3-4-4. Japan's Export Promotion Policy

Immediately after the war, Japan suffered from a shortage of effective demand and an increase in constraint of foreign reserve, and there was no other way to reactivate its economy exports. The balance of international payments (current transactions) was in a continuous surplus from 1946, as it was supported by aid and special emergency demand. In 1953, however, it moved into a deficit, and export promotion became a matter of urgency to overcome the shortage of foreign currency and achieve economic independence. To this end, various measures were taken. Those measures are categorized into 5 types.

[1] Export Finance.
[2] Export Insurance System
[3] Export Promotion Taxation System
[4] Maintenance of the Order of Foreign Trade by the Export and Import Trading law.
[5] Inspection System of Export Goods

3-4-4-1. Export Finance

(1) Export Advance Bill System

According to this system, private financial organizations extended advance bills in order to finance export funds necessary for serial economic activities of exporters, i.e., from product purchasing to shipment procedures. The Bank of Japan gave preferential treatment, both quantitatively (low interest rates) and qualitatively (position regulations) for drafts related to export advance financing. It accepted rediscounts and loan on security and in general tried to promote exports from the financial side.

Following the revaluation of export promotion policy, this system was amended and has functioned as the export advance quasicommercial bill system since October 1972.

(2) Foreign Exchange Fund Loan System

This system was started in 1953 as the foreign exchange reserve loan system. Amplification of this system was planned and realized in 1961.

The purpose of this system was to provide preferential financial measures after shipment, whereas the above-mentioned system of advance bills for exports provides preferential export financial measures before shipment. In concrete terms, in cases when a foreign exchange bank bought foreign currency export usance notes drawn by an

exporter, the Bank of Japan lent the yen required to buy the notes to the foreign exchange bank at the official rate, accepting the notes as collateral. In so doing, the exporter could easily give import usance at a low interest rate to overseas clients. In September 1973, this system stopped functioning for the same reason as in the case of the export advance bill system.

(3) Finance by the Export-Import Bank of Japan

In April 1952, the Export-Import Bank of Japan was reorganized and inaugurated as a governmental financial organization whose object was to supplement the financing of exports and imports by private financial organizations. As for its export related activities, this bank furnishes funds, either together with the private banks or by itself, for transactions which are difficult for private banks to finance under normal conditions, such as transactions that require long-term financing.

In simple terms, the Bank finances exports mainly of ships, vehicles, industrial machinery and technology (loans, discounts for financial organizations) and makes loans (yen loans) to foreign governments and corporations.

3-4-4-2. Export Insurance System

The purpose of export insurance is to ensure the healthy development of export and import trade and other overseas dealings by compensating for the risks generated which cannot be covered by the usual insurance.

The government directly guarantees this insurance, and a special account for export insurance is provided for its operation. (Insurance transactions are placed under the jurisdiction of MITI.)

This system was established in 1950 by the Export Credit Insurance Law. Since then it has developed into a system which includes regular export insurance, export price insurance, foreign exchange fluctuation insurance, export bill insurance, export guarantee insurance, consignment sales export insurance and overseas advertisement insurance.

3-4-4-3. Export Promotion Taxation System

The export income deduction system was implemented as an export promotion tax system. It was abolished, however, following Japan's entry into GATT in fiscal 1964.

3-4-4-4. Inspection System of Export Goods

The export income deduction system was implemented as an export promotion tax system. It was abolished, however, following Japan's entry export of inferior quality goods. Concerning specific export goods, the said law requires exporters to undergo inspection of the quality of goods and packing conditions conducted by government organizations and/or designated inspection agencies. The export inspection system, which began in the Meiji period, has gone through many changes. The present Export Inspection Law came into being through the Export Control Law, which was enacted with the reopening of foreign trade following the war. This system is producing very significant results in ensuring the qualitative international competitiveness of Japanese exports.

3-4-4-5. Improvement of the Design of Export Goods and the Prevention of Imitation

Considering that the improvement of the design of export goods plays an important role in the growth of export, such projects as sending students abroad to study design, collecting samples from overseas competitors, and inviting foreign designers and merchandise specialists to Japan have been conducted mainly by JETRO, the Small and Medium Enterprise Agency, the Japan Productivity Center and the Industrial Craft Research Institute throughout the 1950s and 1960s. Also, in addition to the protection of property rights based on the Design Law and the trademark Law, the registration and authorization of designs and trademarks export goods according to the Export Goods Design Law are conducted in an attempt to protect designs in their early stages. These measures are taken in order to prevent excessive exported designs and to maintain export orders. At the same time, the export approval of the Minister of International Trade and Industry, as stipulated in the Export Trade Control Law, is required for specified goods in order to protect the industrial proprietary rights of the export destination.

3-4-4-6. Maintenance of the Order of Foreign Trade by the Export and Import Trading Law

The Export and Import Trading law was established in 1952 in order to prevent unfair exports and maintain a healthy order in foreign trade.

The said law regulates unfair export and import transactions and at the same time allows agreement to be reached concerning the price, quantity and quality of export and import goods. It also approves the establishment of export associations, import

associations, and export-import associations. Furthermore, the law states that regulatory orders concerning adjustments of export, import and export-import can be enacted if required. The law also provides regulations exempted from application that are necessary according to the aforementioned measures based on the Anti-Monopoly Law.

Many of the agreements regarding export based on the Export and Import Trading Law deal with textile goods and other miscellaneous goods.

3-4-4-7. Foundation of JETRO

As a body for the promotion of overseas export trade, the "Overseas Trade Promotion Organization" was funded by consolidating the International Trade Fair Council, the Japan trade Arbitration Council and the Overseas Market Research Commission. Thus, a unified organization was established for the promotion of such export activities as overseas research surveys, the opening and operating of arbitrary offices for trade, overseas exhibitions, public relations, and publishing work.

In 1958, the Japan External Trade Organization Law was enacted and the Overseas Trade Promotion Organization was reorganized into an agency called the "Japan External Trade Organization.".

References: JETRO, "A History of Japan's Postwar Export Policy" 1983.

4. Foreign Investment Policy

4-1. Current State of Foreign Investment

4-1-1. Trends in Direct Foreign Investment

Foreign investment in Thailand became full scale after the establishment of the Promotion of Industrial Investment Act 1962 in which a policy was laid down for industrialization through use of domestic and foreign private capital. In the same way as the other developing Asian nations, Thailand began with import substitution industrialization of primarily consumer goods. A peak period for introduction of foreign investment was seen in the 10 or so subsequent years until Thailand's international balance deteriorated due to the rising imports of capital goods along with the industrialization, the reduction in Vietnam war demand, etc.

From 1973 to around 1977, foreign investment plummeted due to the combination of several destabilizing factors, e.g., the establishment of the somewhat more selective new Investment Promotion Act of 1972, the oil crises, and the takeover of the Indochina countries by socialist forces. Starting in 1978, foreign investment recovered and continued into the 1980s. Statistics from the Bank of Thailand on direct investment shows the U.S. as the largest investor nation. The BOI statistics, on the other hand, which cover only investment promoted industries, show Japan as the largest investor. Whatever the case, the U.S. and Japan are the two biggest investors. American enterprises primarily invest in mining and services, while Japanese companies tend to invest more in manufacturing, construction, and retailing. In the 1970s, Japanese and American investment both were oriented toward the domestic market and made use of overseas technology to fill initial domestic demand in Thailand.

In the early 1980s, the recession in global business resulted in a slowdown in the economic growth of the export-dependent ASEAN nations. In Thailand, economic growth and investment from abroad also declined. However, after the Plaza Agreement of September 1985, both domestic investment and foreign investment became more active. Thai industries making use of that country's inexpensive, good quality labor, such as in the manufacture of textile products, the top export item, then ICs, canned marine produce, and jewelry, began to be more price competitive due to the upward adjustment of the exchange rates for the Japanese yen, the South Korean won, and the Taiwan Gen NT dollar.

Recently, there have been major changes in the investment activity in Thailand. Companies from Japan and the Asian NIEs, confronted with currency revaluations and

rising protectionism in the importing countries, gave high marks to Thailand as an important Southeast Asian base for their overseas strategies in view of its stable political and economic state, its abundant labor force, and other factors giving that country a superior overall investment environment. The type of investment made has also been changing from these oriented towards the domestic Thai market to there for the establishment of production and export bases.

4-1-2. Current State of Foreign Investment

(1)Trends in Applications to BOI in 1987

[1] There were 1057 applications made to the BOI in 1987, 2.45 times more than in 1986 (431 applications). Of this, 418 (297 in 1986) were by domestic companies and 639 (134 in 1986) by foreign companies.

A look by country shows Japanese companies continuing to be most numerous and shows an increase in investments from Taiwan and the other NIEs. Investment from the U.S. totaled 20.5 billion baht (1.5 times that of previous year) and from Europe 33.1 billion baht (2.0 times). Of the NIEs, investment from Taiwan soared to 14.6 billion baht (up 5.1 times from previous year), primarily in the personal accessory and other labor intensive industries. Investment from Hong Kong totaled 7 billion baht(up 3.5 times).

[2] The total value of investments applied for rose to 209 billion baht (1 baht equaling approximately 5 yen, 59.7 billion baht in 1986), up 3.5 times.

The total investment per application was 197.73 million baht. This represented a 42.8% rise in scale from the 138.49 million baht of 1986. Investment from foreign countries rose to 151.2 billion baht (17.2 billion baht in 1986), an 8.97 fold rise.

[3] A look at the value of the registered capital shows applications for investments from the Thai side at 31,954 million baht (10,962 million baht in 1986), up 2.91 times, and applications for investments from abroad at 25,235 million baht (4,842 million baht in 1986), up 5.2 times. The percentage of the Thai side investments declined from the 69.4% of the previous year to 55.9%.

[4] There were 204 applications for investment from Japan (54 in 1986), worth 47.4 billion baht (14.7 billion baht in 1986), up 3.22 times, and with registered capitals of 9,386 million baht (1,690 million baht in 1986), up 5.55 times. The percentage of Japanese investments in all foreign investments applied for was 37.2%, far ahead of the second place investor (Taiwan, 8.2%).

[5] The scheduled number of workers to be hired, like the total investment, rose sharply to 332,409 workers (100,681 in 1986), up 3.3 times, an increase of 230,000 jobs.(Table I-4-1)

(2) Trends in Approvals of Investment Promotion

1) The number of investments approved in 1987 also increased considerably, up 2.06 times to 607 cases (295 in 1986).

2) The investment value rose 1.9 fold to 65,999 million baht (34,610 million baht in 1986). The investment per case became much smaller, however, 108.73 million baht (117.32 million baht in 1986).

3) A look at the registered capital shows the approved investments having capitals of 18,257 million baht (9,203 million baht in 1986)., up 2.01 fold.

4) Investment from abroad totaled 8,211 million baht (3,139 million baht in 1986), up 2.62 fold. The percentage of the total rose to 44.5% (from 34.1% in 1986).

Japan accounted for 43.1% of the approved foreign investments, or 3,535 million baht (1,675 million baht in 1986), up 2.11 times. Further, investment from Taiwan rose to 1,515 million baht (46 million baht in 1986), up 32.9 times.

Together, Japan and Taiwan accounted for 61.5%. (Table I-4-2)

(3) Cumulative Registered Capital of Investment Promoted Companies as of End of 1987

The cumulative registered capital as of the end of 1987 changed considerably from the value at the end of 1986. The share of Thai capital dropped from 72.2% to 68.9%, while the share of foreign capital rose from 27.8% to 31.1%. The Japan's share rose five points from 7.2% to 12.3%, reaching 40% of foreign capital. The U.S. was in second place, but fell from 4.7% to 3.9%. The third place Taiwan remained steady at 2.6%. (table I-4-3)

(4) Background of Surge in Investment

The following factors may be considered to have been behind the selection of Thailand for the investments by Japan and other foreign countries:

- Stability of political situation
- Good economic performance
- Existence of abundant, inexpensive, good quality labor force
- Lack of religious problems

Further, the improvement of the investment environment (establishment of industrial estates, reevaluation of foreign equity holdings, streamlining of investment

applications, etc.), and the positive PR campaigns to promote investments contributed greatly to the increase in investment.

(5) Trends in Investment From Taiwan and South Korea

Taiwanese Companies

In 1986, there were 35 applications for investment made by Taiwan to the BOI, worth 602 million baht on a registered capital basis (35.3% increase over previous year). This placed Taiwan ahead of the U.S. and second only after Japan.

This trend continued in 1987, with applications rising to 178 cases (5 times that of previous year) worth 14,600 million baht (up 5.2 fold), for striking growth. In the first half of 1987, there were 49 applications made and in the second half 129, with the number thus rising sharply toward the year end. Like Japanese companies, which rushed to invest in Thailand due to the yen's appreciation, Taiwanese firms continued to choose Thailand. Just in January and February of 1988, there were 48 applications made, second only to the 53 of Japan. However, there are some major differences in the contents of the investments of Japan and Taiwan:

[1] The investment per case is 82 million baht, just 36% of that of Japan (230 million baht), i.e., it is small in size (investment according to BOI in 1987).

[2] The investments are mostly for export oriented final products of a labor intensive type and are still only rarely for electrical machinery.
Many of the investments are in industries in which Taiwan's international competitiveness has dropped and against which it is taking early measures. There is thus a possibility of increased investment in electrical machinery and parts in the future.

[3] Almost no investments were in the supporting industries.

[4] Many of the investments were in industries competing with local Thai companies, so problems are appearing in obtaining GSP privileges on the export market.

A look at Taiwanese companies approved by the BOI during the two years from 1986 to December 1987 shows most were 100% export companies.

By industry, most produced final products. Products produced by five or more companies were juice (13), Christmas ornaments (11), shoes and bags (9), furniture (8), canned food (8), and toys (6). (Of these, the companies producing juice, shoes and bags, furniture, and canned food may prove competitive with local Thai industries.)

Examples of Investments from Taiwan (1986 to 1987)

1) Agricultural Products and Food Processing
Canned fruits, vegetables, and marine produce (8), promelalin, eucalyptus chips (2), eucalyptus afforestation

2) Textiles and Sundry Goods

[1] Sporting goods
Shoes (including galoshes) (13), gloves (4), balls (baseball, tennis, badminton) (2), sports hats

[2] Christmas Goods
Christmas trees (6) and Christmas lights (5)

[3] Personal Accessories and Decorations
Artificial flowers, jewelry, accessories, sun glasses, umbrellas, shoes and bags (9), belts, leather and fur products, toys (6)

[4] Kitchenware and Interior Goods
Chopsticks, lacquerware, furniture and parts (5), coconut fiber mattresses, curtain parts, blind parts, plasticware, chinaware

[5] Textile Materials and Semifinished Goods
Synthetic leather, nylon, staple fibers, yarn, fabrics, tuft nylon fabrics, brushes, prints and dyeing (3), fastners, chemicals (4), jute, PVC bags, art bags, particle board and plywood

4) Ferrous Metals, Nonferrous Metals, and Metal Products
Pure antimony, valves, joints (2), stainless steel pipes, connecting rods, cans

5) Machinery and Parts
Mining machinery and machine tools

6) Electronic and Electrical Equipment
Personal computer keyboards, telephones, transceivers, ceiling fans, car radio speakers, amplifiers and car radios, crystal quartz, wires and wire harnesses, silicon oxides

7) Transport Machinery
Bicycles and parts, bicycle tires and tubes (2)

As seen above, many of the investments were of the labor intensive type aimed at coping with the decline in Taiwan's international competitiveness. In general, fairly high production capacities are estimated, only because the companies are export oriented. In addition, many of the investments are for final products, so more are exporting than in the case with the Japanese companies. Capital-wise, there are many joint ventures with Thai

capital, with the Taiwanese capital being less than 50% in many cases, but recently the number of 100% investments has been rising.

South Korean Companies

There were 13 investments from South Korea up until 1986.

Broken down, these included three investments for manufacture of socks, production by an electronic calculator maker in a joint venture with Japan, and production of fountain pens, diesel engines, welding rods, and a hotel. Of these, just three are believed to have performed sufficiently well. In 1986, there were just investments for plastic molds, shoe forms, etc.

In 1987, the won appreciated more in value and wages soared, resulting in more active investment from South Korea. A look at investments as approved by the BOI shows a total of seven investments, in sports shoes, CNSL and charcoal, silicon oxides, dolls, rubber products, and two other products.

On March 11, 1988, Samsui concluded an agreement for the production of 300,000 color televisions in a joint venture with the Saha-Patana Group of Thailand. The South Korean side put up 51% of the initial registered capital of 25 million baht, and thus secured management control of the firm. Of the 300,000 units produced, 80% are scheduled for export and 20% for the domestic market. The company will be operating at 30% of full capacity from January 1989 and at full capacity from the third year. Further, Thai CRTs are scheduled to be produced in the Laem Chabang Industrial Estate (Thai CRT Co., joint venture among Siam Cement, Mitsubishi Electric, etc., scheduled to produce 1 million CRTs a year) and the company is scheduled to make gradual use of the same. In the future, investment from South Korea is expected to gradually increase.

Table I-4-1. Trends in Applications for Investment Promotion

(Unit: Million baht, %)

	1984	1985	1986	1987	Comparison with previous year 86/85	87/86	Share(%) 87
1. No. of Applications	376	325	431	1,057	32.6	2.45Times	-
2. Investment Value	54,896	59,583	59,688	209,003	0.2	3.50Times	-
3. (2/1)	146	183	138	198	-24.6	43.5	
4. Registered Capital	12,240	14,997	15,804	57,189	5.4	3.62Times	(100.0)
Thailand	8,147	10,148	10,962	31,954	8.0	2.91Times	55.9
Foreign Countries	4,093	4,849	4,842	25,235	-0.0	5.21Times	(100.0)
Japan	1,199	443	1,690	9,386	3.81Times	5.55Times	37.2
Taiwan	305	445	602	2,074	35.3	3.45Times	8.2
U.S.	427	2,732	546	1,870	-80.0	3.42Times	7.4
U.K.	390	112	193	233	72.3	20.7Times	0.9
India	128	15	129	848	8.60Times	6.57Times	3.4
Australia	127	36	100	843	2.78Times	8.43Times	3.3
West Germany	141	9	98	75	10.89Times	-23.5	0.3
Hong Kong	249	183	87	851	-52.5	9.78Times	3.4
Malaysia	196	284	58	101	-79.6	74.1	0.4
Singapore	306	27	34	602	25.9	17.7Times	2.4
Netherlands	17	0	5	77	-	15.4Times	0.3
South Korea	4	28	3	426	-89.3	142Times	1.7
Others	604	535	1,297	7,849	2.42Times	6.05Times	31.1
5. Machinery and Equipment Value	24,381	22,603	25,019	113,882	10.7	4.55Times	
6. No. of Thais employed	118,774	76,420	100,681	332,409	31.7	3.30Times	

Source: BOI Monthly Report, Decemher 1987

Note: Order is order of registered capital in value in 1986.

