors. The Sixth National Economic and Social Development Plan (1987-1991), for example, designated metal engineering sectors as a key industry together with agro-industries, regional industries, and small factories.

Promotion policies for industries including the die-making industry in Thailand are as follows:

## 2) BOI Investment Promotion

In May 1987 the metal die sector was designated by the BOI as an "investment promotion industry." Japanese-affiliate metal die manufacturers approved by the BOI are eligible for the following incentives:

1. Seven-year exemption on corporate income tax
2. A 50% reduction in business tax for three years
3. Tariffs on imported raw materials may, upon advance application to the BOI, be reduced to 10% for the first year only. From the second year on the application must be reexamined.
4. Tariffs on imported facilities and equipment are exempted for two years upon application.
5. Jigs are exempted from tariffs for one year.

To be eligible for these incentives, companies must supply at least 80% of their production to exporting customers, while the remaining 20% can be sold to ordinary local firms. This provision, however, is extremely unfair in terms of production costs to those die manufacturers which are not receiving any incentives from the BOI.

## 3) Promotion of Metal Engineering Industries Through MIDI Activities

MIDI, which was established with the goal of promoting small metal engineering and machinery industries, is part of the Ministry of Industry's Department of Industrial Promotion, and its concrete activities are as shown below. Since MIDI activities only began in May 1988, however, not all of these efforts have been fully implemented.

1. Assistance in technological improvement:  
Seminars, training courses, and visits by experts to provide guidance and corporate diagnoses
2. Assistance in improvement of management techniques:  
Seminars, training courses, and visits by experts to provide guidance and corporate diagnoses
3. Assistance for corporate production activities:  
Testing, inspection, and prototype services
4. R&D activities:  
Dissemination of technologies appropriate for Thailand, and R&D and prototype work
5. Technical information service

## 4) Industrial Sector Development Project

The TDIF (Thai Mold and Die Making Industry Forum), with a membership of 181 companies as of June 1990, was established within MIDI in accordance with the results of a survey carried out in 1987 and similar to the present survey. Since January 1989 the Forum has been engaged in activities such as the sponsoring of various seminars and the dispatch of missions to countries with advanced die making industries.

## 5) 2 Years' Certificate Program

A Skills Training Program, consisting of a two-year course, was established in 1989 by the Ministry of Education with the objective of training technician-level workers capable of handling precision dies in order to resolve the skilled labor shortage currently facing the industry.

## 2-4 Malaysia

### (1) Production

#### 1) Outline

According to announcements made by the Malaysian Industrial Development Authority (MIDA), there were approximately 60 firms specializing in the manufacture of dies in 1987, with production for the same year estimated at M\$40-50 million (this figure does not include production of dies intended for in-house use by manufacturers of home electrical appliances, automobiles, and so on, for which specific figures are not available). Despite the use of the term "specializing," more than half of the companies produced dies for in-house use in the manufacture of metal and plastics products.

More than 60% of the firms were concentrated in Kuala Lumpur and the surrounding area, where the country's electrical appliance, electronics, and auto parts industries are concentrated. The great majority of the remaining firms are concentrated in Penang, the center of the nation's semiconductor industry.

The die making industry is dominated by small and medium-sized firms; more than 80% had fewer than 20-30 employees. Capital resources were also limited, with the highest capitalization being M\$1.6 million.

#### 2) Production Structure

Malaysian die manufacturers can be divided into three groups based on technology and management. The first group consists of U.S. and Japanese corporations together with joint ventures with firms from these two countries. Technological standards differ according to the intended use of the die, but processing precision on the micron and sub-micron level is possible, and advanced facilities and equipment are in use. The Malaysian government hopes that these companies will serve as a model for foreign investment and technology transfer. The second group consists of local middle-ranked companies. Firms in this group are capable of producing dies (included those for use in the manufacture of plastic products) of relatively high precision, but it is difficult for these companies to secure qualified technicians, and overall products are characterized by a certain degree of roughness. These companies have significant potential for growth provided they receive appropriate advice and work to adopt more sophisticated technologies.

The third group consists of the extremely numerous small operations with fewer than 30 employees (most in the range of 10-20). At best, these firms are capable of processing precisions on the order of 0.01 mm for both plastic and metalworking dies, but a figure of 0.1 mm would be more realistic.