Table I-4-2. Trends in Approvals for Investment Promotion

(Unit: Million baht, %)

	1984	1985	1986	1987	Comparison with previous year 86/85	87/86	Share(%) 87
1. No. of Approvals	266	210	295	607	40	2.06Times	-
2. Investment Value	37,657	54,197	34,610	65,999	-36.1	90.7	-
3. (2/1)	142	258	117	109	54.7	-6.8	-
4. Registered Capital	9,297	7,421	9,203	18,457	24.0	2.01Times	(100.0)
Thailand	6,844	5,537	6,064	10,246	9.5	69.0	55.5
Foreign Countries	2,453	1,884	3,139	8,211	66.6	62Times	(100.0)
Japan	904	169	1,675	3,535	9.91Times	2.11Times	43.1
Taiwan	248	111	46	1,515	-58.6	32.93Times	18.5
U.K.	101	45	291	112	6.47Times	-61.5	1.4
U.S.	294	737	143	574	-80.6	4.01Times	7.0
India	82	12	27	52	2.25Times	92.6	0.6
Malaysia	68	97	130	16	34.0	-87.7	0.2
Hong Kong	181	163	230	351	41.1	52.6	4.3
West Germany	39	11	121	29	11Times	-76.0	0.4
Australia	125	13	16	36	23.0	2.25Times	0.4
Netherlands	64	21	37	54	76.2	45.9	0.7
Singapore	60	37	97	54	2.62Times	-44.3	0.7
South Korea	3	12	4	102	66.7	25.5Times	1.2
Others	284	456	322	1,781	-29.4	5.53Times	21.7
5. Machinery and Equipment Value	18,874	16,892	18,508	35,743	9.6	93.1Times	-
6. No. of Thais employed	64,845	59,374	60,231	200,638	1.4	3.33Times	-

Source: BOI Monthly Report, Decemher 1987

Note: Order is order of registered capital in value in 1986.

Table I-4-3. Cumulative Registered Capital of Investment Promoted Enterprises at the End of 1987

(Unit: Million baht)

	Cumulative Capital Since 1960		Compared with Past Year	Share (%)	
	A. 1960 to End 1986	B. 1960 to End 1987	B/A	End 1986	End 1987
Total	39,709	51,105	28.7	100.0	100.0
Thailand	28,669	35,200	22.8	72.2	68.9
Foreign Countries	11,041	15,905	44.0	27.8	31.1
1. Japan	2,840	6,306	2.22Times	7.2	12.3
2. U.S.	1,866	2,016	8.0	4.7	3.9
3. Taiwan	1,051	1,307	24.3	2.6	2.6
4. U.K.	732	943	28.8	1.8	1.8
5. Hong Kong	556	629	13.1	1.4	1.2
6. Singapore	484	509	5.2	1.2	1.0
7. Australia	322	353	9.6	0.8	0.7
8. Netherlands	311	321	3.2	0.8	0.6
9. Switzerland	193	290	50.3	0.5	0.6
10. Malaysia	259	284	9.6	0.7	0.6

Source: BOI Monthly Report, Decemher 1987
Note: Registered Capital of Companies issued with Approval.

4-2.Foreign Investment System

4-2-1. Investment Promotion Act

The foreign investment system is based on the Investment Promotion Act of 1977 and is supplemented by the Alien Business Law, which regulates the fields of employment for foreigners, and the Announcement of the BOI No. 1/1983 Regarding Criteria in Approving Investment Promotion and Providing Tax Privileges, which designates projects to be encouraged.

The Investment Promotion Act takes a positive stance toward the introduction of foreign investment and provides various privileges to companies engaged in promoted projects without regard to whether they are foreign capital or domestic capital enterprises.

Investment in Thailand goes through the BOI, whether foreign or domestic, when accompanied by privileges and through the Ministry of Industry when in nonpromoted industries.

4-2-2. Investment Promoting Organizations (BOI)

The BOI handles the investment policies and industrial policies of Thailand, and organizationally belongs to the Prime Minister's Office. It has 10 members and is chaired by the Prime Minister and subchaired by the Minister of Industry. It addition, it has as members four representatives from the economic cabinet and government organizations and four representatives of the private banking and industrial world. As can be judged by the lineup of members, this is the highest policymaking organization in the government sector in the field and wields vast powers. Under the committee is an administrative bureau, which supplies the required information to domestic and foreign investors, takes care of investment processing and handles the administrative procedures for approval of applications for promotion. The BOI issues a promotion certificate and gives tax privileges and protection from competing imports separate from the Ministry of Finance, the Ministry of Industry, and other main administrative agencies, so it is a powerful organization.

The BOI has the policy of promoting investments fulfilling the following conditions:

[1] Large contribution to improvement of trade balance through production of export goods

[2] Assistance to resource development in Thailand

[3] Increase of employment

[4] Operation in regional area

[5] Energy saving or substitution of imported energy

[6] Preparation of foundation of and further development of industrial development

[7] Considered important or necessary by government

When giving approval, the following criteria are used to judge the economic factors and technical value of the investment plans:

[1] Whether the manufacturing facilities or the demand for the service are appropriate for the size of production

[2] Whether the production cost is low enough to enable sufficient competition with imports with a maximum 30% import tariff or current tax rate, whichever is higher

Except in cases where the production is primarily for export, the added value must be at least 20% of the sales earnings.

The debt ratio of the new company to its registered capital or the debt ratio of an existing company to its net assets or registered capital (whichever is lower) must be no more than 1:5.

With the exception of cases where use can be made of an old production process (whose effectiveness is certified by a reliable organization and where the BOI approves of its establishment), use must be made of modern machinery and new production processes.

Further, the BOI has established within it the Investment Services Center, which processes all of the various matters related to investment in Thailand and provides advice and information.

The main activities of the Investment Service Center are as follows:

1) Approval of establishment, construction, and operation of factories
2) Issuance of visas and work permits to foreigners
3) Approval of manufacture and sale of pharmaceuticals and food
4) Registration of companies and registration of trademarks
5) Registration of machinery
6) Payment and repayment of tariffs
7) Overseas remittances of foreign currency

4-2-3. Recent, Major Changes in Foreign Investment System

The major institutional changes having an effect on foreign investment since the latter half of 1986 are as follows:

(1) Establishment of Committee on Acceleration of Investment in September 1986

This committee formulates the policies for improvement of the Thai investment environment and for promotion of domestic and foreign investment. The committee is chaired by the Minister of the Prime Minister's Office and is comprised of six cabinet members including the Secretary General of the BOI. In addition, four representatives from private organizations are appointed as advisors.

(2) Relaxation of Standards for Investment Promotion in October 1986

The BOI relaxed the standards for investment promotion in October as follows:

[1] Reduction of the minimum investment value for export industries, not including land prices and operating funds, from 5 million baht to 1 million baht

[2] Reduction of the export ratio in the case of sole investment by foreign capital from the old 80% to 50% for just the first two years after the start of operations

Further, it simultaneously strengthened the privileges given to export companies, applying the exemption on import duties and business taxes for imported machinery not only upon initial installation but also upon replacement, and allowing exemptions for spare parts as well.

(3) Establishment of the Japan Desk in BOI in November 1986

The BOI established a Japanese Investment Desk in its headquarters to promote investment from Japan. Deputy Secretary General of the BOI explained that the purpose of this is to "to eliminate the language and cultural barriers which Japanese companies run across when deciding to invest in Thailand". Most of the staff of the Japan Desk are fluent in Japanese. From the latter half of 1987, there was also a Japanese staff member.

(4) Streamlining of Import Exemption Procedures in December 1986

The tariff system was amended to promote exports. This amendment eliminates the need for companies which have been designated by the BOI for export promotion to have to once pay the tariff or submit a bank guarantee when importing tax free materials used for products which are all exported, unlike in the past.

(5) Reevaluation of Investment Promotion Zones in September 1987

To promote investment in the regional areas, the country was divided into three zones for investment promotion, and different privileges are applied to each.

4-2-4. Investment Promotion Criteria

(1) Promoted Projects

The BOI gives approval for investment promotion to agricultural, livestock, and fishery projects, mining and other industrial activities, and services which meet the following conditions:

1) Use of production processes not existing in, insufficiently existing in, or unmodernized in the kingdom
2) Importance and advantageous to the economy, social development, and security of Thailand
3) Use of means which are economically and technically sound and suited for regulation and protection of the environment

(2) Investment Policies

As its specific investment policy, the BOI strives to promote investment plans fulfilling the following conditions:

1) Savings of foreign currency or acquisition of large amounts of foreign currency through export activities
2) Assistance to development of natural resources present in the country
3) Increase of employment
4) Location in regional area
5) Savings or substitution of imported energy
6) Provision of basic foundation for advanced industrial development in the future
7) Recognized importance or suitability by the government

(3) Criteria for Approval

Further, the BOI has established measures for the promotion of investment plans so as to rationalize and clarify its approvals of investment promotion:

1) Size of the market and the demand for such goods and services plus the presence of room for expansion

2) Initial production costs low enough to withstand competition with foreign countries, at a current level, or not requiring 30% or more tariff protection

3) With the exception of projects where the majority of the production is to be exported, an added value of at least a net 20%

4) In the case of new companies, a ratio of debts to registered capital and, in the case of existing companies, a ratio of debts to surplus assets or capital, whichever is lowest, with a ratio of not more than 5 to 1.

5) Regarding effectiveness, usage of the latest production processes and the latest machinery and equipment is required except when certification from a reliable organization is issued and allowed by the BOI

As opposed to the above, projects which fall under any of the following may not receive investment promotion:

1) Projects for which there are a number of similar enterprises or enterprises engaged in similar activities which succeeded without promotion.

2) Projects in industries which have grown sufficiently and no longer require promotion and so have been suspended by the BOI from the List of Activities Eligible for Promotion.

3) With the exception of exports, projects in industries where the amount of production is sufficient for the next three years.

4) Projects using 100% imported materials and producing mostly for the domestic market and for which the import duties on production are already over 40%.

5) Projects in industries which the BOI announces are suspended from the List of Activities Eligible for Promotion or which are judged by the BOI to be unsuitable for special privileges.

(4) Criteria for Receipt of Foreign Investment

The following criteria are applied to 100% foreign investments and joint ventures:

1) When the products are mainly for distribution domestically, Thai nationals must own over 51% of the registered capital.

2) For investment plans in the agricultural, livestock, fishery, mineral resource development, mining, and service sectors, Thai nationals must own 60% or more of the registered capital.

3) In the case where at least 50% of the production is for export, foreign investors may hold over half of the equity and in the case where 100% of the production is for export, they may hold 100%.

4) When there are justifiable reasons, the BOI may consider the following factors and extend the term of the privileges or attach conditions to the same:

- Investment amount
- Technical level
- Creation of employment in regional areas
- Location of factory
- Social and economic benefits of plan
- Other matters worth consideration

(5) Tax Privileges

To promote investment, the BOI may give the following tax privileges under law:

1) Exemption of corporate taxes
2) Total exemption or reduction of import duties and business taxes on imported machinery
3) Reduction of import duties on imported materials
4) Reduction of taxes on companies established in investment promotion zones
5) Exemption or reduction of import duties to promote exports

(6) Criteria for Tax Exemptions

A-1. A three to eight year exemption from corporate taxes is extended to promoted projects under the following guidelines:

1. Companies with factories located in Bangkok or Samut Prakan Province (outside industrial estates) - First Region

1) No exemptions on import duties are recognized for machinery, except in the following case: Cases where 80% or more of the production is exported or where it is a promoted industry in 5.49 (in case of manufacture of export products, same below)
2) No exemptions on corporate taxes are recognized, except when two or more of the following conditions are satisfied, upon which three years' exemption of corporate taxes is recognized.
   [1] Cases where 80% or more of the production is exported or where it is a promoted industry of item 5.49
   [2] Cases where US$1 million or more in net foreign currency is generated each year

[3] Cases where over 200 workers are permanently employed

2. Companies with factories located in Samut Sakon, Patmuthani, Nonthaburi, and Nakhon Patom (outside industrial estates) - Second Region

1) In principle, a 50% reduction on import duties for machinery. However, total exemption is recognized in the case where 80% or more of the production is exported or a promoted industry of 5.49

2) In principle, three years' exemption on corporate taxes. Further, one year's further extension is possible for each of the following conditions satisfied for a maximum of five years:

[1] Where US$1 million or more in net foreign currency is generated each year

[2] For agro-industries, or where use of domestic agricultural produce is prompted, or where domestic agricultural produce is used as the main materials, or where domestic products are used for over 60% of value of materials used

[3] Where over 200 workers are permanently employed

3. Companies with factories located in industrial estates of Bangkok, Samut Prakan, Nakhon Patom, Nonthaburi, Patmuthani, and Samut Sakon - First Region and Second Region

1) Exemption on import duties for machinery.

2) Four years' exemption on corporate taxes. However, extension to a maximum of five years when fulfilling one or more of the following conditions:

[1] Where US$1 million or more in net foreign currency is generated each year

[2] Cases of agro-industries, or where use of domestic agricultural produce is prompted, or where domestic agricultural products are used as the main materials, or where domestic products are used for over 60% of value of materials used

[3] Where over 200 workers are permanently employed

4. Companies with factories located in other 67 provinces - Third Region

1) Case of attracted projects

A project is an attracted project when falling under any one of the following:

(I) Where 80% or more of the production is exported or what it is a promoted industry in item 5.49

(II) Where agricultural produce or natural resources are used as main materials and where they are supporting agro-industries or use of domestic agricultural produce

(III) Where they produce engineering products

(IV) Industries recognized by BOI as being especially important economically and socially

A-2. The tax privileges given to atracted projects are as follows:

1. Exemption of import duties for machinery.

2. Reduction by 50% of import duties and business taxes on materials used for manufacture of products for domestic sale for one year

3. Recognition of five years' exemption from import duties and business taxes on materials used for manufacture of products for export.

(Note) Export products are exempted from import duties on materials in general even without the investment promotion of the BOI. Here, the five years means the period of application exemption at the BOI. After the five years, the regular application exemption at customs office may be demanded.

4. Minimum four years' exemption on corporate taxes. Further, when complying with the following conditions, the exemption on corporate taxes may be extended for a further year for each condition met to a maximum eight years:

1) Where US$1 million or more in net foreign currency is generated each year.

2) agro-industries, or where use of domestic agricultural produce is prompted, or where domestic agricultural produce is used as the main materials, or where domestic products are used for over 50% of value of materials used

3) Where over 200 workers are permanently employed

4) where location of factory is in industrial estate

5) Where project is recognized by BOI to be of special importance

5. The following additional privileges are provided to investment promotion zones under Article 35 of the 1977 Investment Promotion Act:

1) 90% exemption on business taxes for five years from date of generation of income

2) Recognition of 50% reduction of corporate taxes for further five years after end of exemption from corporate taxes

3) Note, the following additional privileges may be given when the BOI deems it appropriate:

[1] Deduction as expenses of double the expenses of transportation, electricity, and water when assessing corporate taxes for 10 years from the date of generation of income

[2] Deduction from net profit of 25% of the expenses for installing machinery or other construction work for promoted projects

B. General Projects (Other than Attracted Projects)

1. Exemption on import duties for machinery

2. Minimum four years' exemption on corporate taxes. Further, when complying with the following conditions, the exemption on corporate taxes may be extended for a further year for each condition met to a maximum seven years:

1) Where US$1 million or more in net foreign currency is generated each year

2) agro-industries, or where use of domestic agricultural produce is prompted, or where domestic agricultural produce are used as the main materials, or where domestic products are used for over 50% of value of materials used

3) Where over 200 workers are permanently employed

4) where location of factory in industrial estate

5) Where project is recognized by BOI to be of special importance, where the following additional privileges are provided to investment promotion zones under Article 35 of the 1977 Investment Promotion Act:

[1] 90% exemption on business taxes for five years from date of generation of income

[2] Recognition of 50% reduction of corporate taxes for further five years after end of exemption of corporate taxes

[3] Note, the following additional privileges may be given when the BOI deems it appropriate:

a) Deduction as expenses of double the expenses of transportation, electricity and water when assessing corporate taxes for 10 years from the date of generation of income

b) Deduction from net profit of 25% of the expenses for installing the machinery or other construction work for promoted projects

(7) Criteria for Exemption or Reduction of Import Duties and Business Taxes upon Import of Machinery

Tax privileges for imported machinery are recognized in the following cases:

1) When similar machinery is not produced in Thailand to the extent required by the company
2) When domestic production is not possible
3) When manpower cannot be used instead commercially
4) When the machinery used in the production process is of the latest type. However, this does not apply when otherwise recognized by the BOI.
5) Spare parts and replacement of old machinery are not included

(8) Criteria for Abatement of Import Duties upon Import of Materials

The following points are considered in deciding on approval for abatement of import duties on import of materials:

1) The company receiving the privilege must have been in operation for at least six months. However, the following cases are exceptions:
   [1] An application has been made from the start for tax privileges when making application for incentives
   [2] When incentives are disadvantageous due to the reform of the tax system for raw materials and finished goods
2) Consideration is given to the followig points and decisions made on a case-by-case basis:
   [1] Comparison of import duties on materials and import duties on finished products
   [2] Competitiveness with imports
   [3] Effects on other activities and government revenue
   [4] Benefit to government finances
   [5] Other cases deemed suitable by BOI

(9) Criteria for Exemption and Reduction of Import Duties Given for Promotion of Exports

1) Exemption from the import duties and business taxes upon import of materials may be extended when the following conditions are met:
   [1] When 30% or more of the production capacity for the year is exported and the promoted company makes an application for a

bank guarantee of the corresponding tax amount as designated by the Tariff Act No. 9 within six months from the start of imports

[2] Only materials imported for the production of export goods may be covered by the exemption.

[3] In some cases, over one year's extension may be recognized.

2) The exemption from the import duties and business taxes on materials imported for export goods may be changed at the discretion of the BOI.

3) The exemption from the export duties and business taxes on export goods may be changed at the discretion of the BOI.

4) Deductions of 5% of the increase in exports from the previous year may be made when paying corporate taxes

(10) Exceptions

The above are the standards set by the BOI as guidelines for investment promotion. The following exceptions are recognized, however:

Cases where the BOI indicates other conditions

Cases of specific investment activities which the BOI deems important

Table I-4-4. Investment Promotion Incentives and Criteria Put in Force (from September 1, 1987)

	Level 1 Minimum: Reduced	Level 2 Intermediate: Reduced	Level 3 Maximum: Enlarged		Old BOI promotion program
	Two provinces of Bangkok and Samut Prakan	Four provinces of Nakhon Patom Nontaburi, Pratomutani and Samut Sakhon	Remaining 67 provinces (except Laem Chabang and Mab Ta Put)		Industrial promotion zones/ Industrial estates (including Laem Chabang and Mab Ta Put)
Import Duties for Imported Machinery	No exemptions in principle. However, exempteds in following cases:	50% deduction. However, exempted in following cases:	General companies Exempted	Specified companies* Exempted	Exempted
	(1) Export of over 80% of production or production in principle for export (corresponding to 5.49)	(1) Same as left			
	(2) Location of factory in industrial estate	(2) Same as left			
Corporate Income Taxes	No exemption in principle. However, three years' exemption in cases satisfying two of the following conditions:	3 years' exemption. However, additional one year's exemption for each of following conditions satisfied for 5 years' exemption in all.	4 years' exemption However, additional one year's exemption for each of following conditions satisfied for 7 years' exemption in all.	4 years' exemption. However, additional one year's exemption for each of following conditions satisfied for 8 years' exemption in all.	3 to 8 years' exemption
	(1) Export of over 80% of production or production in principle for export (corresponding to 5.49)	(1) Savings in foreign currency or acquisition in same equal to net US$1 million or more per year	(1) Same as left	(1) Same as left	

	(2) Savings in foreign currency or acquisition in same equal to net US$1 million or more per year	(2) Industry producing agricultural products or company promoting use of domestic agricultural products or using agricultural products as main raw materials or one using domestic products for over 60% of raw materials used.	(2) Industry producing agricultural products or company promoting use of domestic agricultural products or using agricultural products as main raw materials or one using domestic products for over 50% of raw materials used.	(2) Same as left	
	(3) Over 200 permanent employees	(3) Over 200 permanent employees	(3) Same as left	(3) Same as left	
	(4) Location of factory in industrial estate	(4) Location of factory in industrial estate	(4) Same as left	(4) Same as left	
		(5) Project deemed particularly important by BOI directors	(5) Same as left	(5) Same as left	
Special Privileges under Investment Promotion Law, Article 35			1. Deduction of up to 90% of business tax on sales of products for 5 years.	1. Same as left	1. Deduction of up to 90% of business tax on sales of products for within 5 years.
			2. Deducti of up to 50% for 5 years after end of exemption period of corporate income tax	2. Same as left	2. Deductin of 50% of corporate income tax for 5 years after end of usual exemption term of corporate income tax or 5 years from date of generation of income revenue.
			3. In some cases, following approval is given:	3. Same as left	3. Following deductions recognized from taxable corporate income:

	(1) Double deduction for 10 years of water, power, and transport costs		(1) Twice water, powe, and transport costs
	(2) Deduction from net profits of 25% of installation or constructin costs of basic business facilities		(2) Up to 25% of installation or construction costs of basic facilitis for 10 years from date of generation of income
Special Rights and Interests in Addition to Usual Rights and Interests	General companies	Specified companies 1. 5 years' exemption of import duties and business taxes for basic materials and main materials imported for use for producing products for export	1. Exemption of import duties and business tax on imported materials, etc. However, conditions, procedures, and period to be determined by BOI.
		2. 1 year's 50% deduction of import duties and business taxes for basic materials and main materials imported for use for producing products for domestic market.	2. Deduction of up to 90% of normal tax rate each time in year for the left article. However, conditions, procedures, and period to be determined by BOI.

* Specified companies are companies which (1) produce over 80% of their products for export or produce in principle for export, (2) use agricultural produce or natural resources as main material, (3) manufacture engineering products, or (4) are deemed important to the Thai society and the economy by the BOI directors.

4-2-5. Privileges under the Investment Promotion Act

The following are the corresponding passages of the Investment Promotion Act:

<Guarantees>

- Said companies shall be protected from nationalization. (Article 43)
- New establishment of state-run enterprises competing with said companies shall not be allowed. (Article 44)
- Monopolization of the market by existing state-run enterprises in the same industry is prohibited. (Article 45)
- Price controls shall not be enforced except in cases deemed necessary by the BOI. (Article 46)
- Export permits for products are guaranteed at all times. (Article 47)
- Exemptions on import duties and business taxes on company products handled by government agencies and state-run enterprises for the securing of domestic sales channels of said products are prohibited. (Article 48)

<Protection>

- Assessment, when necessary, of tax on competing imports once a year to range not exceeding 50% of CIF price so as to protect said product. (Article 49)
- Prohibition of imports of competing products by Ministry of Commerce when above taxes are judged insufficient by BOI. (Article 50)
- Immediate amendment of tariff system when the chairman of BOI (the Thai Prime Minister) deems that current tariff system and investment promotion policies lack compatibility. (Articles 51 and 52)

<Approval>

- The BOI may give entry visas to foreigners entering the country for feasibility studies on investments. (Article 24)
- Skilled foreign workers, engineers, and their families required for a promoted company may be allowed to reside in Thailand longer than the usual time when approved by the BOI and may be given work permits. (Articles 25 and 26)
- When a foreign capital enterprise is promoted, it may own the necessary area of land over the usual limits. (Article 27)
- No legal restrictions are placed on overseas remittances. Restrictions are made in accordance with the Thai foreign currency situation, but there are the following minimum guarantees: overseas remittances of dividends up to 15% a year of the

capital brought in and remittances of principle, up to 20% a year, after two or more years from the date the capital is brought in. (Article 37)

<Tax Privileges>

- When a promoted company imports machinery, an exemption or 50% reduction of the import duties and business taxes shall be given. (Articles 28 and 29, see also Criteria in Approving Tax Privileges, 7. Criteria for Exemption or Reduction of Import Duties and Business Taxes Upon Import of Machinery)
- An exemption of up to a maximum of 90% shall be given on the import duties and business taxes on materials and goods which cannot to be procured in Thailand. However, this shall be only for one year. (Article 30, see also Criteria in Approving Tax Privileges, 8. Criteria for Exemption or Reduction of Import Duties Upon Import of Materials)
- An exemption on corporate taxes (three to eight years). If any loss occurs during the period, expenses may be entered as a carried over loss for a maximum of five years after the end of the exemption period. (Articles 31 and 32, see also Criteria in Approving Tax Privileges, 6. Criteria for Exemption of Corporate Taxes)
- Five years' exemption shall be given on withholding taxes on overseas remittances of goodwill, royalties, and technical guidance fees based on contracts approved in advance by the BOI. (Article 33)
- Deduction from taxable income of dividends during period of exemption on income taxes. (Article 34)

Additional Privileges

1. The following privileges are further provided to companies established in investment promotion zones:

<Additional Privileges for Investment Promotion Zones>

- Exemption of up to 90% of business taxes for up to five years. (Article 35 [1], see Criteria in Approving Tax Privileges, 9. Criteria for Reduction of Taxes for Promotion of Investment in Investment Promotion Zones, 9.1)
- Reduction of 50% of the corporate taxes for a further five years after the generation of income after the end of the usual period of exemption of income taxes or when no income tax exemption is received. (Article 35 [2], see Criteria in Approving Tax Privileges, 9. Criteria for Reduction of Taxes for Promotion of Investment in Investment Promotion Zones, 9.2)

- Deduction from taxable corporate income of double the actual expenses for transportation, electricity, and water. (Article 35 [3], see Criteria in Approving Tax Privileges, 9. Criteria for Reduction of Taxes for Promotion of Investment in Investment Promotion Zones, 9.3)
- In addition to usual depreciation, deduction from taxable income of 25% of the expenses required for construction of infrastructure for any year within 10 years from date of generation of corporate income. (Article 35 [4])

  The investment promotion zones are all 67 provinces with the exception of Bangkok, Samut Prakan, Nakhon Patom, Nonthaburi, Patmuthani, and Samut Sakon.

<Additional Privileges for Export Oriented Industries>

- Exemption of import duties and business taxes on materials for manufacture of export products. Exemption of business taxes on purchases of domestic materials. (Article 36 [1], see Criteria in Approving Tax Privileges, 10. Criteria for Exemption and Reduction of Import Duties Given for Promotion of Exports, 10.1, 10.2)
- Exemption of import duties and business taxes on products for reexport (Article 36[2])
- Exemption of export duties and business taxes (Article 36 [3], see Criteria in Approving Tax Privileges, 10. Criteria for Exemption and Reduction of Import Duties Given for Promotion of Exports, 10.3)
- Deduction from taxable corporate income of 5% of increase in exports from previous year, not including shipping and insurance fees. (Article 36 [4], see Criteria in Approving Tax Privileges, 10. Criteria for Exemption and Reduction of Import Duties Given for Promotion of Exports, 10.4)

4-2-6. List of Activities Eligible for Promotion

The List of Activities Eligible for Promotion, which was announced at the end of February 1988, includes six sectors and 123 industries. The minimum investment, export ratio, Thai equity, and other conditions are clearly set down for each industry. Note that this list is not periodically reviewed each year as in Indonesia and other countries. Rather, new industries may be added at any time and old industries suspended from list at any time too.

[1] Agricultural sector: Large scale cultivation, processing of agricultural produce, feed, meat processing, rubber products, etc. Total: 20 industries

[2] Mining, metal, and ceramics sector: Coal mines, mining, metal refining, metalworking, ceramics (glass, ceramics). Total: five industries

[3] Chemical products sector: Petrochemicals, chemicals, fertilizers, paints, paper. Total: 13 industries

[4] Machinery and electrical equipment sector: Engines, auto parts, assembly of machinery and equipment, production of parts, production of electronic components. Total: seven industries

[5] Other manufacturing sectors: Watches, cameras, ships, maintenance and repair, rubber products. Total: 53 industries

[6] Service sector: Hotels, tourism, warehousing, hospitals. Total: 25 industries

4-2-7. Processing of Applications for Promotion of Investment

The flow of applications processing for investment promotion by the BOI is believed to be as next page.

4-2-8. Summary of Restrictions

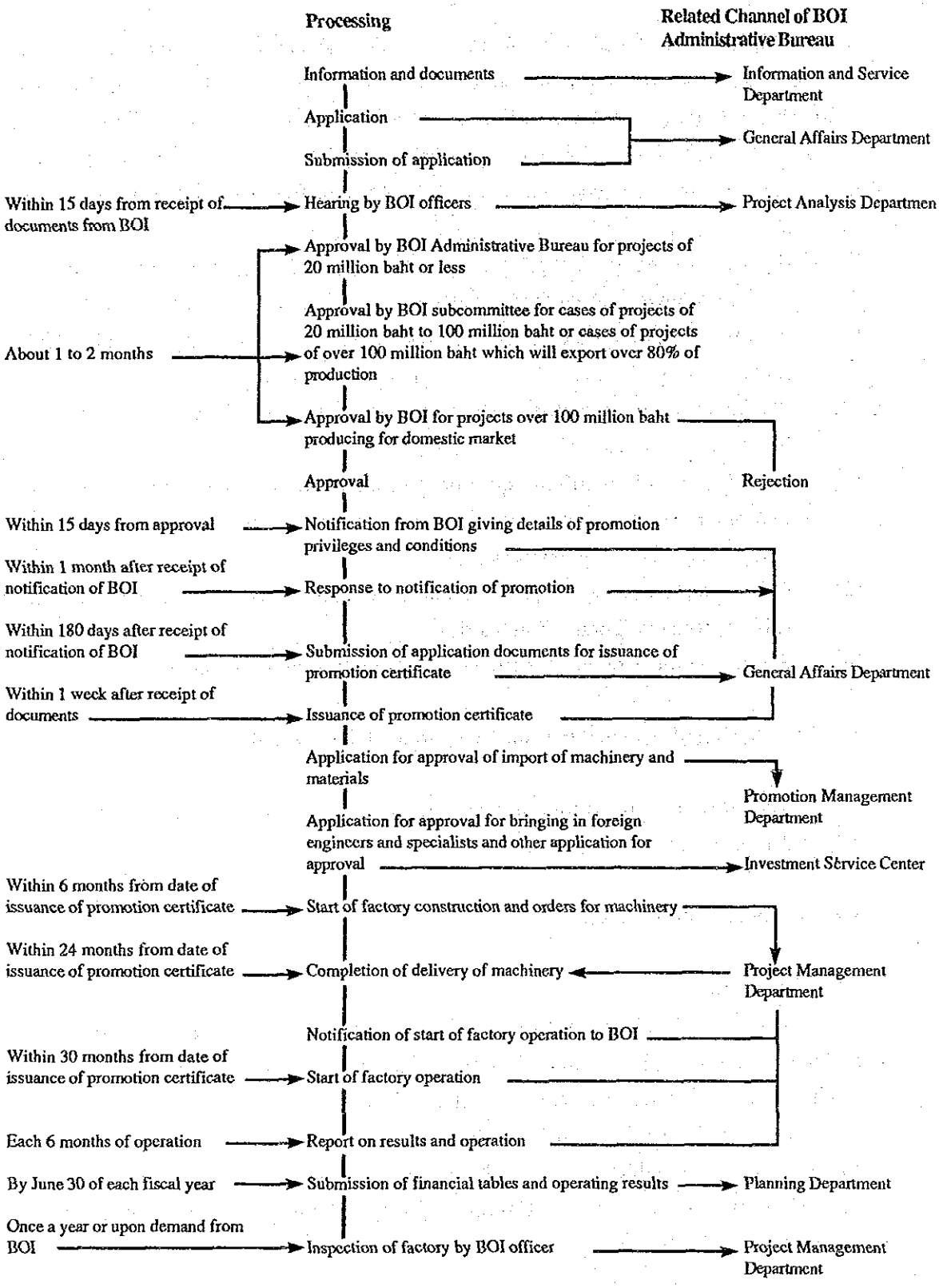
(1) Equity Ratio

The Alien Business Act (established in 1972 and partially amended in 1978) prohibits a foreign majority equity in some industries, such as agriculture and specialized services. The restricted fields are classified into three categories:

List A: Those for which foreign majority holdings are prohibited whether a company is newly established or already in existence - 4 industries, 12 businesses

List B: Those for which foreign majority holdings are allowed only when the project receives investment promotion from the BOI - 5 industries, 37 businesses

Chart I-4-1. Process of Approval of Investment Promotion Application



List C: Those for which foreign majority holdings are allowed when approved by the Ministry of Commerce - 4 industries, 14 businesses

Note that the Announcement of the BOI No. 1/1983 Regarding Criteria in Approving Investment Promotion and Providing Tax Privileges, Article 4 also gives guidelines on the equity ratio of foreign capital for receiving incentives of the BOI.

List A

Industry - 1: Agriculture
- 1) Rice crops
- 2) Salt making (salt fields), including mining of underground salt, but not including rock salt

Industry - 2: Commerce
- 1) Domestic transactions of domestic agricultural products
- 2) Real estate transactions

Industry - 3: Services
- 1) Accounting
- 2) Law
- 3) Architecture
- 4) Advertising
- 5) Brokering or representation
- 6) Auctioning
- 7) Barbershops and beauty parlors

Industry - 4: Others
- 1) Building construction

List B

Industry - 1: Agriculture
- 1) Farming
- 2) Gardening
- 3) Livestock (including silkworms)
- 4) Lumber
- 5) Fisheries

Industry - 2: Industry and Handicrafts
- 1) Rice polishing
- 2) Rice flour production
- 3) Sugar making
- 4) Production of soft drinks and alcoholic beverages

5) Icemaking
6) Drug making
7) Freezing
8) Lumbering
9) Gold, silver, and iron work and other jewelry work
10) Production/casting of Buddhist images and incense burners
11) Wood carvings
12) Lacquerware production
13) Match production
14) Lime, cement, and cement products
15) Stone cutting
16) Production of plywood, cardboard, etc.
17) Production of garments and footwear (excluding those for export)
18) Printing
19) Newspapers
20) Silk spinning and printing of silk fabrics
21) Production of silk fabric, silk yarn, and products using silk cocoons

Industry - 3: Commerce

1) All retailing, except for those given in list C
2) Transactions in mineral products, except those given in list C
3) Sales of various foods and beverages, except those given in list C
4) Transactions in antiques and artwork

Industry - 4: Services

1) Tourist guide services
2) Hotel business, except for management of hotel work
3) Businesses covered by Act on Recreational Facilities
4) Photo studios, film development and printing
5) Cleaning
6) Tailoring

Industry - 5: Others

1) Land, water, and air transport in Thailand

List C

Industry - 1: Commerce

1) All wholesaling except for that given in list A
2) Export transactions
3) Retailing of machinery, equipment, and tools

4) Sale of food and beverages for tourists

Industry - 2: Industry and Handicrafts

1) Production of feed
2) Refining of vegetable oil
3) Spinning, dyeing, knitting,and printing of textile products
4) Production of glassware including light bulbs
5) Production of cups, bowls, and dishes
6) Production of writing paper and printing paper
7) Mining of rock salt
8) Mining

Industry - 3: Services

1) Other services not given in list A and list B

Industry - 4: Others

1) Construction except that given in List A

The "foreign majority" spoken of in the Alien Business Act means the following:

1) *Individuals and corporations not having Thai nationality*
2) Corporations with capital over 50% of which is owned by foreigners
3) Corporations in which foreigners account for over half of the shareholders or partners or business participants regardless of amount of capital investment by foreigners
4) Limited partnerships and unlimited partnerships where foreigners are the joint managers or sale managers

(2) Employment

The Alien Work permit Act of 1987 prohibits employment of foreigners in agriculture, forestry, fisheries, traditional industries, and accounting, law, and other specialized services. Further, the law promotes employment for Thais and replacement of foreign managers and engineers by Thais.

1) Foreigners desiring employment in a company in Thailand must apply to the Labor Department of the Ministry of Home Affairs for a work permit and obtain such a permit. (issued by Labor Department or BOI)
2) The validity of the work permit is usually one year. Those issued under the *Investment Promotion Act are valid for the term of the promotion.*
3) When issuing a work permit, the Labor Department may attach conditions to the employment .

4) The work permits for foreign engineers and skilled workers needed for an investment promoted company can be obtained relatively easily (applications may be made locally).

The activities forming the criteria for the entry permits are as follows:

- Production activities which bring modern technology to Thailand. Use of 50% or more domestic materials. Employment of 20 or more persons.
- Export orientation or promotion of exports. Further, international trade which develops new overseas markets for domestic products
- Travel business causing investment in travel service field and promoting an increase of tourists in Thailand
- Trade and investment offices
- Financial institutions with 20% or more Thai capital participation which introduce over 100 million baht in foreign currency.

Schedule Annexed to the Royal Decree Stipulating Work in Occupations and Professions Prohibited to Aliens 1979

1) Physical labor
2) Employment in agriculture, livestock, forestry, and fisheries or supervision of farms (however, not including special skills)
3) Stone workers, carpenters, and other construction workers
4) Wood carving
5) Driving of motor vehicles or trucks, excepting pilots on international lines
6) Store clerks
7) Auctioneers
8) Accounting, excepting irregular internal auditing
9) Jewel cutting and polishing
10) Barber shops and beauty shops
11) Hand weaving
12) Production of mats
13) Production of writing paper
14) Production of lacquerware
15) Production of Thai musical instruments
16) Production of iron work
17) Working of precious metals
18) Production of bronze work
19) Production of mattresses or sheets
20) Production of incense burners
21) Production of handmade silk products

22) Production of Buddhist images
23) Production of knives
24) Production of umbrellas
25) Production of footwear
26) Production of hats
27) Brokering or representation, excepting international transactions
28) Civil construction, including design and calculations, excepting those requiring special skills
29) Building work including design and drafting
30) Production of garments
31) Production of chinaware
32) Hand rolling of tobacco
33) Tourist guides or tour organizers
34) Traveling salesmen
35) Platemaking in Thai language
36) Hand winding and weaving of silk
37) Office workers and secretaries
38) Legal and court work

(3) Obligation to Use Domestic Products

There is no comprehensive law on the use of domestic products, but one of the requirements for theapproval of investment promotion is a clear indication of the rate of use of domestic items. Furthermore, for automobiles and other specific industries, guidelines are given to raise the local content rate.

(4) Foreign Exchange Controls

Thai's foreign exchange controls are based on the 1942 Exchange Control Act BE2485 and set by other ministerial ordinances and notifications from the Bank of Thailand.

Remittance of Profits

1) When remitting home capital for purposes other than payment for imports, it is necessary to make an application giving the details to the Bank of Thailand. Furthermore, before apploving the remittance, the Bank of Thailand sometimes demands documents such as a bank certification showing that the applicant has enough funds to continue operations. Once the procedures considered necessary are completed, there are few restrictions.

2) The Bank of Thailand normally allows the following remittances:

- Profits and dividends after payment of taxes and subtraction of funds based on the Company Act
- 50% of the projected net profit for first six months of the accounting year
- Principle and interest on loans, fees, and royalties
- Profit when liquidating business and miscellaneous revenue in work

Further, when the remittance is large, remittance in installments is also recognized.

3) In the first two years after investment, it is possible to remit up to 20% of the principle a year and interest on foreign currency loans regardless of the Thai foreign currency situation.

Note that nonresidents are obligated to report when they bring in above a certain value of foreign currency and cannot take out foreign currency which they brought in without reporting it. Furthermore, residents cannot hold foreign currency accounts without obtaining special permission and are restricted in transactions using such accounts when held.

(5) Industrial Property Laws Etc.

1) License Agreements

There is a provision in the Patent Law that license agreements on patents may not inhibit the development of Thai industry, handicrafts, agriculture, or commerce, but in general the government does not exert any control over license agreements or technical transfer agreements. License agreements, however, have to be registered at the Registration Department of the Ministry of Commerce and the Bank of Thailand. Further, the approval of the BOI must be obtained when companies under license seek investment incentives.