Recently, healthy local demand has provided a strong impetus for firms to purchase advanced facilities and equipment, and some are now beginning to introduce EDM and machining centers. Although it is possible to improve die precision through the introduction of high-precision facilities and equipment, as yet the results have been less than spectacular due to a lack of mastery of fundamentals and a shortage of skilled technicians and designers. Furthermore, borrowing from banks is made difficult by a lack of collateral, forcing many firms to make do with outdated equipment.

The Malaysian government is fully aware of the importance of dies as a foundation for other industries. Dies were designated as a highest priority item in the Industrial Master Plan (IMP), which forms the basis of Malaysian industrial policy, and efforts are being made to promote die production. Since manpower training in particular is one of



the greatest needs indicated by all firms, improving technological standards at companies in the third group could provide a foundation for the promotion and expansion of the die making industry as a whole.

## (2) Local Die Supply and Demand

The main purchasers of dies in Malaysia are the electronics and electrical industries together with the plastics forming industry. Other important demand sectors include metalworking, rubber forming, and glass and ceramics.

Concerning supply to the electronics and electrical industries, die manufacturers have developed primarily through supply to export-oriented semiconductor manufacturing plants located in export processing zones (FTZ). As of 1988, there were 22 die suppliers engaged mainly in the production and repair of dies (to be used in chip production) and die components. With the exception of the three largest firms, all of these companies had fewer than 20 employees and recorded annual sales of M\$50,000 - M\$8 million. Annual die shipments to the electronics and electrical industries amount to M\$20-30 million, estimated to represent 20% of the M\$150 million total demand for dies in said industries.

Most of the die firms engaged in subcontracting work for the plastic forming industry are small businesses handling simple, low-precision dies for sale on the local market, though some also export to neighboring countries. Dies being produced include injection molds, blow molds, compression molds and extrusion molds, and they are used in sectors such as electrical products, household goods, medical products, and construction materials.

There are 21 plastic forming-related die firms, but many of the plastics firms produce their own dies. The die manufacturers specializing in this area are small operations with 10-20 employees. Annual die demand in the plastic forming industry is estimated at M\$50 million, of which shipments by local manufacturers account for 20-30%.

Demand in metal engineering sectors involves press dies for electronics and electrical components, auto parts, and household goods. Production of press dies remains relatively undeveloped, but in recent years growing demand for industrial electronic components and home electrical appliances has resulted in increased orders. At present, there are 11 dedicated manufacturers in addition to the aluminum extrusion plants and pressed component manufacturers producing dies for in-house use, and although it is difficult to make an accurate estimate of annual production in this field industry sources set the figure at less than M\$10 million.

Concerning the die casting sector, there are currently 11 diecast manufacturers engaged in the production of auto parts, cable terminal boxes, and fan components. All of the dies used by these firms are imported.

Production of molds for rubber product manufacturing, with the exception of tires, is limited, with virtually all dies being imported.

## (3) Imports and Exports

### 1) Imports

In the case of molds for use in plastic manufacturing, roughly 80% of all molds weighing more than 3-4 tons are imported from Japan, Taiwan, and Singapore. Virtually all of the work processed by the die manufacturers is limited to 1,000 mm square pieces, and cases of products exceeding this figure are extremely rare.

Concerning processing precision, micron-order dies must also be imported. There are no problems with dies for use in producing daily household items (requiring precision of 0.1 mm), and a portion of dies for home electrical appliances and auto parts can already be supplied locally. Overall, however, metal die users in Malaysia still rely on imports for more than 70% of their needs.

More than one-third of all imported dies (in terms of value) originate in Japan, but shipments from the NIEs, particularly Taiwan, Singapore, and Hong Kong, are on the rise. As a result of the strong yen, imports from the NIEs are expected to increase further in the future.

## 2) Exports

Most domestic shipments in Malaysia are to FTZ. Some firms "export" as much as 80% of their production to FTZs, and the industry average is 40-50%. This is due to the presence of numerous die users in these zones, and export ratios naturally rise as a result.