2) Patent and Trademark Acts

Patents are protected by the 1979 Patent Act. These must be registered at the Registration Department of the Ministry of Commerce. However, Thailand is not a member of the Paris Convention or other international conventions, so applications must be filed in Thailand without such rights.

Validity of patents	15 years
Validity of industrial designs	7 years

The law provides, however, that anyone may contest the validity of a patent, etc., to destroy the monopoly if the invention has not been used in Thailand for three years since registration.

Trademark Act (1931, 1961)

Validity of trademarks 10 years

Extension is possible through application within three months before the expiration date of the right. Registration may be made with the Registration Department of the Ministry of Commerce or an Investment Service Center. For renewal, no proof is required concerning use of the trademark.

Protection of Literary and Artistic Works Act (1978)

The 1978 act protects rights to literary and artistic works. Thailand has been a party to the Berne Convention on Protection of Literary and Artistic Works since 1931.

3) Royalties

Royalties are paid in general through the formula of a deposit and then a fixed percentage of sales. Revenue from royalties, copyrights, and business rights are exempt from income taxes for five years from the start of business.

(6) Restrictions on Land Holdings

1) The Land Act BE 2497 (1954) allows Thai corporations to hold land, but not, in principle, when foreigners hold more than 49% of the corporation's shares. However, the Investment Promotion Act enables approval of land ownership required for the activities of foreigners engaged in business activities when conditions of the BOI are met.

Note that when promoted companies suspend their business operations or transfer them to other parties, they must dispose of the land held under the approval within one year from the date of suspension of the business or transfer.

4-3. Other Aspects of the Investment Environment

4-3-1. State of Establishment of Industrial Estates

(1) State-Run

As of March 1988, the state was constructing five industrial estates and three export processing zones. The construction and operation of industrial estates is primarily the business of the Industrial Estate Authority of Thailand (IEAT). The IEAT is part of the Ministry of Industry and takes care of industrial estates and export processing zones from the planning stage to development and operation stages. Specifically, it acquires the land for the establishment of new industrial estates and the expansion of old ones, lays the roads, sewage systems, power lines, and waterworks for the construction of estates, prepares other infrastructure, and rents or sells the real estate and movables for operation of the estates. Further, it engages in capital participation in private sector construction of estates.

The industrial estates are summarized below:

[1] Bank Chang Industrial Estate (Minburi Province)

Construction of this was taken over from the Department of Industrial Works by the IEAT. It holds 66 companies. At present, no new sale of plots is scheduled.

[2] Lart Krabang Industrial Estate (Minburi Province)

As of June 1987, there were 42 companies in the estate, of which 25 were in the export processing zone. All of the 1300 rai (about 210 ha) of the existing industrial estate has already been sold. In 1987, the commercial zone was changed to an export processing zone and 17 plots of 50 rai each were sold. These are also sold out. At the present time, a third phase of construction is underway for an additional 1000 rai (about 160 ha). An export processing zone is established in the estate.

A breakdown shows the following:

	Scheduled area	Ratio
General industrial estate	450 rai	45%
Export processing zone	300 rai	30%
Public land	250 rai	25%
TOTAL	1000 rai	100%

The development period is from 1988 to 1989. The schedule allows for some companies to enter from the first half of 1989.

Scheduled Sales Price

The plots are scheduled to be sold from the end of 1988. The price will be an average 950,000 to 1,000,000 bahts/rai (about 3,000 yen/m2) in the general industrial estate and 1,100,000 to 1,200,000 bahts/rai (about 3,500 yen/m2) in the export processing zone.
(Note) 1 rai = 1,600 m2

[3] Bangpoo Industrial Estate (Bangpoo Province)

The Bangpoo Industrial Estate was constructed by a private developer, the Real Estate Development Co. The IEAT has invested in the estate (5%) and maintains its facilities. The estate has an area of 579 ha, making it the biggest industrial estate in Thailand at the moment, but suffers from the problem of a weak foundation. As of June 1987, only 77 companies were in the estate. An export processing zone was established in 1988.

[4] Bangplee Industrial Estate (Bangpoo Province)

This estate was developed by the IEAT and the National Housing Authority (NHA) together with a housing complex and is aimed at small-sized enterprises. There are 59 companies in the estate.

[5] Northern Region Industrial Estate (Chieng Mai Province)

The Lamphun estate was the first estate built in the regional areas. All the necessary infrastructure is provided for the estate, but at the present time only seven companies have located there, for a low occupancy rate of 5%. The estate has an export processing zone, but no company is yet making use of it.

(2) Privately-Run

[1] Nava Nakorn Industrial Estate (Pathum Thani Province)

This is a purely private sector industrial estate built by a private developer. It is the closest of the existing industrial estates to Bangkok Airport. Already 400 ha of the plots of the third stage of construction have been sold and over 100 companies are located there. At the present time, a fourth stage of construction is

Table I-4-5. Summary of Main Industrial Estates (September 1987 Survey)

	Bangchang Industrial Estate	Lat Krabang Industrial Estate	Bangpoo Industrial Estate	Bangplee Industrial Estate	Northern Regional Industrial Estate	Laem Chabang Industrial Estate	Mab Ta Put Industrial Estate
1. Location	30km east of Bangkok	35km east of Bangkok	35km southeast of Bangkok	40km southeast of Bangkok	25km south of Chiangmai	130km southeast of Bangkok	190km southeast of Bangkok
2. Total area (ha)	108.35	206.38	579.30	72.8	280.06	544.0	960.0
General industrial area	86.00	116.35	424.10	62.4	162.11	288.0	800.0
Export processing zone	–	30.00	51.20	–	25.40	224.0	–
3. Year of completion	1972	1979	1977	1984	1985	1989	1989
4. Remaining sites	0	0	311.30	0	176.781	512.0	160.0
General industrial area	0	0	260.10	0	181.381	288.0	160.0
Export processing zone		8.00	51.20	0	25.40	224.0	–
5. No. of investing companies							
General industrial area	66	42	77	59	7	–	–
Export processing zone	–	25	–	–	–	–	–
6. Industries	Auto parts processing, asssembly of home electric appliances, food, chemicals, plastics, machinery, furniture, wood working	Auto assembly, drugs, food, textiles, chemicals, apparel, furniture, electronic components, artificial flowers	Chemicals, food, metals, leather, plastic, textiles, aluminum, furniture, machinery	Food, textiles, plastic, toys, chemicals, computer components, furniture, woodcraft	Auto parts processing, textiles, woodcraft, leather, apparel	Electronic components and other nontoxic industries, plastic, toys, drugs, furniture, auto assembly	Chemicals and other basic industries, metals, large-sized industries
7. Sales price (baht/m^2)							
General industrial area	406.25	468.75	313.125	433.75	125.00	350.00	218.75
Export processing zone	-	618.75	-	–	168.75	362.50	-

8. Service charges and maintenance fees (baht/m^2/year)	0.41	General industrial area 1,125, Export processing zone 3,112	0.56	–	1.875		
Water charges (baht/aaverage)	3.60	3.60	3.60 (1-1,000) 2.50 (more than 1,001)	5.0	6.0	–	–
Sewage treatment charges (baht/ average)	–		5.80	–	5.0 (BOO<200mg/l) 6.0 (BOO=200-300) 7.0 (BOO>300mg/l)		
9. Minimum wages (bahg/day)	73	73	73	73	61	67	61
10. Notes	Oldest industrial estate	Export processing zone could be entered up to end of 1987.	Jointly developed estate with private development company.	Jointly developed estate with housing authority.	Currently two factories in operation. Export processing. zone could be entered until end of 1987.	Export processing zone can be entered in 1989.	Since 1985, salable land has been secured by two to three large corporations.

Source: Thai Industrial Estate Authority

Chart I-4-2. Industrial Estate Development Plan - Sixth Five Year Plan (1987 to 1991)

(Unit: Million bahts)

No.	Project Name	(ha)	Land Acquisition Cost	Construction[2] Cost	Total Investment	1987 1988 1989 1990 1991
1.[1]	Samut Sahkon Industrial Estate	332.8	70.2	527.8	598.0	<---LA---><---DB--><------C--
2.[1]	Small Sized Service Industrial Estate (Nakhon Ratchasima)	24.0	9.12	27.88	37.0	-LA--><--DB--><--C--><--O----
3.[1]	Southern Thailand Industrial Estate (Songkhla Hat Yai)	128.0	44.4	147.8	192.2	<--LA--><---DB--><--C--><--O--
4.	Lard Krabang Industrial Estate Expansion (III)	120.0	60.0	195.0	255.0	<--DOO--><-LA--DB--><--C--><--O
	TOTAL	604.8	183.72	898.48	1,082.2	
5.	Laem Chabang Industrial Estate	286.4				Construction to Take About 30 Months
6.	Mab Ta Phut Industrial Estate	370				

Note: 1. Already Approved by Cabinet
2. Including Interest During Construction

Source: IEAT Materials

DOC - Documentation Approval
LA - Land Acquistion
DB - Design & Bidding
C - Construction
O - Operation

Table I-4-6. Industrial Estates Developed for Investors

	Location	Area(rai)	Opening	Area Lett(rai)	Mode of Land Use
1.	Bang Chan	501	1972	-	Sale
2.	Lard Krabang	766	1979	-	Sale
	EPZ	235	1979	-	Sale/Lease
3.	Bangpoo	3,900	1977	1,500	Sale
	EZP	234	1988	100	Sale
4.	Lamphun	885	1985	800	Sale
	EZP	158	1987	80	Lease
5.	Laem Chabang	2,000	1990	2,000	Lease
	EZP	1,200	1990	700	Lease
6.	Mab Ta Put	6,000	1989	-	Lease
	Expansion	8,000	Planned	8,000	Sale
7.	Bang Plee	440	1984	-	Sale
	Bang Plee 2	450	1988	450	Sale
	Bang Plee 3	900	Planned	900	Sale
8.	Samut Sakhon	1,250	Planned	1,250	Sale
9.	Songkhla/Hat Vai	500	Planned	500	Sale
10.	Phuket EZP	200	Planned	200	Sale
11.	Lard Krabang III	1,000	Planned	1,000	Sale
12.	Nakhon Ratchasima	2,000	Planned	2,000	Sale

Private Industrial Estate: A project approved by and already in operation is Nava Nakom in Pathum Thani Province which is 20 kilometers north of Bangkok Internationl Airport. It has sold 1,000 rai in the first phase and more is being developed.

Soure: Investment News BOI

underway. Of the 60 companies with second stage plots, 90% are Japanese. A further 320 ha is scheduled to be developed in the future.

[2] Bangkradee Industrial Estate (Phatum Thani Province)

This industrial estate is being built by Toshiba Thailand Co., Ltd. and Mitsui Corporation. It has a planned area of 1023 rai and is scheduled to house Toshiba affiliated companies and manufacturers of jewelry, electronic equipment, and products of other nonpolluting industries.

[3] See Racha Industrial Park

An "industrial park" differs from an "industrial estate" in that no incentives are provided. The industrial park is large in size and is used as a factory site of the Saha Pathana group. It has an area of 128 ha.

(3) Plans for New or Enlarged State-Run Industrial Estates

In the future, Thailand plans to newly establish or enlarge industrial estates at the following sites:

[1] Lard Krabang phase 3
[2] Mab Ta Put
[3] Laem Chabang
[4] Bang Plee phase 3
[5] Samut Sakhon
[6] Songkhla/Hat Yai
[7] Nakhon Ratchasima

(4) Export Processing Zones

There are currently three export processing zones: one in Lard Krabang (33 ha), one in Bangpoo (51 ha), and one in Lamphun (25 ha). As of March 1988, only Lard Krabang was occupied (about 25 companies). EPZs are planned for Laem Chabang and Phuket as well.

Export processing zones are industrial estates aimed at the promotion of export industries and are constructed and managed by the IEAT.

Companies locating in the export processing zones (condition of location is export of 100% of production) are automatically given the following privileges in addition to the usual privileges given to companies locating in general industrial estates:

[1] Exemption on import duties and business taxes for imported machinery and imported materials

[2] Rebate on import duties and business taxes assessed on materials purchased from domestic producers

[3] Exemption on export duties and business taxes for exported products

Note that export companies not located in export processing zones can make use of the bonded factory system and also obtain exemptions on export and import duties. This system is therefore used by regionally located export companies etc.

4-3-2. Port Facilities

The main trade ports of Thailand are Klongtoey port, managed by the Port Authority of Thailand (PAT), and Sattahip port, of Chon Buri province. Klongtoey is used most due to its location in the Bangkok metropolitan region, where factories concentrate. In 1987, Klongtoey handled 650,000 containers, according to the PAT.

The average annual growth rate in cargo handled betwen 1980 and 1985 was 17.5%, but with the increase in exports and imports after the yen appreciation, this soared to 26% in 1986 and 33% in 987. If cargo handling continues to grow at the present rate, it will reach 10 million tons (1 million containers) by 1989.

Klongtoey is a river port, so it is shallow and has narrow waterways. Therefore, large-sized vessels cannot enter, making it difficult to deal with the increasingly large size of ships and the greater use of containers.

The container yard is small, so the loading speed has dropped. There is about a one week delay in loading work.

In addition to this congestion of port facilities, there was the problem of the introduction by PAT of mobile cranes. This has exacerbated the situation. It was decided to use mobile cranes until the introduction of gantry cranes and to prohibit the use of ship cranes. The handling capacity of mobile cranes is estimated to be less than half that of ship cranes, and further more, a charge is levied for the use of the mobile cranes. For this reason, there have been strong protests from users. This matter was brought to the attention of the Minister of Transportation, who ordered PAT to suspend use of the mobile cranes in the middle of May. The matter was finally headed toward resolution. However, as seen from this incident, there remains considerable room for improvement in the management and operation of the facilities.

Sattahip is an old military port, but has been made available for commercial use since 1979. At one time, there were plans for its expansion, but the lack of surrounding land and the distance from industrial areas led to suspension of the plans. Instead, it was decided to builtdup Mab Ta Put as a deepwater industrial port.

Table I-4-7. Port Facilities at Bangkok Port and Sattahip Port

(Capacity: Million tons/year)

	No. of Berths	Length/Draft(m)	Capacity
Bangkok Port			
West Wharf	10	172/8.5	2.7
East Wharf			
Container Wharf	6	172/8.5	3
Barge Wharf	2	-	-
Dolphin	15	172/8.5	2
Buoys	6	135/	0.5
Sattahip Port			
West Wharf	3	180/9.0	2.7
East wharf	2	150/7.8	

Source: BOI 1987 materials

Table I-4-8. Freight Turnover at Klongtoey Port

(Unit: Million tons, %)

	85	86	87	88	89
Total Freight	6.36	-	-	-	-
(Compared with Previous Year)	3.3				
Containers	3.88	4.90	6.50	8.63	11.45
(Compared with Previous Year)	15.5	26.3	32.7	32.7	32.7
Containerization Rate	61.0	-	-	-	-

Source: PAT, Projections for 1988 on.

As an alternative to Klongtoey port, where expansion of facilities would be difficult, it is planned to construct a port at Laem Chabang. As mentioned earlier, various problems have arisen concerning the capacity of Klongtoey, so it is hoped that Laem Chabang port will be quickly built and equipped.

4-3-3. State of Other Infrastructure

Electric Power

Power supplies are handled by EGAT from the generation to the primary transmission and by the MEA and the PEA for the later transmission. EGAT power stations had a capacity of 6.46 million kW as of the end of 1985 and were thermal stations generating 26 kWh., 82.9% (using lignite, natural gas, and some oil).

The transmission network is comprised of a 230 kV system of 5200 km, a 115 kV system of 8322 km, and 65 kV system of 933 km. The power supplied to general households is 220V and to business establishments, 380/220V. The power demand has been rising in the metropolitan area at an annual rate of 6.5% and in the regional areas at 12.5%. EGAT's 10-year plans (1986 to 1995) projects an average annual demand growth rate during that period of 7% and calls for raising the generation capacity to 9.12 million kW by 1995.

Fuel and Energy

The main sources of energy in Thailand are natural gas, oil, and lignite. Production of natural gas in the Bay of Siam began in 1981 and has now reached a daily 500 million cubic feet (corresponding to 100,000 barrels of crude oil). This is separated into propane and butane by the natural gas cracking facilities at Rayong Province and supplied in the form of LPG. In addition, it is utilized by the South Bangkok and Bangpakon power stations of EGAT and a cement plant of Siam Cement. Use of chemical fertilizers and fossil fuels is also planned.

Petroleum is produced by the Sirikit oilfields and the Erawan oilfields etc. Production at the Sirikit oilfields reached 20,000 barrels a day. There are refineries in Siiacha (2 locations) and Bangchak with a total refining capacity of 193,000 barrels per year.

Lignite deposits are found in Me Moh in Lampang province in the north and in Kurabi in the south. Me Moh, in particular, has confirmed deposits of 850 million tons (estimated deposits of 1300 million tons), enough for 209 kW power generation for 30 years. Lignite is used by tobacco plants, cement plants, and other industrial sectors in addition to its use for power generation.

Table I-4-9. Power Charge System (Contract Capacity Over 500 kW)

Basic Chartge	Per 1kW	90.00 baht
to 200 kWh	Per 1kWh	1.44
200 to 480kWh	Same as above	1.43
480kWh to	Same as above	1.41

Source: BOI 1987 materials

Table I-4-10. Power Generating Facilities of EGAT

Type	End of Fiscal 1985	
	kW	%
Hydroelectric	1,183,624	28.07
Thermal		
Banker Oil	342,500	5.30
Natural Gas	2,400,000	37.15
Brown Coal	885,000	13.70
Gas Turbine		
Diesel Oil	120,000	1.87
Natural Gas	145,000	2.24
Diesel	33,600	0.52
Gas Turbine Combination Type	720,000	11.15
TOTAL	6,459,724	100.00

Source: EGAT

Roads, Railroads, and Airlines

Thailand has a road density of 0.118 per km2 in the south, 0.113 in the central region, 0.075 in the northeast, and 0.073 in the north - considerable differences according to area. The nationwide average is 0.291 km, higher than the 0.055 km of nearby Indonesia and the 0.089 km of Malaysia. The amount of paved roads rose in the 20 years from 1965 to 1985 from 5,046 km to 15,132 km. The percentage of paved national roads rose from 35.8% to 96.4%. The amount of traffic exceeds 100,000 to 150,000 vehicles on the metropolitan trunk roads on some days. To relieve this congestion, plans are underway for the construction of national highways (according to the Thai Economic Summary 1987, published by Japan Chamber of Commerce in Thailand).

The railroads are mostly single track. None are electric, i.e., all are for diesel engines. From 1985, Japanese-made stainless steel diesel cars began running on the metropolitan lines. There are plans for a mass railroad transit (MRT) system using elevated tracks so as to provide a means of transport cheaper than buses in the metropolitan area.

Air freight services are available at 34 airports including Bangkok, Chiengmai, Hat Yai, Phuket, and Uttapao. There are expansion plans for Bangkok Airport to meet with the growth in air transport demand in the next 10 to 15 years.

Waterworks

Only a low 8% of the regional areas are serviced by waterworks, but there was a 36% increase in connections and a 50% increase in the volume of water supplies from 1980 to 1985. In the metropolitan area, a 30-year plan (1970 to 2000) is underway for construction of waterworks which aims at a daily supply capacity of 4.5 million m^3 by the year 2000. The charge for industrial water supplies is a basic fee of 50 bahts plus 6.22 to 8.7 bahts per cubic meter used (according to 1987 materials of BOI).

Communications

Communications in Thailand are handled by TOT and CAT, both state-run organizations. TOT is supposed to handle domestic telephone traffic, and CAT is supposed to handle telecommunications other than those handled by TOT, but the line between the two's activities is growing vaguer with the arrival of car telephones, data communications, Videotext, and other new services.

The TOT is simultaneously proceeding with a fifth and sixth plan for construction of telecommunications systems and aims at provision of 2.71 telephones per 100 persons and introduction of various data communications services, among other things. The

problems now being faced are a low distribution of telephones, large regional disparities, and the need for improvement of services (to eliminate breakdowns, noise, crosstalk, etc.) In the area of international telecommunications, Thailand began offering facsimile services in 1983 and international dialing in 1984. For car telephones, TOT has adopted the Western European MMT system (covering 2,317 cars as of April 1987), and CAT has adopted the U.S. AMPS system (a network with capacity for 10,000 vehicles comprised of eight stations completed in February 1982).

Telephone rates (amended March 1986) are comprised of a monthly rental fee of 50 baht for dial phones and 100 bahts for pushbutton phones plus 3 bahts per domestic call and 8,000 bahts for telephone installation work. Telex charges are comprised of a monthly rental of 2,000 bahts for the equipment and 500 to 3,000 bahts for use of the lines plus a deposit of 20,000 bahts and installation fees of 10,220 baht.

Table I-4-11. Supply of Energy by Source

	Actual	Projections	
	1982	1991	2000
Oil and Oil Products	10,873	9,769	16,099
Natural Gas	1,300	6,877	9,588
Hydroelectric Power	1,300	2,500	4,127
Coal	766	3,646	6,243
Firewood	646	603	599
Charcoal	1,934	1,957	2,053
Rice Stalks	142	56	60
Bagasse	1,159	1,489	1,695
TOTAL	18,120	26,897	40,464

Source: National Energy Administration: "Quarterly Bulletin," Projection by NEA"

Table I-4-12. Extension of Roads (1985)

Road Density	Paved	0.061
(km/km^2)	Unpaved	0.010
	Planned or Under Construction	0.017
	Subtotal	0.088
Road Length	Paved	0.666
($km/1,000$ persons^2)	Unpaved	0.106
	Planned or Uner Construction	0.190
	Subtotal	0.962

Source: DOH

Table I-4-13. Use of Bangkok Airport (1986)

No. of Passengers	Domestic Flights	1,135,431
	International Flights	6,578,833
Cargo	Domestic Flights	3,120 tons
	International Flights	163,236 tons

Source: BOI

Table I-4-14. Main Indicators of Thai National Railway

Item	Fiscal 1985
Kilometers Operated	3,735
Transport	
Passengers (1,000)	78,013
Passenger-Kilometers (Million Passenger-km)	9,140
Tonnage (1,000 tons)	5,648
Ton-km (Million ton-km)	2,718

Source: Thai Economic Summary 1987

Table I-4-15. *Distribution of Telephones in Thailand*

Item	Bangkok	Regional	Total
No. of Telephone Offices	46	173	219
Switching Facilities (lines)	383,000	187,000	571,000
No. of Telphones	482,000	211,000	693,000
No. of Telephone Subscribers	362,000	158,000	520,000
No. of Telephone Subscribers per 100 person	5.46	0.36	1.03

Source: Thai Economic Summary 1987

4-4. Investment from Japan

4-4-1. Trends in Investment from Japan

(1) Background of Surge in Japanese Overseas Investment

Japanese companies have been rapidly increasing their overseas investments in Thailand and other Asian regions and in the western nations for the following reasons:

[1] A rise in interest in investing overseas due to the rapid appreciation of the yen after the G5 Conference

[2] The need for more international harmonization in exports

[3] A stress on a horizontal division of labor due to the growth in overseas production

Japan may be seen to be working to reduce its exports from Japan proper in fields like automobiles and electrical and electronic equipment - where its export ratio is already high and trade friction is being caused. In these industries, it may be seen to be moving toward overseas production and horizontal divisions of labor within the same corporate groups. In other industries too, the appreciation of the yen has led to major rises in the production costs in Japan and thus companies are shifting their overseas production systems from mere assembly to full-scale production. Along with this, companies investing overseas are becoming more diversified, entering fields not only like automobiles and electrical and electronic equipment, but also, more recently, machine tools, precision machinery, and food processing, etc. The investing companies are also spreading from large firms to medium and small sized ones.

Further, the level of Japan's overseas investment was extremely low compared with the advanced nations of the West in view Japan's its industrial and economic level and so there was considerable room for growth in investment. (Japan had a ratio of overseas production of 4% in March 1985, compared with 17% for the U.S. in March 1984 and 19% for West Germany in March 1985.) (Table I-4-16)

(2) Position of Japanese Investment in Thailand

By cumulative registered capital from 1960 to the end of 1987, Japan accounted for 6,306 million bahts of the 15,905 million baht of registered foreign capital and for a 12.3% share of all investment in Thailand, domestic and foreign, up 5 points from the end of 1986. It accounted for a 39.6% share of cumulative investment from overseas, higher even than its share in 1972 and 1976. Its share in foreign investment had dropped from 38.2% in 1976 to 25.7% in 1986, but there was a surge in investment from Japan to Thailand in 1987. In 1987 alone, approval was given to 3,466 million bahts in

investments from Japan, higher than the cumulative 2,840 million bahts of investment from 1960 to 1986.

Next, a look is taken at Japan's investment in Thailand by industry, using materials from the Bank of Thailand. (Note the materials are current as of 1985.) The figures are for 1981 to the end of 1985, but in any case the investments were largest, in order, in construction (accounting for 39% of Japanese investment during the period), industry (31%), and sales (22%). In the industrial sector, metal and nonmetallic parts (33% of investment in industrial sector), electrical equipment and parts (32%), and textiles (24%) accounted for 90% of the investment in the industrial sector.

A look at the share of Japan in foreign investment in Thailand by industry shows Japan strongest in textiles (76%), metal and nonmetallic products (73%), and construction (66%). A look at the investment trends in 1986 and 1987 shows a large number of investments in metal and nonmetallic products, electrical equipment and parts, and machinery and transport machinery, so it means that the share of Japan in these industries is further rising. (Table I-4-17, 18, 19, 20)

Table I-4-16. Stock Values of Overseas Direct Investment

Countries	1985 Year-End Stocks (US$ Billion)	Ratio of Stocks To GNP (%)	Ratio of Overseas Manufacturing(%)
Japan	44.0	3.3	3.9 (FV'83)
U.S.	232.7	5.8	17.3 ('83)
West Germany	62.4	8.4	19.3 ('84)
U.K.	116.9	25.7	.....

Note: Ratio of overseas manufacturing = A/B
A = Sales volume of overseas manufacturing
B = Sales volume of domestic manufacturing
Source: JETRO White Paper on Overseas Investment 1987

Table I-4-17. Registered Capital by Country Covered by Investment Promotion (Cumulative)

(Unit: Million baht)

	1960-1972	1960-1976	1960-1980	1960-1986	1960-1987
Net Registered Capital	8,020	13,792	19,886	39,709	51,105
(Million bahts)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
1. Thailand	5,450	9,811	15,209	28,669	35,200
	(68.0)	(71.1)	(76.5)	(72.2)	(68.9)
2. Foreign Countries	2,570	3,981	4,677	11,041	15,905
	(32.0)	(28.9)	(23.5)	(27.8)	(31.1)
Foreign Countries By Country					
1. Japan	965	1,521	1,564	2,840	6,306
	(37.6)	(38.2)	(33.4)	(25.7)	(39.6)
2. Taiwan	403	465	644	1,051	1,307
	(15.7)	(11.7)	(13.8)	(9.5)	(8.2)
3. U.S.	356	622	578	1,886	2,016
	(13.9)	(15.6)	(12.4)	(17.1)	(12.7)

Note: Figures in parentheses indicate percent. Figures by country indicate share in total foreign investment.

Source: BOI Activity Report

Table I-4-18. Breakdown of Investment in Thailand by Industry (Net Base for 1981 to 1985)

Investment Value / Industry	Total Investment (81-85) A Million BT	%	Investment from Japan (81-85) B Million BT	%	B/A %	Investment from U.S. (81-85) C Million BT	%	C/A %
Financial Institutions etc.	10.1	0.0	280.7	3.1	2,779.2	315.7	3.0	3,125.7
Sales	5,789.3	17.6	2,010.6	22.4	34.7	992.3	9.4	17.1
Construction	5,400.4	16.4	3,539.1	39.4	65.5	507.3	4.8	9.4
Mining	7,207.2	21.9	6.9	0	0	4,304	40.6	59.7
Oil Development	(6,446.8)	(19.6)	(6.6)	(0)	0.1	(4,265.8)	(40.3)	66.2
Others	(760.3)	(2.3)	(0.3)	(0)	0	(38.2)	(0.4)	5.0
Agriculture	215.7	(0.7)	87.2	1.0	40.4	71.5	0.7	33.1
Industry	10,813.5	32.9	2,772.3	30.9	25.6	3,019.7	28.5	27.9
Food	(607.3)	(1.8)	(Δ212)	(-)	-	(297.6)	(2.8)	49.0
Textiles	(889.9)	(2.7)	(676.2)	(7.5)	76.0	(5.8)	(0)	0.1
Metals and Nonmetals	(1,246.3)	(3.8)	(914.1)	(10.2)	73.3	(Δ72.3)	(-)	-
Electric Appliances and Parts	(3,010.3)	(9.2)	(880.1)	(9.8)	29.2	(1,794.3)	(16.9)	59.6
Machinery and Transport Machinery	(930.4)	(2.8)	(280.8)	(3.1)	30.2	(90.8)	(0.9)	9.8
Chemicals	(1,406)	(4.3)	(200.4)	(2.2)	14.3	(337.1)	(3.2)	24.0
Oil Products	(2,052)	(6.2)	(1.2)	(0)	0	(416.1)	(3.9)	20.3
Building Materials	(84.3)	(0.3)	(15.4)	0.2	18.3	-	-	-
Others	(587)	(1.8)	(16.1)	0.2	2.7	(150.3)	(1.4)	25.6
Services	3,461	10.5	278.5	3.1	8.0	1,383	13.1	40.0
Transportation and travel	(1,178.5)	(3.6)	(117.4)	(1.3)	10.0	(399.5)	(3.8)	33.9
Housing and Real Estate	(505.1)	(1.5)	(Δ3.8)	(-)	-	(329.2)	(3.1)	65.2
Hotels and Restaurants	(584.5)	(1.8)	(8.1)	(0)	1.4	(230.4)	(2.2)	39.4
Others	(1,192.9)	(3.6)	(156.8)	(1.7)	13.1	(423.9)	(4.0)	35.5
TOTAL	32,897.2	100	8,975.3	100	27.3	10,593.5	100	32.2

Source: Prepared from materials of Bank of Thailand

Table I-4-19. Main Industries Invested in Thailand(Comparison of U.S. and Japan)

Japan			U.S.		
	Three Largest Investment Sectors	%		Three Largest Investment Sectors	%
(I)	Construction	39	(I)	Mining (Oil development)	41
(II)	Industry	31	(II)	Industry	29
(III)	Sales	22	(III)	Services	13
Of which, breakdown of industrial sub-sector		(100)	Of which, breakdown of industrial sub-sector		(100)
(I)	Production of Metallic and Nonmetalilc parts	(33)	(I)	Production of Electrical Products and Parts	(59)
(II)	Production of Electrical Products and Parts	(32)	(II)	Production of Oil Products	(14)
(III)	Production of Textiles	(24)	(III)	Production of Chemicals	(11)

Note: 1981 to 1985 share of total investment in industries by country (net base)
Source: Prepared from Materials of Bank of Thailand.

Table I-4-20. High Presence Industries (Comparison of U.S. and Japan)

Japan		Japanese Investment in Industry	U.S.		U.S. Investment in Industry
		Total Foreign Investment in Industry			Total Foreign Investment in Industry
(I)	Production of Textiles	76%	(I)	Oil Development	66%
(II)	Production of Metallic and Nonmetallic parts	73%	(II)	Housing and Real Estate	65%
(III)	Construction	66%	(III)	Production of Electrical Products and Parts	60%

Note: 1981 to 1985 share by country in foreign Investment by Industry (net base)
Source: Prepared from Materials of Bank of Thailand.

Table I-4-21. Trend of Japanese Investment in Thailand

	1982	1983	1984	1985	1986	1987
No of Applications	21	27	32	30	54	204
Investment (Mil. Baht)	2,696	6,515	5,801	6,693	14,729	47,705
Registered Capital (Japan/Mil. Baht)	95	388	1,199	443	1,690	9,387
Employment (Thai + Foreign)	2,651	3,651	9,747	5,207	21,829	85,829

Source: Board of Investment

4-4-2. Current State of Investments from Japan

There were 54 applications for Japanese investment made in 1986, much higher than the 30 applications in 1985, but in the first half of 1987 there were 80 applications, eight times higher than the corresponding period of the previous year, and in the second half 124, for further accelerated growth. In total, there were 204 applications made in 1987, 3.8 times the previous year, worth all together some 477 billion baht, 3.2 times the previous year. In January to March 1988, there were over 80 applications made, which would mean 320 applications on a yearly base.

The Nava Nakorn Industrial Estate is a popular location for Japanese companies. At the present time, it is in the middle of its fourth stage of construction. Of the 60 companies entering in the second stage, 90% were Japanese. As a result, there are some fears about overcrowding. Further, in view of the ESB (Eastern Seaboard Development Plan), there has been an increase in companies locating along the Ban guna (Pataya) Highway and along National Road No. 1, which runs from the airport to Ayutthaya. Since the government review of promotion zones, companies have also invested in the regional areas (Minebea, Shinano Silk, etc.) Recently, Japanese trading companies have been forming industrial estates to deal with the shortage of space. (Table I-4-21)

4-4-3 Japanese Affiliated Companies as Seen from BOI Approved Company List

Picking up and analyzing the Japanese affiliated firms approved by the BOI from 1986 to 1987 from the BOI reports, the following can be seen:

[1] By industry, the share of electrical and electronics related investments in approved investments was 20%, the highest share.

[2] The electrical and electronics related investments (29) were all export oriented, with 80% or more of their production to go overseas. After this, 88% of the consumer goods related investments were export-oriented.

Only 50% of the investments in transport machinery, which requires numerous supporting industries, and ferrous and nonferrous metal products, requiring numerous molds and dies, were export-oriented.

[3] Large Scale Investments in Engines, Textiles, Etc. Due to Policy Changes

There were six projects with total investments per case of over 500 million bahts (2.5 billion yen) in the field of textile spinning and fabrics (517 million bahts to 1,498 million bahts), due to the large capital investment required in the field. Further, there were six in the field of transport materials (784 million bahts to 1,678 million bahts) due to the government policy of domestic production of pickup and motorcycle engines, two in the

Table I-4-22. Examples of Promotions of Investment in Molds and Dies and in Toys

(Unit: Million baht)

Classification and Company Name (Production Item and Quantity, Name of Japanese Investors, etc.)	(Approval Date)	Export Ratio	Registered Capital (Japanese Equity)	Investment	No. of Employees Thai-Japanese
Mr. Tadashi Shimizu (Punch die element, 3,294 sets, etc.)	July 21, 1987	-	20(100%)	89	85-10
..... (Molds and dies for auto parts, 120 sets) (Tripetch Isuzu)	Nov. 21, 1987	50%	25(49%)	123	111-5
Union Itoh Mould Co., Ltd. (Plastic forming molds, 400 sets)	Sept. 1, 1987	-	60(35%)	100	47-3
Thai Stanley Electric Co., Ltd. (Plastic molds, metal dies, 65 sets)	July 28, 1987	50%	53(49%)	29	31-2
Thai Toshiba Electric Ind. Co. (Work tools and jigs 100 sets, press dies 220 sets, plastic molds 40 sets)	Aug. 21, 1987	...	33(45%)	40	70-2
National Thai Co., Ltd. (Plastic molds 40 sets, dies 50 sets)	June 11, 1987	...	111 (49%)	99	51-1
..... (Stuffed toys, 2 million)	Oct. 26, 1987	100%	150 (29%)	40	347-3
Taiji Wakimura (Plastic toys, 700,000)	Sept. 30, 1987	100%	5(100%)	24	217-3
Mr. Kantaro Tomiyama (Plastic toys, 6 million)(Tomy)	Sept. 28, 1987	93%	129(100%)	220	490-15
Yamauchi Sangyo Co., Ltd. (Dolls, 720,000)(Yamauchi Sangyo)	Jan. 28, 1987	100%	5(100%)	14	312-2
Bandai & K.C. Co. Ltd. (Plastic toys and parts, 4 million)(Bandai)	May 12, 1987	80%	50(50%)	113	450-7

Note: Asterisks indicate case of existing company

Table I-4-23. Trends in Investment by Country (1986 to 1987)

(Unit: Million baht)

	BOI Applications				BOI Approvals				BOI Operations Started			
	No.	1986	No.	1987	No.	1986	No.	1987	No.	1986	No.	1987
Foreign Country Total	204	41,700	638	151,200	148	25,211	367	54,400	68	15,970	86	12,160
Japan	54	14,729	204	47,705	35	14,421	130	23,548	11	7,464	30	5,623
Taiwan	35	2,870	178	14,658	23	2,331	100	7,309	17	1,183	8	399
EC	42	16,292	110	33,131	35	6,901	51	6,901	17	1,616	15	1,113
U.S.	23	14,096	58	20,504	14	904	35	5,025	8	2,249	10	1,563
Hong Kong	17	2,006	47	7,044	19	1,966	31	3,335	5	188	11	2,467
Australia	7	587	24	7,388	6	411	11	793	3	682	4	158
Singapore	10	399	36	606	7	397	16	1,711	3	116	4	2,936
Malaysia	9	494	13	586	12	837	5	196	2	108	2	104

Source: BOI, "Investment News", No. 4, Merch 1988.

field of electrical and electronic equipment (Sharp 639 million bahts, Sony 527 million bahts), one in the field of petrochemicals (3,102 million bahts), and two in the field of ferrous and nonferrous metal products (Thai Ferrite 597 million bahts and Tostem Thai 1,336 million bahts).

[4] Large Employment of Over 1000 Workers in Electrical and Electronics Field

There were six companies scheduled to employ over 300 workers in the field of textiles, two in the field of ferrous and nonferrous metals, 12 in the field of electrical and electronic equipment, three in transport machinery, and five in other fields. The most employees to be hired were in the electrical and electronic field, with Thai Aero Products scheduled to hire 12,000 workers (Yazaki Musen), Asahi Electronics 1,385 workers (Asahi Denki), Mizuki Electronics 1,380 workers, and Minebea Thai (printers, microspeakers) 1,147 workers. (See Table I-4-24 to I-4-25.)

Table I-4-24. Number of Japanese Investment Projects Classified by Type of Industry

(Approval Base)

	1986	1987	Total
Food Processing	4	7	11
Chemical Products	2	10	12
Metal Fabrication	3	12	15
Electrical Appliance Parts	4	32	36
Machinery	8	21	29
Transportation Parts	(7)	(17)	(24)
Other Machinery	(1)	(1)	(5)
Medical Equipment	1	-	1
Precision Equipment	1	1	2
Optical Equipment	1	-	1
Textiles	2	14	16
Construction Materials	-	3	3
Wood Products	4	3	7
Others	-	27	27
TOTAL	30	130	160
	[20]	[100]	[120]
			75%

Note: Figure in [ ] indicates number of Japanese investment projects oriented to export (export ratio not less than 80%)
Source: BOI

Table I-4-25. List of Approvals of Japanese Affiliated Companies in 1986, 1987 by Industry

(Unit: Million baht)

Industry	(1) No. of cases share %	(2) 80% exports up (2)/(1) %	(3) Registered Capital	(4) Total Investment	(5) Employees	(6) Foreigners
1. Agricultural produce	16	13	1,573	1,760	1,402	57
	10.1%	81.3%				
2. Textiles	20	14	4,701	7,588	29,015	140
	12.7%	70.0%				
3. Petrochemicals	15	11	1,404	4,015	1,445	43
	9.6%	73%				
4. Forrous and Nonferrous metals	20	11	1,649	3,923	2,533	80
	12.7%	55%				
5. Machinery	9	6	428	1,185	1,102	41
	5.7%	66.7%				
6. Electronics and Electrical	29	29	4,905	7,386	11,478	284
	19.1%	100%				
7. Transport Machinery	22	11	4,027	9,427	3,838	107
	14.0%	50%				
8. OTHERS	25	22	978	1,663	4,376	108
	15.9%	88%				
TOTAL	156	117	19,665	34,400	55,189	860
	100%	75%				

Source: JETRO Bangkok Center
Note: 9 cases, in addition to the total 156 cases, are not classifiable due to lack of information.