The leading export destinations are Singapore and Thailand, and simple dies comprise virtually all of the shipments to both countries. Japan is one of the markets with high potential for future exports. For instance, technology in the field of molds for plastics is now at a level roughly equal to that of Japan ten years ago, and a probable scenario is that Japan will import semi-finished molds from Malaysia for final processing in Japan.

The appreciation of the yen has also brought about a great deal of investment by Japanese corporations, and die manufacturers are no exception. In the near future, therefore, exports of dies from Malaysia to Japan may very well become an important trade channel.

## (4) Production Technology Standards

### 1) Design

With the exception of a handful of companies, the small and medium-sized firms in the third group are usually supplied with product designs by their customers. In some cases, however, there is no design, and companies are forced to fabricate dies based on a sample piece. At present dies are produced based on verbal instructions from the manager (at small firms this is usually the owner). If this individual is absent, therefore, production cannot proceed.

### 2) Machining

Facilities and equipment differ from firm to firm, and it is difficult to provide an average value, but in general the firms are equipped with the minimum necessary facilities and equipment at each grade. In other words, they have the general-purpose machine tools necessary to produce dies -- lathes, milling machines, vertical ram type milling machines, shapers, boring machines, radial boring machines, surface grinders, engraving machines (at some), and general-purpose electrical discharge machines (EDM). These machine tools have been in use for relatively long periods of time; in some cases precision has not been maintained and reliability is often questionable. The great majority of these tools are imported from Taiwan.

In the case of vertical ram type milling machines, numerous U.S. products can also be seen. High-level firms are equipped with machine tools of the highest standards

(even though these are general-purpose machine tools). Recent-make models are common, and maintenance and inspection are carried out with a reasonable degree of frequency. At most firms, however, methods of usage are far from ideal and equipment is often used beyond its actual lifetime.

Concerning precision equipment, so-called CNC (computerized numerical control) and NC (numerical control) equipment has been introduced at upper- and middle-grade firms. This category includes CNC machining centers, CNC EDMs, and CNC wire cut EDMs. The great majority of precision equipment is imported from Japan or Europe. Due to the high cost of this equipment, firms have implemented two- and three-shift systems to improve operating rates. The use of precision equipment at these firms is stabilized, and there were no cases of improper usage.

### 3) Dies for Use in Metalworking

In contrast to the field of molds for plastics, where technological standards are "relatively sophisticated," the situation in the metalworking-related sector is less promising. Only a very small portion of shipments are actually "finished dies," with the great majority (though there are exceptions) falling into the category of simple components. As a result, only a few firms can properly be classified as manufacturers of dies for metalworking, while the remainder are no different from stamping firms. Processing precision is limited to the 0.01 mm level, and the great majority of firms have difficulty in achieving even this degree of precision. The standards for basic cutting processes are also a step lower. One exception is the local firms supplying to the electronics component industry in Penang; they are capable of precision on the micron level. In summary, the standards of Malaysian technology for dies used in producing auto parts and electrical products have only just reached a "dawning."

### (5) Technical Training Organizations

#### 1) MIDEAC (Metal Industry Development Center)

MIDEAC was established in April 1986 by the integration of MITEC (Metal Industry Technology Center), MIRDC (Metal Industry Research and Development Center), and the Design and Fabrication Unit of SIRIM (Standards and Industrial Research Institute of Malaysia). MIRDC provides advice and guidance to firms in the metal engineering industries, including die making, through services such as design, R&D, prototype fabrication, training, and materials analysis.

MITEC and MIRDC were both established in 1978 with assistance from the Japanese government.

#### 2) CIAST (Center for Instructor and Advanced Skill Training)

This organization conducts a training program for machinery and die operation. Trainees are limited to 45 per year, and companies are allowed to place their own skilled laborers in Center programs for the improvement of die making technology.

#### 3) ITI (Industrial Training Institute)

Falling under the control of the Ministry of Labor, five of these Institutes have been set up around the country. A die training program has been offered at the facility in Prai since 1981.