4-4-4. Current State of Japanese Affiliated Companies in Thailand

The following materials were obtained by surveys by JETRO Bangkok Center and are current up to December 1985. (See Table I-4-26 to 30.)

Table I-4-26. Japanese Affiliated in Thailand

(as of end of December 1985)

Industry	No. of Companies	Percent share (%)
Manufacuring	208	44.3
Food	18	3.8
Textiles	27	12.1
Lumber and pulp	10	2.1
Oil and Chemicals	24	5.1
Ferrous and nonferrous metal	13	2.8
Machinery	11	2.8
Electronic and electrical equipment	19	4.0
Transport machinery	15	3.2
Others	39	8.3
Representative Offices in Manufacturing Industry	32	6.8
Mining	2	0.4
Construction	52	20.2
Trade and Commerce	95	0.2
Financing and Insurance	31	6.6
Services	26	5.5
Transportation and Warehousing	19	4.0
Real Estate	5	1.1
Others (Government Related Institutions etc.)	32	6.8
TOTAL	470	100.0

Source: JETRO Bangkok Center

Table I-4-27. Distribution of Equity Shares of Japanese Affiliates by Industry

(As of end of December 1985)
(Unit: Cases)

Industry	Total	Less than 10%	10 to less than 20%	20 to less than 30%	30 to less than 40%	40 to less than 49%	49%	50 to less than 100%	100%
Manufacturing	168	1	8	17	9	58	43	25	7
Food	18	1	1	1	1	4	8	2	0
Textiles	27	0	2	7	1	8	6	3	0
Lumber and Pulp	9	0	1	1	0	3	3	1	0
Oil and Chemicals	24	0	1	3	1	9	7	2	1
Ferrous and Nonferrous Metals	13	0	1	2	1	5	1	3	0
Machinery	8	0	0	0	0	5	2	0	1
Electronic and Electrical Equipment	19	0	1	1	3	10	2	1	1
Transport Mahinery	14	0	0	0	0	5	5	4	0
Others	36	0	1	2	2	9	9	9	4
Nonmanufacturing	181	0	4	5	8	34	110	6	14
Construction	45	0	0	0	5	8	31	0	1
Trade and Commerce	72	0	1	2	2	14	329	4	10
Financing and Insurance	14	0	2	2	1	4	4	0	1
Services	20	0	0	1	0	1	17	0	1
Transportation and Warehousing	11	0	0	0	0	5	6	0	0
Real Estate	5	0	0	0	0	1	2	2	0
Others	14	0	1	0	0	1	11	0	1
Total	349	1	12	22	17	92	153	31	21
	(100%)	(0.3%)	(3.4%)	(6.3%)	(4.9%)	(26.4%)	(43.8%)	(8.9%)	(6.0%)

Source: JETRO Bangkok Center

TableI-4-28. Distribution of Japanese Affiliates by Size of Investment (Paid-in Capital)

(As of December 1985)

Paind-in Capital	Japanese Affiliates	%	Manufacturing	%	Non-manufacturing	%
Less than 1 million bahts	54	14.3	5	2.9	49	24.0
1 million to less than 5 million bahts	110	29.2	26	15.0	84	41.2
5 million to less than 10 million bahts	37	9.8	18	10.4	19	9.3
10 million to less than 15 million bahts	39	10.3	25	14.5	14	6.9
15 million to less than 20 million bahts	20	5.3	13	7.5	7	3.4
20 million to less than 30 million bahts	32	8.5	21	12.1	11	5.4
30 million to less than 40 million bahts	16	4.2	11	6.4	5	2.5
40 million to less than 50 million bahts	19	5.0	14	8.1	5	2.5
50 million to less than 60 million bahts	8	2.1	3	1.7	5	2.5
60 million to less than 70 million bahts	6	1.6	6	3.5	0	
70 million to less than 80 million bahts	5	1.3	3	1.7	2	1.0
80 million to less than 90 million bahts	1	0.3	1	0.6	0	
90 million to less than 100 million bahts	1	0.3	1	0.6	0	
100 million to less than 150 million bahts	14	3.7	12	6.9	2	1.0
150 million bahts or more	15	4.0	14	8.1	1	0.5
	377	100.0	173	204	204	100.0

Note: Companies whose capital could not be determined are excluded. Government related institutions, representative office, organizations, and branches are also deleted. However, the branches of three financial and insurance companies are included as they are engaged in business activities locally. Their capital, or funds supplied for their business activities, are counted.

Source: JETRO Bangkok Center

Table I-4-29. State of Employment of Japanese Affiliates in Thailand

(As of end of December 1985)
(Unit: Persons)

Industry	Thai Employees	Japanese Employees	No. of Companies	No. of Thai Employees per Company
Manufacturing	72,143	586	203	355.4
Food	7,503	52	18	416.8
Textiles	31,838	111	27	1,179.2
Lumber and pulp	1,608	17	10	160.8
Oil and Chemicals	4,020	47	22	182.7
Ferroud and Nonferrous Metals	3,544	11	13	272.6
Machinery	5,631	93	11	511.9
Electronic and Electrical Equipment	6,852	62	18	380.7
Transport Machinery	4,681	58	15	312.1
Others	6,392	99	38	168.2
Representatives Office	74	36	31	2.4
Nonmanufacturing	14,895	794	251	59.3
Mining	10	6	2	5
Construction	2,436	206	51	47.8
Trade and Commerce	9,059	355	94	96.4
Financing and Insurance	961	45	27	35.6
Services	633	59	25	25.3
Transportation and Warehousing	1,235	45	16	77.2
Real Estate	53	3	5	10.6
Others	508	75	31	16.4
Total	87,038	1,380	454	191.7

Source: JETRO Bangkok Center
Note: Excluding 16 companies whose number of employees could not be identified.

Table I-4-30. Distribution of Thai Employees of Japanese Affiliates by Size

(Unit: Persons)

Distribution of Employees by Size	No. of Companies	%
1 to less than 50	234	52.9
50 to less than 100	54	12.2
100 to less than 500	103	23.3
500 to less than 1000	29	6.6
1000 to less than 2000	16	3.6
2000 to less than 3000	4	0.9
3000 to less than 4000	1	0.2
4000 to less than 5000	1	0.2
TOTAL	442	100.0

Note: Excluding 16 companies whose number of employees could not be identified. Note that 12 companies not employing any Thai were also excluded, so the numer of companies does not reach the 454 of Table I-4-29.
Source: JETRO Bangkok Center

4-5. Foreign Investment Policy in 3rd Countries

In sections I-4-1 through 4, a grasp was obtained of the current state of the foreign investment policies of Thailand. Here, the foreign investment policies of South Korea, Taiwan, and Japan will be introduced.

4-5-1. South Korea's Foreign Investment Policy

1. Course of Foreign Capital Introduction Laws

South Korea, which suffered an extreme shortfall of the necessary capital for economic development, enacted its first piece of legislation related to foreign capital introduction in 1960. Although that legislation, the "Foreign Capital Introduction Promotion Law", contained measures for taxation reductions and exemptions, and remittance guarantees for principal and profit for foreign investors, investment came mainly from the introduction of foreign capital through loans rather than through direct investment.

In 1966 new legislation, the "Foreign Capital Introduction Act", encouraging direct investment over loans was enacted. The first clause in the law states that the objectives for the introduction of foreign capital are " the appropriate application and administration of foreign currency which will contribute towards the independence of the economy, its sound development and an improvement in the balance of international payments". Based on the objective of improving the balance of international payments export industries and import substitution industries were designated as investment priority industries. The incentives that were offered were preferential measures relating to taxation and also various kinds of guarantees affording the same treatment as given internally, such as foreign remittance guarantees for profits and dividends, recovery guarantees for principal, and assets guarantees. Although no limits whatsoever were set for foreign capital investment ratios, the administration directed that for non-exporting industries the ratio of internal capital must be over 50%. Also, in cases where companies not involved in export industries set themselves up independently the details of their applications for licensing were subject to examination.

In March 1970 the bureaucratic procedures related to investment were simplified and in August of the same year the Economic Planning Agency announced a list of 228 industries for which the introduction of foreign capital was to be encouraged.

Because at around this time the First and Second Five-year Economic Development Plans had recorded results which exceeded the original targets and the

infrastructure for receiving foreign investment was being put in place, with the Masan Export Processing Zone as one such example, manufacturing industry investment from Japan and the U.S. became very active.

In March 1973 the 1966 Foreign Capital Introduction Act was revised with a change towards greater regulations regarding foreign capital. The major changes as a result of the revision were: 1) emphasis was laid on regulations relating to foreign investment, approval criteria were tightened and joint venture investment was given priority; 2) clauses for the revocation of approvals and registration were newly established; and 3) unrestricted recovery of principal was permitted.

In October the same year the Economic Planning Agency announced investment promotion areas which consisted of 138 export industries and 71 import substitution industries. This was followed by the announcement of a set of criteria for licensing in February 1972 in order to prevent companies with unsatisfactory performances from entering industries. Then a month later in March, a new list of investment promotion industries comprising of 17 industries and 236 items was announced. The list specified foreign capital investment ratios, investment quotas and export criteria for each item, and that investment by foreign investors in areas outside the list was forbidden as a rule. The minimum level for investment was set at $200,000 and investment ratios were, in principle, set at an even 50:50.

Thus, a change was made from the once free investment policy to a policy which contained a higher degree of selection and regulations. The reasons for this change were: 1) to restrict foreign investment in labor intensive areas and to safeguard the devlopment of smaller enterprises; and 2) the perception by the South Korean government that there was a lesser need to rely on foreign investment as a result of the steady growth of private companies, mainly centered around the *zaibatsu.*

However, during this period Japanese companies were pulling out of Korea as a consequence of the 1973 oil shock crisis and the tightening of investment regulations. Consequently, since 1976 the amount of forign investment entering Korea has fallen to below a third of previous levels. Then, the second oil crisis in 1978, the 1979 assassination of President Park, the export supremacy of the 1970's, and the appearance of strains in the course of heavy and chemical industrialization all combined to worsen the investment environment.

Faced with this situation, the Zen Do Huan administration relaxed the various regulations governing foreign investment in September 1980. Areas for investment were expanded from the heavy and chemical industries to include energy-related industries and domestic resource development industries, making a total of 56 industries for which 100% investment by foreign investors was permitted. But because the flow of foreign

investment stayed at a standstill the "New Foreign Investment Liberalization Policy" was announced in October 1982 as part of a policy to open up the economy. This was implemented because of the increase in the foreign debt and it was the intention of the South Korean government to control loans, increase the amount of foreign investment, improve international competitiveness through intra-enterprise competition, and improve the level of the industrial structure.

The obligation to export was abolished for some industries in March 1978, and in the autumn of the same year export obligation ratios were decreased or abolished. However, at this time there was a noticeable incidence of companies experiencing business difficulties or withdrawing from business altogether.

In 1984 the 1973 Foreign Capital Introduction Act was revised and in July of that year the excessive regulations and systems governing the introduction of foreign capital were either eased or abolished. The main changes that were made were: 1) a negative list system was adopted for industries for which investment was possible. As a result, industries permitted foreign investment totalled 762 (with a liberalization rate of 76.3%), and the liberalization rate for the manufacturing industry became 92.5%; 2) an automatic approval system was adopted; 3) regulations governing foreign capital investment ratios were abolished; and 4) the introduction of technology was liberalized.

The depreciation of the U.S. dollar which has continued since September 1985, combined with the drop in the price of oil and primary goods and the decline in interest rates, has brought about the "three low" effect which has had the effect of increasing foreign investment in South Korea. This "Three Low Effect" and the 1984 revision of the Foreign Investment Act have increased the amount of direct foreign investment in South Korea. As a means of countering the strong yen the advantages for Japanese companies of using South Korea as a production and exporting base are increasing. Also, the Korean economy itself is improving and there has been significant investment aimed at guaranteed markets and growth areas such as the automotive parts industry.

Although the result of easing regulations relating to foreign investment by the Korean government has been considerable, it is also the move to liberalize policies which has caused foreign investors to reconsider South Korea.

2. Characteristics of South Korea's Foreign Investment Policies

It could be said that generally the fundamental stance taken by the South Korean government in regard to direct foreign investment has been cautious. This is based on the view that when it comes down to it industrialization lies with Korean companies and that it is the role of investment companies to complement this. Up until now the percentage of

direct foreign investment has been no greater than 5.7%, and this is because loans have accounted for the greater part of foreign investment (refer Table 1). However, loans bring with them a serious obligation to pay principal and interest, as illustrated by Mexico's debt problem in the early 1980's. On this point, direct investment does not require repayment, and it is also different from loans in that it is accompanied by the transfer of technology and business knowhow. Recent Korean companies have established a base and have grown to the extent that they support an independent economy. It could be said that it is because of this that the Korean government has moved in the direction of inducing direct foreign investment.

Also, past industrial polcies have had the effect of laying particular emphasis on the *zaibatsu*, so that the small and medium-scale companies which comprise the base of industries have been slow to develop. One of the objectives of the investment in Korea by small and medium-sized Japanese companies as a result of the appreciation of the yen is to strengthen this industrial base.

The increase in South Korea's industrial competitiveness and the increasing level and future potential of its markets have made investment in South Korea attractive to companies from countries such as Japan, the U.S. and European countries. More and more companies are devising strategies which place emphasis on Korea as an international base in the Asian and Pacific region.

The way in which South Korea will absorb the technology and management which foreign companies will bring in the future and the role which the strengthening of the structure of local companies will play will in turn determine the country's future foreign investment policies.

4-5-2. Taiwan's Foreign Investment Policy

1. The Flow of Foreign Capital Policies

The history of foreign capital introduction legislation in Taiwan goes back to the "Foreigner Investment Act" of 1954 and the "Kikoku Investment Act" of 1955. When these laws were enacted, however, the reputation of the Taiwanese economy abroad was less than shining, and the resulting inflow of foreign capital was correspondingly limited.

It would take until 1960, when the "Investment Promotion Act" was passed and private investment began to be promoted, before the inflow of foreign capital would begin to increase.

This "Investment Promotion Act" was a set of general rules regarding investment relationships and served as something of a supplement to the existing "Foreigner Investment Act" and "Overseas Chinese Investment Act." In essence, its aim was to activate private investment with no concern as to whether the capital was domestic or foreign in origin. Among its concrete provisions were investment incentives such as tax reductions and exemptions for investment in specified fields (designated in associated legislation such as the "Types of and Standards for Promotion of Production Ventures" and the "Mining and Manufacturing Industries and Creation of New Ventures and Expansion Promotion Standards"), as well as facilitation of the acquisition of land for factory use.

Concerning the introduction of technology as well, the "Technology Collaboration Act" was put into law in 1962 as one link in a group of industrial modernization policies, and modernization of local industry products and enterprises themselves through the introduction of technology from foreign enterprises was encouraged. Both of these laws were put into effect during the third economic construction plan (1961-64), thus appearing just as export channels began to increase.

While the passage of foreign capital introduction laws helped to bring about increasing foreign capital inflows (the total figure for the period 1951-68 is approximately $1.5 billion), U.S. economic aid, which had made such an important contribution to the development of the Taiwanese economy during that time, was cut off in 1968. In response to this, Taiwan intensified its efforts to attract foreign investment in private enterprise. Specifically, the "Investment Promotion Act" and "Technology Collaboration Act" were significantly reformed in 1964 to allow even more beneficial treatment of foreign capital and strengthen export obligations, and in

1965 the "Processing Exit Zone Facility Administration Act", under which Taiwan's first export free region was created at Kaohsiung, was established.

With the improvements in the investment environment created by these policies, a more stable political situation, and favorable economic performance, foreign investment in Taiwanese private enterprise grew rapidly from the fourth economic plan (1965-68) onwards. Foreign investment during this period was dominated by U.S. and Japanese electrical home appliance and electronics manufacturers. Due to the large technological gaps which were present in the first stages of development, the introduction of foreign capital was accompanied by the introduction of new technologies, and these were to help to bring about drastic development in Taiwanese industry. As a result, the electric and electronics industry grew to become Taiwan's second largest export industry, second only to textiles.

2. Foreign Capital Policies

The security provisions contained in the "Foreigner Investment Act" (current as of late 1986) and the incentives described in the "Investment Promotion Act" are as follows:

(1) Foreigner Investment Act

- Remittance of invested capital and profits
- Inapplicability of restrictions concerning foreigner (including foreign corporations) investment ratio
- Inapplicability of restrictions concerning the nationality and residence of corporate officials

(2) Investment Promotion Act

- A chioce of exemption from corporate taxes for five years from the time of establishment or accelerated depreciation of fixed assets
- Deduction of investment in production facilities
- Reduction of corporate tax on important production ventures
- Reduction of withholding tax for dividends payable
- Exemption from business tax for exported goods
- Deduction of research and development costs

(3) Industrial Parks

In addition to the above, it is worthy of note in relation to Taiwan's foreign capital introduction policies that a number of industrial parks have been developed. Based on the park development regulations provided in the Investment Act, the first industrial park was opened in 1986, and by mid-1986 industrial parks, export processing zones, and science and industry districts had been set up by the government at 64 locations around the nation. Six industrial parks have also been developed by private enterprise. Finally, 30 additional sites have been selected for industrial use, with plans to develop according to need.

References:

Peat Marwick, Investment in Taiwan, 1986.

Taiwan's Industrialization and Export Expansion, JETRO, 1979.

Taiwan's Industrial Parks

(As of August 1986)

	Export processing zone	Science and industry park	Ordinary industrial park
Characteristics	Special industrial parks for export operations	Parks for the promotion of leading-edge technology and industrial technology R&D	Ordinary industrial park
Locations	Taichung, Kaohsiung, Nanhsia (Kaohsiung suburb)	One location in Hsinchu City	60 sites across Taiwan
Conditions	Although there are no absolute conditions, the following two requirements are hopefully to be met: a. A local corporation based on the Foreigner Investment Act (FIA) b. Minimum capital of NT$5 million required to abtain import/export permits • In principal, all products were to be exported, but since 1985 certain percentage of domestic sales allowed. • Added value of the products is to be at least 25% • The operation is to be free of pollution.	• To be engaged in the manufacture or the research and development of advanced technological industrial products and to employ a large number of Taiwanese engineers.	• There are pollution regulations depending on park in question, tending to become harsher each year.
Industries	1. Precision machinery 2. Electronics products 3. Optical products 4. Metal products 5. Plastic products 6. Machine products 7. Furniture, wood decorations, etc. 8. Handicrafts 9. 25 types of electrical, rubber, and chemical products	1. Electronics and information processing industries 2. Precision measuring devices and precision machinery 3. Special industrial materials 4. Energy-saving-related 5. Aeronautics-related 6. Bioengineering-related 7. Other advanced scientific and technological industries	No particular specifications, although certain parks are limited to firms in the petrochemical industry
Tax incentives	1. Those operations falling under the "Productin Venture Promotion Items and Standards" of the Investment Promotion Act are entitled to choose an exemption from corporate taxes for five years (four years in the case of capital expansion) from the time of establishment or accelerated depreciation of all fixed assets. 2. Those firms to which the "Capital-Intensive or Technology-Intensive Important Production Venture" of the Investment Promotion Act is applicable are entitled to a reductin of the corporate tax rate from 25% to 22%.		