## 2-5 Other Countries

### (1) Taiwan

#### 1) Outline

Taiwan's first full-scale manufacturer of dies appeared in 1964, and at present there are 1,831 die manufacturers with approximately 20,000 employees. More than 95% of these have fewer than 30 employees. When broken down by the type of dies being produced, press die makers are the most common, accounting for 45.2% of the total, followed by plastic molds, at 20.5%, forging dies, at 9.4%, die casting dies, at 9.3%, and casting dies, at 3.1%. 1989 production totaled NT\$17.9 billion, with great growth shown by pressing and forging dies and plastic molds. In recent years, development of the electronics, plastics, machinery and metal engineering industries has resulted in increased demand for the die making industry, but local suppliers remain unable to satisfy the needs of local users in terms of either quantity or quality.

In Taiwan, the die making industry supplied mainly to the local market until the mid-1980s. However, die exports began to grow rapidly starting in 1985, when the balance of trade for dies posted a surplus for the first time ever. In 1988, exports totaled NT\$2,659 million against imports of NT\$2,044 million, giving the nation a surplus of NT\$615 million.

#### 2) Facilities and Equipment and Technological Standards

The typical die manufacturing plant in 1987 was equipped with boring machines, lathes, shapers, milling machines, and surface grinders as well as EDM and copy milling machines. Sophisticated machine tools such as machining centers, EDM, and CNC lathes are produced locally, and the range of equipment (including advanced measuring devices) maintained by die making firms is gradually improving based around the larger plants.

Taiwan depends on Japanese companies for its die making technology, and the transfer normally occurs according to one of the following patterns:

1. Design methods and designs are purchased from the Japanese company.
2. Personnel are dispatched to the Japanese company for training.
3. Engineers are dispatched from the Japanese company to provide training in Taiwan.
4. Die components and raw materials are supplied from the Japanese company.

Although die fabrication technologies and the standards for dies themselves have improved greatly with the development of user industries, a sizeable gap remains with Japan and the West in terms of design capabilities.

#### 3) Manpower Training

One of the major elements supporting die maker technology is the accumulated experience of engineers and technicians. At die manufacturers in Taiwan, 78% of all engineers and 65% of all technicians have at least three years of experience. These figures are quite favorable in comparison to the high turnover rates seen in Hong Kong and R. Korea, and this is thought to be the reason for the relatively superior technology and production found at die manufacturers in Taiwan.

The number of specialists in die design is limited, and many lack both theory and practical experience. The present situation, in which die makers purchase designs from foreign corporations for processing, is hindering the improvement of design capabilities. Consequently, there is a need for the industry as a whole to provide fundamental

measures for the training of specialists in die design. Concerning the training of engineers, 20% of the large corporations with business in other fields have their own in-house technical training courses, but these are not limited to die technology alone. The OJT system has been adopted at smaller companies with no budget for such programs. At present the apprentice system can be seen at approximately 70% of all die manufacturers.

Vocational training centers for the training of skilled craftsmen have been established one each in the north, central, and southern regions of the country. 16% of all die manufacturers rely on these centers for the training of their skilled craftsmen. Under this system, companies send their employees to the centers for training during working hours (costs are borne by the company), and workers are given a pay raise after completing the program. They are, however, required to stay with the sponsoring company for a given period of time.

Another system is the in-company training program, under which companies accept students from industrial schools for practical training. Students are then obligated to work for the company for 1-2 years upon graduation. School holidays are used to provide in-house training to the students, who in return are given scholarships. 9% of die manufacturers make use of this program.

#### 4) Industrial Promotion Policies

There are no promotion policies specifically targeting the die making industry. Following is an outline of industrial promotion policies in general.

The Economic Four-Year Plan and other industrial promotion policies of the 1950s emphasized the development of import replacement industries and export promotion. Specific measures included the export rebate program and foreign capital attraction measures. Measures were established for the promotion of export industries during the following twenty years, and export processing zones and a bonded factory system were established. National projects in the field of shipbuilding and other heavy chemical industries were promoted while at the same time credit guarantee and other financing-related measures were adopted for small and medium-sized businesses. These policies, and the export promotion policies in particular, were modeled to a significant extent on Japanese policies of the time. In addition, the activities of Japanese corporations, including the large trading houses, were quite active in Taiwanese industrial development.

In 1984 a central-satellite factory system was established for the promotion of corporate grouping at manufacturers. Efforts are also being made to promote the components sector and other supporting industries by incorporating the merits of Japanese systems. Taiwan's policy for the promotion of corporate groups is aimed at the component industry, which is a step ahead of Korea's, but in fact some believe that independent efforts by foreign affiliates would be more effective.