	3. Those firms to which the "Production Venture" section of the Investment Promotion Act is applicable are eligible for the following tax incentives: a. 5%-20% deduction of production facility acquisition costs b. An increase in the retained earnings limit such that up to 100% (20% for enterprises engaged in strategic production) of the paid-in capital may be retained 4. Withholding tax on dividend payments by corporations established under the FIA wil be reduced from 35% to 20% 5. Exported goods are exempt from corporate taxes. 6. Tariffs and commodity taxes are eliminated for imported machinery and equipment, raw materials, components, and fuels necessary for productin.		7. Imported raw materials required in the production of products for export are allowed the same exemption as items in the left category.
		8. 20% of the increased research and development costs may be deducted (up to 50% of the corporate tax paid by the corporation in the given period)	
Other incentives		Investment in formof patent rights and know-how is alowed up to 25% of total capital.	
Other	1. Firms may either purchase standard factories or construct their own; the land is rented. 3. Thanks to the collective procesing of administrative duties, the time required to fill out applications for permits, etc. has been reduced. 5. Various administrative agencies have been established.		2. Firms purchase the land and construct their own buildings. 4. Although it depends upon the site, the securing of manpower is relatively easy.

Note: The tax incentives described above are not dependent upon the type of industrial park but rather upon factors such as the industry to which a firm belongs, the presence or absence of FIA, and the presence or absence of exports. The above types, therefore, are provided purely for reference.

Source: Investment in Taiwan, 1986

4-5-3. Japan's Fopreign Investment Policy

In the postwar reconstruction period, the Japanese economy was far behind those of the western countries in terms of capital stock and technical level and suffered from a lack of the foreign currency required for importing raw materials and capital goods. The government took steps to resolve these problems all at once with the establishment in 1950 of the Law Concerning Foreign Investment (below, "foreign investment law") to promote the introduction of foreign investment. There were, however, strong apprehensions over the effect of foreign enterprises with their superior business resources on the growth and development of domestic industries and the development of domestic technology. Therefore, stress was placed on the protection of fledgling industries still in the process of growth. For this reason, the law was considerably restrictive in content.

With its basic intent being the promotion of foreign investment, the law set forth the following two criteria for approval and one for rejection:

Criteria for approval

1. Contribution directly or indirectly to improvement of international balance
2. Contribution directly or indirectly to development of key industries or public works

Criteria for rejection

1. Possible adverse influence on reconstruction of Japanese economy

While the above three criteria were used for judging foreign investment, the government did not release detailed conditions for approval and thus left considerable room of control for decision on administraative praactice. At the time, Japan may be considered to have still enforced strict controls over investment.

On the other hand, to raise the level of technology, in 1951, the government established a system of exemptions for import duties on new-type, high performance industrial machinery which were difficult to produce domestically by designating them as important machinery, so as to promote an infusion of advanced technology.

In 1956, the government moved to relax some of its controls over foreign investment and established a system for free acquisition of yen-denominated shares. This system enabled free acquisition by corporations of the U.S. and certain other designated countries of a certain amount of shares not involving remittance of foreign currency. This

continued up to 1963. Quite a few of the multinational corporations now operating in Japan made their initial investments in Japan under this system.

The foreign investment concentrated in the electrical, gas, metal, transportation and communication, oil refining, and other industries. In particular, it played a large role in the rationalization and modernization of the electric power and steelmaking industries. On the other hand, most of the technology introduced was for the machinery, chemical, and other heavy industries.

In 1964, Japan became an Article VIII member of the IMF and simultaneously joined the OECD. In doing so, it signed the "capital movement liberalization agreement" and "invisible trade liberalization agreement". As a result, Japan was obliged to push ahead with liberalization of capital etc.

Even after signing these agreements, however, Japan took a cautious approach in its liberalization of foreign investment, liberalizing the investment in four stages. In the first stage of 1967, when it began expanding the numbers of industries for which foreigners could freely acquire shares, the number of industries for which up to 50% foreign equity was allowed was 33 and the 17 industries for which up to 100% foreign equity was allowed. By 1973, Japan had in principle liberalized all investment.

Trends in Liberalization of Direct Investment in Japan

Class	Time of liberalization	Group 1	Group 2	Total
First liberalization	July 1967	33	17	50
Second liberalization	Mar. 1969	135	20	155
Third liberalization	Sept. 1970	315	8	323
Automobile	April 1971	6	0	6
Fourth liberalization	Aug. 1971	—	151	—

Note: Group 1 indicates industries in which up to 50% foreign equity was allowed and Group 2 those in which 100% was allowed.
Source: Customs and Tariffs Bureau, Ministry of Finance

The relaxation of the foreign investment law had good effects on introduction of technology as well. The government allowed new technology to be introduced for companies considered to have high potentials for growth into hard currency generating enterprises through future exports. The numbers of new technologies introduced rose from the average 103 cases per year from 1950 to 1959 to an average 469 cases from 1960, when the foreign investment law was relaxed, to 1967, to 1061 cases in 1968, when foreign investment was further liberalized, and to 1154 cases in the following 1969.

On the other hand, the controls under the foreign investment law had for a temporary period limited the companies able to import technology and this resulted in a

stronger negotiating position for them vis-a-vis technology vendors, thus helping to suppress foreign currency payments for technology transfers. The Ministry of International Trade and Industry held down fees of imported technology to less than US$30,000 and, on the other hand, made announcements of technology for which assistance was sought. The fields covered incuded the chemical industry, metal industry, machinery industry, aircraft industry, and electrical machinery industry, all aimed at a transition to a more sophisticated industrial structure. The aim was to purchase advanced foreign technology at as low a cost as possible so as to eliminate the technological gap, which the domestic industries would have difficulty closing on their own.

As seen above, up until the liberalization moves of 1973, Japan, in its development policies, adopted a cautious approach to liberalization of foreign investment in its territory while striving to increase the competitiveness of domestic industry through selective technological transfers.

II. MOLD AND DIE INDUSTRY

II. THE MOLD AND DIE INDUSTRY

1. Analysis of the Present Condition

1-1. Policy Measures for the Mold and Die Industry

1-1-1. The Position of the Mold and Die Industry From an Industrial Perspective

Since industrial policy and export promotion policy as a whole are examined in a separate section, they will not be covered here.

Although there is no existing policy that focuses specifically on the mold and die industry, the government does consider the industry important as a supporting industry for exports. Along with agro-industry and small- and medium-scale factories, the metal processing industry including the mold and die industry, holds an important position in the 6th National Economic and Social Development Plan for the years 1987 to 1991. The BOI (Board of Investment) also began to approve in of the mold and die industry May 1987 as a promoted industry.

The mold and die is included in the "List of Activities Eligible for Promotion" of the Investment Promotion Act, corresponding to item 4.4, Production of components and parts of machinery or electrical equipment, of category 4, Mechanical and Electrical Equipment. Item 4.4 stipulates that there be a capital investment of not less than 3 million baht, excluding the cost of land and working capital.

1-1-2. Example of BOI approval

The case of the first Japanese-affiliated K company mold and die manufacturer receiving approval as a supporting industry to exporting industry.

1) 7 years exemption from corporate tax.
2) 50% tax exemption on business tax for 3 years.
3) 90% tax exemption in the first year on raw materials subject to BOI's approval. Reevaluation from the 2nd year on.
4) 2 years tax exemption on approved equipment.
5) 1 year customs duty exemption on jigs and tools
6) A condition that 80% of goods produced be supplied to mold and die users that are exporting enterprises. The remaining 20% can be supplied to domestic industry. In other words, goods produced are not to be supplied to mold and die users oriented toward the domestic market.

This project was beneficial as an encouragement for investment enterprises that were either exporting industries or supporting industries for exporting enterprises. It is however, a financial disadvantage for the same type of business not promoted by BOI, once 20% of the manufactured goods are delivered to the domestic market.

1-1-3. The Role of MIDI

Although not specifically focusing on the mold and die industry, the government of Thailand established the Metal Working and Machinery Industries Development Institute (MIDI) using approximately 320 million baht in aid from Japan for the purpose of promoting small and medium metal processing and machine industries.

MIDI is affiliated with the Department of Industrial Promotion in the Ministry of Industry. Since MIDI just recently started operations, all the functions supposed to be filled are not yet provided. An outline of its specific functions is as follows:

(1) Support for Technological Improvement

Holding seminars and training courses, extension service to enterprises on a rotational basis, and consulting in areas such as casting, welding, heat treatment, electroplating, machine work, gear-cutting, planning, drafting, and automation technology.

(2) Support for Improvement of Management Skills

Holding seminars and training courses, extension service to enterprises on a rotational basis, and analysis in such areas as metal processing, production control in the machine industry, quality control, cost management, and pollution prevention.

(3) Support for Production Activities

Service to tests, surveys and processing for trial production.

(4) Research and Development Activities (R&D)

R&D in technology appropriate for Thailand,

(5) Technological Information Service

1-1-4. Demands on Import Duties and Other Taxes by Enterprises

According to the survey, many enterprises found it difficult to introduce new machinery because of the high rate of import duties, taxes and other taxes. The heavy tax burden can be considered to have a bad effect on the promotion of the mold and die industry. An example of the high taxes for one case in which machinery indispensable to

mold and die production were imported is given below. In all, the various taxes summed up, amounted to 65.73% of the CIF price. Then, adding in the dealer's profit margin and the interest paid on installment plans, the purchase price paid by the enterprises becomes 2 to 2.5 times the CIF price.

As a general rule, import tariffs apply as *ad valorem* duties. These duties are gradually being lowered. Recently, in December 1986, import duties on raw materials were lowered in order to hasten exporting. However, there is as yet a strong element of protectionism for domestic industry in the tariffs. The cost of raw materials and equipment investment is therefore high for the industries which support exporting industries.

The tax burden on machine tools necessary to the mold and die industry is as follows:

Preliminary Calculations

<CCCN 84059> Machine tools (including way-tape unit head machines) for drilling boring, milling, threading or tapping by removing metal, other than lathes of heading No. 84,58

Using a hypothetical CIF value of 100:

1)	CIF Value		100
2)	Import Duty		30
3)	Subtotal		130
4)	Standard Profit		
	16%	130 x 16% =	20.80
5)	Subtotal		150.80
6)	Business Tax		
	9%		13.57
7)	Municipal Tax		
	as 10% of business tax		1.36
8)	Import duty and miscellaneous taxes		65.73

1-2. Structure of the Industry

Between May and July 1987, MIDI (The Metal Working and Machinery Industries Development Institute) completed a survey on the status of Thailand's mold and die industry. Our study team did not take a question format, but instead focused on visits to the factories. Most of this section is taken from the results of the MIDI survey, and unless otherwise noted, information is based on those results.

1-2-1. Operating Years of Enterprises

In 1985, there were 330 mold and die factories registered by the Ministry of Industry. This figure grew by 31 in 1984 and 30 in 1985. The average annual growth rate was between 10 and 11%.

In a survey issued by MIDI in 1987 to 60 companies, 21 of them, or 35%, had been in operation between 6 and 10 years.

Next, 12 companies, or 20%, had been operating for 11 to 15 years, and 11 companies, or 18.3%, for 16 to 20 years. Finally, 10 companies, or 16.7%, had been around for 20 or more years.

Since Thailand's mold and die industry is said to have begun around 20 years ago with a small factory in the vicinity of Bangkok and Thonburi, it is an industry which has many new factories with short histories.(Table II-1)

1-2-2. Types of Molds and Dies Being Produced

The mold and die manufacturing enterprises can be divided into two: 1) those that produce molds and dies for use within their own companies, and 2) those that manufacture them to sell to other companies. The first category consists primarily of large-scale enterprises such as automobile assemblers, household electronic goods manufacturers, press processing factories, and forging operations. The second category is composed of small-scale enterprises. Some of these small enterprises not only produce molds and dies, but also undertake machine processing.

Of the 60 companies in the 1987 MIDI survey, 25, or 41.7%, were producing molds and dies for metal processing. 24 companies, or 40.0%, were manufacturing simple blanking dies and forming dies. 15 companies, or 25%, were producing compound molds and dies, and 9 companies, or 15%, were manufacturing progressive dies. Only 1 company was producing transfer dies, which require complex, high-grade technology. (Table II-2)

Table II-1. Operating Years of Companies or Factories

Years	1983		1987	
	No. of Factory	%	No. of Factory	%
1. Not known	0	0	0	0
2. More than 20 yrs.	4	6.7	10	16.7
3. Between 16-20 yrs.	6	10.0	11	18.3
4. Between 11-15 yrs.	12	20.0	12	20.0
5. Between 6-10 yrs.	14	23.0	21	35.0
6. Between 2-5 yrs.	24	40.0	5	8.3
7. Less than 2 yrs.	0	0	1	1.7
TOTAL	60	100	60	100

Table II-2. Production of Sheet Metal Die at Factories Surveyed

	Details	1983		1987		Changes	
		Sites	%	Sites	%	Sites	%
1.	Not Producing Metal Dies	22	36.7	35	58.3	+13	+21.6
2.	Simple Blanking forming Dies	35	58.3	24	40.0	-11	-16.0
3.	Compound Dies	22	36.7	15	25.0	-7	-11.7
4.	Progressive Dies	16	26.7	9	15.0	-7	-11.7
5.	Transfer Dies	—	—	1	1.7	+1	+1.7
6.	Others	2	3.3	—	—	-2	-3.3

% means percentage among all factories surveyed.

36 companies, or 60.0%, were producing molds and dies for use with plastics. 33 companies, or 55.0%, were manufacturing blow molds, and 5 companies, or 8.3%, were producing low pressure molds (Table II-3). 35 companies, or 58.3%, were making automobile components. 25 companies, or 35%, were producing household equipment, and 13 companies, or 21.6%, were producing toys. 12 companies, or 20%, were making household electronic appliances (Table II-4).

1-2-3. Enterprise Proprietary Form

33 of the companies, or 55%, were run by single owners. 16 companies, or 26.7%, were incorporated, and 4 companies, or 6.6%, were joint ventures with foreign capital (Table II-5).

Of all the enterprises surveyed by MIDI, 86.61% combined ownership and management. In 33 companies, the owner participated directly in the manufacturing process. 1 company produced molds and dies for use within the company. 1 more company produced molds and dies for use both within and outside of the company. The remaining 31 companies were all manufacturing to sell to other operations.

1-2-4. Workers and the Number of Years of Continuous Employment

Of the 58 companies that responded, there was a total of 869 employees, with the average number of employees per company being 15.0 workers. In 1983, there was an average of 11.9 workers per company with 714 total workers in 60 companies. Therefore, the employee scale is increasing slightly.

The number of workers by factory type is shown in Table II-6. Family businesses with 1 to 4 workers comprised 13.8% of the total. Small-scale enterprises with 5 to 10 workers totalled 48.3%. These two categories combined equal 62.1%.

At 39% of the factories, the average number of years worked by an employee was between 2 and 5. At 33.9% of the factories, employees stayed no more than 1 to 2 years. Combining these two categories, workers at 72.9% of the factories stayed on the job for 1 to 5 years. It is clear that the ratio of employment duration was not very good (Table II-7).

Most companies in which the average number of years worked by the employees exceeded 5 years were not exclusive mold and die manufacturers. They were generally consumer goods manufacturers that produced molds and dies within the company. In such cases, both incentives and benefits to workers were high.

Table II-3. Production of Plastic Molds at Factories Surveyed

	Details	1983		1987		Changes	
		Sites	%	Sites	%	Sites	%
1.	Not Making Plastic Molds	33	55	24	40	-9	-15
2.	Injection Molds	27	45	33	55	+6	+10
3.	Blow Molds	10	16.7	12	20	+2	+3.3
4.	Compressive Molds	6	10	5	8.3	-1	-1.7
5.	Others	—	—	1	1.7	+1	+1.7

Table II-4. Number of Factories by Product Type

	Details	Number of Factories	
		1983	1987
1.	Auto Parts	32	35
2.	Machine Parts	8	4
3.	Electrical Parts	16	18
4.	Electrical Appliances	18	12
5.	Cutlery	8	5
6.	Kitchen Utensils	7	10
7.	Household Equipment	14	21
8.	Office Equipment	6	9
9.	Housing Parts	6	1
10.	Toys	9	13
11.	Plastic Containers	9	9
12.	Footwares	4	4
13.	Decorating Ornaments	6	8
14.	Stationery	4	5
15.	Others	13	8

Note: % means percentage among all factories surveyed.

Table II-5. Nature of Business

Nature of Business	Factory Sites	%
1. Single Owners	33	55
2. Limited Partnership	7	11.7
3. Incorporated	16	26.7
4. Joint Venture with Foreign Capital	4	6.6
5. State-Run	—	—

Table II-6. Number of Workers by Factory Types

	Nature of Business	Number of Factories by No. of Workers						
		1-4 Workers	5-10 Workers	11-20 Workers	21-50 Workers	51-100 Workers	Unknown	TOTAL
1.	Single Owners	6	21	5	—	—	1	33
2.	Limited Partnership	2	3	2	—	—	—	7
3.	Incorporated	—	4	2	5	4	1	16
4.	Joint Venture with Foreign Capital	—	—	2	2	—	—	4
5.	State-Run	—	—	—	—	—	—	—
	TOTAL	8	28	11	7	4	2	60
	Percentage	13.3 (13.8)	46.7 (48.3)	18.3 (18.9)	11.7 (12.1)	6.7	3.3	100

Note: ( )....Except for two factories of which no. of workers unknown.

Table II-7. Correlation Between Level of Education and Consecutive Working Years in the Factory

(Unit: Factory)

Average Working Years	Less than 1 year		1 to 2 years		2 to 5 years		More than 5 years	
Year / Level of Education	1983	1987	1983	1987	1983	1987	1983	1987
1. No Education to Primary Grade 5	6	1	7	13	7	8	9	9
2. Grade 5 to Secondary Grade 4	4	—	8	6	13	10	1	4
3. Graduate from Vocational School or Technical College	—	—	—	1	2	5	2	2
TOTAL	10	1	15	20	22	23	12	15
Percentage	16.7	1.7	25.0	33.9	36.7	39.0	20.0	25.4

1-2-5. Wages

Monthly wages excluding overtime were between 3 thousand and 4 thousand baht at 41.7% of the factories; between 4 thousand and 5 thousand baht were at 30% of the factories; between 2 and 3 thousand baht at 18.3% of the factories; over 5 thousand baht at 8.3% of the factories; and less than 2 thousand baht at 1.7% of the factories (Table II-8).

According to MIDI, employees at 78.3% of 60 companies worked in 1 shift and overtime.

1-2-6. Average Level of Employee Education

The average education of most of the factory employees is as follows: primary-school level and below at 32 companies, or 53.3%; and secondary-school level at 20 companies, or 33.4%. These two categories combined total 86.7%. So, level of technology and skill will not be high. (Table II-9)

1-2-7. Market

Molds and dies are not sold in the marketplace like normal consumer goods, because the customers are metal processing enterprises, automobile parts manufacturers, household electric goods producers, and so on. Thus, most of the goods are produced after being ordered.

Since 14 of the 60 companies produced molds and dies for their own use, they did not need to sell them in the market. The other 46 companies used a variety of methods to reach their customers, as shown in Table II-10. Direct contact by the customer was the most common, as it was cited by 34 companies. Next, 19 companies utilized introductions by former customers. For those companies that were seemed to solicit business, only 1 used the media and 8 employed direct contact with the customer by the factory.