In recent years, the government has emphasized promotion of leading-edge sectors and other high-tech industries, and the Hsinchu Science Park was established with the aim of nurturing and attracting high-tech industries.

A strategic industry promotion policy has been in effect since 1980. Though it was only in 1987 that the die making sector was designated as a strategic industry, the Medium and Small Business Administration of the MOEA (Ministry of Economic Affairs) has been the focus of efforts to promote development of the die making industry through financing assistance and management and technological-related guidance. Specifically, tax incentives are available, a credit guarantee system has been established, and bank of

communications will lend money at annual interest rates of less than 6% (current market rates fall in the range 8-10%).

## (2) Republic of Korea

### 1) Outline

At the end of the Second World War, Korea's die production technologies were very backward. Production capacity was insufficient to meet local demand, and the country was forced to rely on imports for most of demand until 1960. After 1960, a policy of industrialization was pursued, awareness of the importance of local production of dies as a means of securing defense secrets increased, and the foundations were laid for today's die making industry.

Changes in the industrial structure during the 1970s coupled with the expansion of strategic industries brought the number of die manufacturers to about 350 by the end of the 1970s. By the time the recession of the early 1980s had passed, there were 800 manufacturers. At the time, government assistance measures and financing-related incentives had brought about further local production of machinery, and awareness of the importance of the die making industry had also grown dramatically. The number of die manufacturers by the high economic growth period of late 1985 is estimated at approximately 1,200 (there are no official figures, but the Seoul office of JETRO places the figure for mid-1985 at 1,200-1,500).

In recent years, 90% of die manufacturers have been producing dies and molds for the automobile and electrical equipment/electronics industries in addition to plastics and pressing. Three-quarters of the firms have fewer than 20 employees, and fewer than 5% have 50 or more workers.

1988 production is estimated at approximately US\$1 billion. According to 1984 statistics of the Economic Planning Board, dies for use in metalworking accounted for 29% of the total 112.3 billion won in die shipments. There are no statistics for the percentage of die production for in-house use and outside sale, but according to a survey conducted by the Korea Institute for Economics and Technology the ratio of in-house use is high for metalworking dies and low for plastic molds. According to a report on a mining and manufacturing industries statistical survey released by the same agency, import dependence from 1983 to 1987 remained above the 20% level, with most shipments originating in Japan. Export ratios during this period hovered around 10%, with molds for use in the manufacture of rubber and plastics being most common. In recent years progress has been seen in the localization of NC machine tool production, though imports are also increasing on a yearly basis. The modernization of die plants and particularly those plants specializing in die manufacturing, however, has only just begun.

### 2) Promotion Policies for the Die Making Industry

The government has been extremely enthusiastic in its promotion of the die making industry, commensurate with the status of dies as mother tools. As a result, the Korean die making industry is one of the most enthusiastic in the world.

### 1) Training of Engineers and Technicians

Die making industry in the R. of Korea has been plagued by a shortage of skilled technicians starting in the latter half of the 1970s, and around this time many companies established in-house training as well as offering overseas training opportunities and carrying out active scouting programs. At the beginning of the 1980s, education and training programs came to be held through educational institutions, public organizations,

vocational training centers, and special in-house training facilities. It was around this time that the shortage of high-level engineers became critical, and special facilities designed expressly for the training of high-level engineers began to be established.

Die education is now a part of the regular school curriculum, and metal die design departments have been established at two universities (maximum enrollment: 160) and six junior colleges (520). In addition, the Central Occupational Training Institute and other organizations are responsible for the training of 200 die technicians and craftsmen each year (Table III-1-6).

The government has also adopted a system of standardized national tests for die workers, with successful applicants receiving the qualifications of "engineer" or "technician," in an attempt to train personnel in die technologies (Table III-1-7).

## 2) Improvement of Technology, Aid to Plants

In June 1987 the government announced its intentions to expand tax and financing-related assistance for firms in seven sectors -- dies, casting and forging, plating, heat treatment, welding, surface treatment, and dyeing -- falling technologically behind their counterparts in the industrialized nations with the goal of bringing them up to industrialized nation levels by 1991. Details of the Key Technology Promotion Program established by the government are as follows:

### 1. Graded plant system:

Standards and a grading system will be established for processing technologies, quality control, and so on. Technological evaluations will be conducted for 2,354 companies for the three-year period 1987-1989, and companies given one of four rankings -- 1st grade, 2nd grade, 3rd grade, or substandard. Highly-ranked companies will be eligible for tax benefits and financial aid, training programs, and research and development assistance. Also, products using components produced by these companies will be exempted from export inspections.

### 2. Assistance to highly-ranked companies:

2,500 corporations thought to have high potential for growth during the five-year period 1987-1991 will be selected and provided with technological guidance in the areas of quality control, measurement, and testing and analysis by the Korean Machinery Research Institute and regional testing and inspection facilities.

### 3. Establishment of specialized industrial estates:

The construction of specialized industrial estates in four locations for three sectors -- dies, electroplating, and casting -- is planned to promote specialization and joint efforts, and immediate construction is being promoted. Long-term, low-interest financing will be provided for the construction of joint facilities such as waste water disposal facilities and pollution control equipment.

### 4. Tax and financial-related assistance:

Taking into consideration the fact that most of the tenants of these estates will be small businesses, tariff quota will be applied to machinery and testing facilities which are difficult to import. In addition, installment payments will be allowed for the payment of tariffs on specified items and disaster insurance rates brought down in an attempt to reduce the financial burden on companies. In the area of financing, an "Industrial Technology Improvement Fund" offering loans with a 5% annual interest rate and 10-year period of repayment will be established. The creation of a "Pollution Treatment Facility Fund" for low-interest, long-term loans is also being planned.

### 5. Training of engineers and technicians:

Five departments, including a metal die department, will be newly added to the Technical Training Centers to provide a two-year retraining program for field workers with long years of service. Programs for the dispatch of technicians for overseas training will also be expanded. Furthermore, specialist education at the university level will be enhanced by expanded overseas training opportunities, the invitation of foreign experts, and the expansion of technical training programs.

6. Assistance for technological development:

Assistance should be given in fields where the low level of technology is impeding the overall technological development of the industry. The number of researchers at the Korean Machinery Institute should be increased. It is recommended that 23 new study facilities be established for research and development in the following six areas; dies, casting and forging, plating, heat-treatment and welding.

7. Arrangement for use of testing facilities:

National and regional industrial testing stations should be opened for utilization by firms which are not fully equipped with testing facilities.

(3) Hong Kong

1) Outline

The die making industry in Hong Kong is centered around the production of molds for use in small to medium-sized plastic injection molding. Although the industry remains dependent on domestic demand, exports are also growing.

In 1987 there were approximately 1,000 firms specializing in the manufacture of dies. In addition, 30% of the 3,000 plastic manufacturers had their own facilities for the manufacture of dies, so the total number of producers is estimated at about 2,000. More than 70% of these have fewer than 10 employees, while 20% employ at least 50 workers. The latter group of companies is responsible for most exports.

Die production for the local market grew from HK\$500 million in 1981 to HK\$1.5 billion in 1986, while exports exceeded HK\$500 million in 1986. Based on 1989 export figures, China was the largest export destination, responsible for 52.1% of all exports of "Interchangeable Punches and Dies (HK SITC Rev. 2; 695413)" and 62.9% of all exports of "Dies and Molds for Metal Casting (HK SITC Rev. 2; 749910)."

The main demand industries for dies in Hong Kong are plastics, metal engineering, and electronics and electrical equipment. Together, these sectors export more than 80% of their annual production.

2) Technology

In the past Hong Kong die manufacturers were conservative with respect to technology, but the 1980s brought evidence of a gradual change in attitudes towards the introduction of new technologies. Experience in advanced technologies remains in short supply, however, and technicians are inexperienced. As a result, the introduction of new technologies and equipment is proceeding at a slow pace overall.

The specialties of Hong Kong die manufacturers include metal presses, forming, and cutting, but most firms use single action press and simple tooling, and technological standards are not high. Dies for metal stamping represent 20-25% of all die production. There is also need for improvement of precision stamping dies and punching dies. Dies used in the production of high-precision and complex components are still imported.