Table II-8. Wages of Workers

	Wages	1983		1987		Percentage of Changes
		Site(s)	%	Site(s)	%	
1.	Less Than 2,000 Baht	1	1.7	1	1.7	—
2.	2,000-3,000 Baht	20	33.7	11	18.3	-15.0
3.	3,000-4,000 Baht	23	38.3	25	41.7	+3.4
4.	4,000-5,000 Baht	12	20.0	18	30.0	+10.0
5.	More Than 5,000 Baht	4	6.7	5	8.3	+1.6

Notes: % means percentage among all factories surveyed.

Site(s) means unit of factories.

Table II-9. Level of Education of Mold Workers

	Level of Education	1983		1987		Percentage of Changes
		Number	%	Number	%	
1.	From No Education to Primary Grade 5	31	52	32	53.3	+1.3
2.	Primary Grade 6 to Secondary Grade 4	24	40	20	33.4	-6.6
3.	Finished Vocational School or Technical College	5	8	8	13.8	-5.3

Table II-10. Ways of Reaching Customers

		Number of Factories	
		1983	1987
1.	No Custmers	18	14
2.	Via Media Such as Newspapers and Yellow Page	—	1
3.	Via Association of Industries	—	—
4.	Via Government Agencies	—	—
5.	Direct Contact by Factory	11	8
6.	Via Former Customers	27	19
7.	Direct Contact by Customers	31	34
8.	Others	—	1

1-3. Major Equipment

1-3-1. Details and Scale of Equipment

On the basis of a survey conducted on 60 companies (including 4 foreign capital joint venture companies) by MIDI in 1987, the types of major equipment in the Thai mold and die industry are as follows:

Lathe	all companies in possession	(100%)
Shaper	56 companies	(93.3%)
Milling machine	57 companies	(95.0%)
with Digital read-out		14.2%
with Profile function		28.5%
with NC or CNC function		4.8%
Grinding machine (Plane)	34 companies	(43.3%)
DO (Cylindrical)	12 companies	(20.0%)
EDM	20 companies	(33.3%)
W/C EDM	5 companies	(8.3%)
Machining center	1 company	(1.7%)

Details concerning the scale of the major equipment of the companies which were acquired during the course of the interview survey are as follows:

Thai Companies (12 companies---combined work force 240)

Lathe	10 companies (83.3%),	41 machines (27.2%)
Shaper	12 companies (100 0%),	35 machines (23.2%)
Milling machine	11 companies (91.7%),	55 machines (36.4%)
with Profile function	3 companies (27.3%),	10 machines (6.6%)
Grinding machine	7 companies (58.3%),	10 machines (6.6%)
EDM	7 companies (58.3%),	10 machines (6.6%)
W/C EDM	0 companies (0.0%)	
Machining center	0 companies (0.0%)	
	TOTAL: 151 machines	0.63 machines/ employee

Foreign Capital Joint Venture (6 companies---combined workforce 187)

Lathe	3 companies (50.0%),	3 machines (5.6%)
Shaper	2 companies (33.3%),	2 machines (3.7%)
Milling machine	6 companies (100.0%),	23 machines (42.6%)
with Profile function	3 companies (50.0%),	3 machines (5.6%)
Grinding machine	4 companies (66.7%),	9 machines (16.7%)
EDM	3 companies (50.0%),	8 machines (14.8%)
W/C EDM	2 companies (33.3%),	3 machines (5.6%)
Machining center	2 companies (33.3%),	3 machines (5.6%)
	TOTAL: 54 machines	0.29 machines/ employee

Although the results of the above survey do not cover the parameters of the whole Thai mold and die industry, these results gained through interviews and inspections of factories are sufficient for a rough grasp of trends and characteristics. The characteristics of the Thai mold and die industry relating to types of equipment and their scale are outlined below.

(1) Thai Mold and Die Enterprises

1) Today, as in the past, lathes and shapers are used as the main means of machine processing molds and dies. Most of them are old and are in addition second-hand machines.

2) There has been a rapid increase in the installation of milling machines and they have already become the main means for machining. However, most of them are operated manually.

3) Although the number of companies which possess milling machines with profile functions is increasing, those which have digital read-out or NC functions, that is, functions that are required for the next step, are to be found in only a very few companies.

4)Many of the various types of milling machines, which should comprise the core of machine processing for molds and dies, are old,and what is more, because of the problems which arise concerning machining capacity as a result of the insufficient diameter of the spindles, many of them are not suitable for heavy cutting.

5)The number of companies which use EDM, is increasing rapidly, but although it has become fashionable to acquire EDM they still account for a small proportion of the total number of companies. The industry is in the first stage of adopting W/C EDM.

(2) Mold and Die Divisions of Foreign Capital Joint Venture Companies

1) The installation ratio for shapers and lathes is low and there is a strong emphasis on machining by using milling machines. They follow the normal pattern for mold and die processing.

2)Compared to Thai companies the ratio of companies which have finishing machines such as surface grinders is high, and the equipment of the companies is relatively balanced.

3)Furthermore, a change over is taking place to numerical control for major processing machines such as EDM and W/C EDM.

4)Types of machine tools which have profile machining functions are in the process of being replaced by NC milling machines and machining centers.

5) The reason why the ratio of machines per worker in these companies (0.29) is lower than the ratio for Thai companies (0.63) is because investment in the equipment is recent and there are few old machines.

(3)The position and the composition of Major Equipment in the Thai Mold and Die Industry

The composition of major equipment for specialist mold and die companies in Japan compared to (1) and (2) above is listed below (based on a research report of urban companies entitled "Plant Equipment in Companies with Less Than 10 Mold and Die Process Workers" compiled by the Yokohama City Medium and Small Enterprise Guidance Center):

Lathe	6.1%
Shaper	7.6%
Milling machine	39.4%
Grinding machine	22.7%
EDM	4.5%
W/C EDM	13.6%
Number of machines per worker	2.4

For reference, the equipment of Japanese Company A, which is considered most representative of companies in Japan today, is as follows:

Lathe and shaper	0
Milling machine	6
NC milling machine	2
Grinding machine	10
(plane, cylindrical, project, tool, jig)	

Jig borer	1
EDM	2
NC EDM	1
CNC W/C EDM	1
Machining center	1
3 dimensional CAD/CAM	1 (system)
Heat treatment furnace	2 (sets)

[Company A employs 12 workers, of whom the average age is 37. Out of the 12, 8 possess the qualification of 1st grade National Certificate Technician and 4 have qualified for the 2nd grade.]

The process of change which has occurred in Japan up until the present day in regard to main processing machines is as listed below:

1st phase	lathe, shaper
2nd phase	milling machine, profile milling machine
3rd phase	profile milling machine, NC milling machine, NC EDM, NC W/C EDM
4th phase	3rd phase plus cutting machines with machining center

Today there is much research and development relating to high precision automatic processing with utilizes CAD/CAM or CAE, and in some cases it has entered the implementation stage.

Judging from the main types of equipment used, the Thai mold and die industry in general is in the process of leaving the lathe and shaper phase and is entering the milling machine phase. Foreign companies specializing in mold production and foreign companies which have in-house divisions, which have a high capacity for self-supply of molds are somewhere between the 3rd and the 4th phases, and the medium and small-size Thai companies which comprise the majority of producers are somewhere between the 1st and 2nd phases. Companies which supply molds and dies to companies which export such as medium-scale Thai companies, or large companies with in-house divisions which are mainly foreign capital companies, can be placed between the 2nd and 3rd phases.

However, as already mentioned in relation to processing machines, due to the high percentage of old machines and the lack of maintenance over the years, the control of precision has been ignored except in the companies affiliated with foreign capital,and this presents a major obstacle to maintaining and improving the precision of molds and dies. Furthermore, a high number of cutters which were inferior in quality due to scratches and

wear were observed, and there is a serious problem in the actual maintenance and control of cutters, which determine the state of finishing for machining.

(4) Measuring Instruments and Tools

1) The situation concerning measuring instruments and tools which are used in the mold and die industry is set out in Table II-11, and is restricted to instruments which obtain the minimum in basic measurements. This corresponds closely to the perception of the situation which was gained in the process of the Thai survey.

2) With the exception of the foreign companies, hardly any surface plates were to be seen, although these form the basis of machine processing which sets measuring standards. Even in the few incidences where they were seen they were used as work benches.

3) Despite being important basic instruments and tools, they are treated badly, as if they were the same as general tools. Also, there were no signs of any regular checks being made.

4) As will be mentioned later, many of the companies in the Thai mold and die industry have little understanding of mold precision, and there is a particularly low level of understanding concerning the importance of measuring instruments and tools as being indispensable for raising the quality of molds and dies, nor is there much interest in investing in such instruments.

5) As a result, with the exception of some of the foreign companies, there is still only a low level of investment in optical measurement instruments or profile measurement instruments as a method for obtaining molds which are high in precision and quality.

For reference, the types of measuring instruments which Company A introduced at (3) has are:

- Three dimensional measuring instrument
- Universal projector
- Material testing machine (compression, tension)
- Surface testing machine (statical and dynamical friction)
- Surface roughness measurer
- Perfect circle measuring instrument
- Contact tester
- Contour measurement instrument
- Hardness tester (Vickers, Rockwell)
- System microscope
- Stereoscopic microscope
- Other

Table II-11. Tools and Equipment Used in Gauging

	Details	1983 Sites	1983 %	1987 Sites	1987 %
1.	Ruler	33	55.0	47	78.3
2.	Vernier Caliper	59	98.3	59	98.3
3.	Outside Micrometer or Dial Gauge	37	61.7	24	40.0
4.	Inside Micrometer or Depth Micrometer	23	38.3	14	23.3
5.	Gauge Block	9	15.0	10	16.7
6.	Digital Readouts	6	10.0	15	25.0
7.	Others	5	8.3	1	1.7

1-4. Technicians and Skilled Workers

The ratio between companies and the number of workers employed in the Thai mold and die manufacturing industry is more or less the same as that shown by the results of a survey undertaken at 60 companies by MIDI in 1987. According to the survey, companies with under 10 workers accounted for 62.1% of the companies in the industry, and those with under 20 workers accounted for 81.1% of companies.

According to a survey of 11,923 factories in Japan undertaken by the Japan Die and Mold Manufacturers Association in 1987, 80.2% of Japanese manufacturers employed less than 10 workers and those with under 20 accounted for 91.4% of the factories within the industry. Therefore, basing the scale of the companies on the number of workers they employ, it is possible to conclude that Japanese mold and die manufacturers are smaller than their Thai counterparts. Although there are no Thai statistics covering companies with more than 100 workers, in Japan they account for only 0.6% of manufacturers within the industry (Chart II-1).

However, although Japanese mold and die manufacturers have not yet lost their labor-intensive quality completely, the industry has basically finished changing over to being an equipment-oriented industry. In contrast to this, the Thai mold and die industry is still a typically labor-intensive industry.

Consequently, judging from the companies themselves, their scale and the development process of Thai industry up until the present day, and the resulting weak industrial base, it is easy to surmise that there are still insufficient numbers of technicians and skilled workers within the companies and that they have yet to reach an adequate level in terms of technology and skill.

An analysis of the present state of the Thai mold and die industry is provided below from the perspective of the usual number of technicians and skilled workers for each occupation in companies and the industry as a whole.

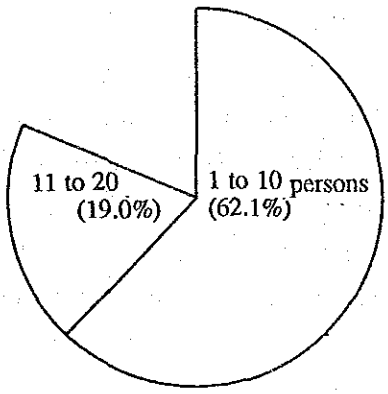
1-4-1. Design and Drafting Experts

(1) Design Scale (using only actual results obtained during the survey)

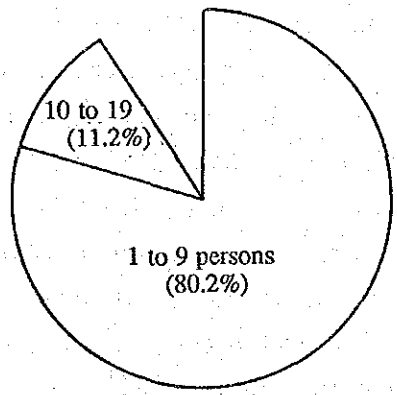
The Companies which obtained the actual number of designers and draftsmen during the factory survey are as stated below.

Thai mold manufacturing companies	21 companies,	total employees	688
Japanese specialist co.s/in-house divisions.	11,	"	424
Thai parts/processing specialist co.s	3,	"	116

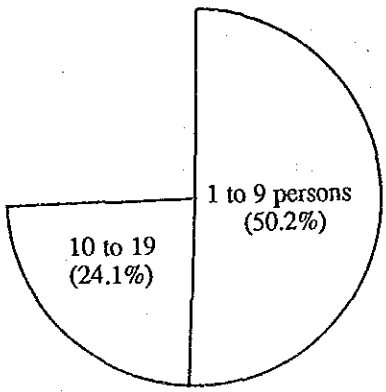
Chart II-1. Percent Share of Small-Size Mold and Die Companies



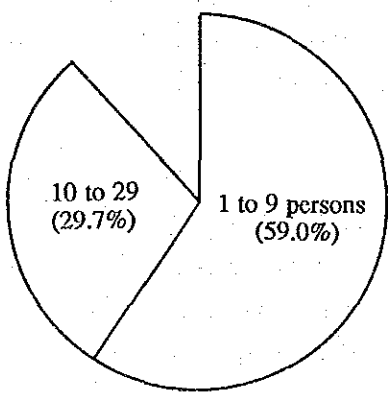
Thai Mold and Die Industry
(1987 MIDI survey of 58 companies)



Japanese Mold and Die Industry
(1987 Japand Mold and Die Manufacturers Association material on 11,923 business establishments)



South Korean Mold and Die Industry
(Korean Mold and Die Industry Review 1987 covering 1,055 companies)



Taiwan Mold and Die Industry
(Exchange Association, "Mold and Die Industry in Taiwan 1982," 525 companies)

1) Design Scale of Thai Mold and Die Manufacturers

Companies with full-time designers 2 companies, 7 employees (includes 5 from Sammitr Motor Manu.Co., Ltd.)

Companies with designers-cum-draftsmen. 5 companies,30 employees

Companies with full-time draftsmen. 2 companies, 11 employees (includes 10 from Sammitr Motor Manu.Co., Ltd.)

* Companies which carry out design and drafting in one form or another and the number of employees

8 companies (38.1%), 48 people (7.0%)

* Companies which carry out no design or drafting

13 companies (61.9%)

[1987 MIDI survey ; the ratio of companies which depend on customers for design is 56.7% and the ratio of those with no draftsmen is 63.3%. (Table II-12 &13)]

2)Design Scale of Japanese Specialist Co.s/In-house Divisions

Companies which carry out design and drafting in one form or another and number of employees

8 companies (72.7%), 63 employees (14.9%)

Companies which carry out no design or drafting

3 companies (27.3%)

[One company is provided with all its plans by its Japanese parent company. The other 2 just carry out maintenance.]

Design Scale of Thai Parts/Processing Specialist Companies

Companies specializing in parts manufacture

2 companies, 1 employee in charge of design

Companies specializing in electric spark

1 company, 3 machining employees in charge of making NC tape

(2) Characteristics of Thai Mold and Die Companies relating to Design Scale

1) 61.9% of Thai companies do not have design divisions or carry out design. According to the results of MIDI's surveys undertaken in 1983 and 1987 the proportion of companies relying on customers for designs increased from 26.7% to 56.7%, or showed more than 100% increase in the intervening four-year period. This shows that

Table II-13. Number of Full-Time Draftsman

	Number of Draftsman	1983 Sites	1983 %	1987 Sites	1987 %
1.	None	37	61.7	38	63.3
2.	1-2	16	26.7	13	21.7
3.	3-5	5	8.3	4	6.7
4	More Than 6	2	3.3	5	8.3

Table II-12. Designers of Molds

	Designers of Molds	1983 Sites	1983 %	1987 Sites	1987 %
1.	Factory Owners	28	46.7	19	31.7
2.	Designers	21	35.0	14	23.3
3.	Supervisors	7	11.7	5	8.3
4.	Mold Technicians	9	15.0	10	16.7
5.	Customers	10	26.7	34	56.7

design and machining /assembly are rapidly becoming more distinct in the Thai Mold and Die Industry.

2) The ratio of the number of Japanese affiliated companies which have design and drafting-related staff and the proportion of the companies' total work forces comprised by such staff are 72.7% and 14.9% respectively, but 38.1% and 7.0% respectively in the case of Thai companies, which is approximately 50% of those of Japanese affiliated companies.

3) According to MIDI's 1987 survey, the percentage of companies with no draftsmen was 63.3% or a 1.6% increase compared to four years previously. The percentage for companies with less than 5 employees decreased from 28.4% to 6.6%.

4) From the above it can be said that Thai mold and die manufacturers generally have an extremely low level of appreciation of the importance of design technology and skills and the need for capital investment in this area, and moreover, this trend is getting worse.

5) On the other hand, the ratio of companies with more than 6 draftsmen rose gradually to 8.3% in 1987 from 3.3% in 1983, and from this it can be concluded that a gap is appearing in relation to efforts spent in the area of design between the larger and the medium and small-scale manufacturers in the industry. Sammitr Motor Manu. Co, Ltd. has 5 design experts and 10 draftsmen in its in-house mold and die division. It is worth noting that it has adopted a design system which clearly makes a distinction between technology and skills, and also that it is taking constructive measures to foster design experts with help from outside as well as inside the company.

6) The 2 parts manufacturing specialist companies and the single electric spark machining specialist company included in this survey do not have designers in the true sense of the word. They process or make NC tapes by using plans from their customers or on the basis of standard parts catalogs of foreign manufacturers.

(3) Technical level Standard of Design and Drafting for Molds and Dies

While according to MIDI's 1987 survey the number of companies with no designer or draftsman is on the increase, the ratio of workers who have received education of a higher level provided by vocational schools or colleges institutes is increasing. It was learned from the interviews that most of these employees are in charge of design-related work. Moreover, the MIDI survey found that the average length of service of these employees with tertiary education is nearly 5 years (Table II-7).

The above helps to show that, although it does not apply to all companies, Thai companies are beginning to realize the importance of the considerable effect which design and design capability have on the quality, production process, delivery, cost of molds and

dies and productivity of manufactured goods. Nevertheless, an overwhelming number of company operators have little appreciation of this importance and actual design capability of designers within those companies is of a low level. For some examples:

• The technical level of the designers who have graduated from a university or technical college and who have been trained within the company through some means or another is such that they can design similar things repeatedly and can design imitation products. However, they have difficulty designing new or precision molds, and they are restricted to simple molds for lower to medium grade products.

• Even if product plans are treated separately, there are many companies which cannot draw mold plans satisfactorily, and more than half rely on plans supplied by their customers;

• There are many cases where design and drafting are regarded as the same. There are few companies and designers who understand that mold and die design is a comprehensive engineering technology combining metal processing, molding (plasticity), and mass production based on fundamental engineering such as dynamics, material engineering, mechanical engineering and measurement engineering. In this respect, there is a huge gap between Thailand and advanced countries.

• The drawing methods and the form of plans drawn by draftsmen more or less follow the correct order of drafting techniques. The appearance of the plans is good and there is no problem with the ability to draw. However, there were many indications that there is insufficient understanding as to the significance of and the degree of quality required in relation to surface finishing, roughness and waviness, etc. There are also indications of insufficient understanding concerning the meaning and way in which dimension tolerance should be taken.

• It seemed that among the company operators there were more than a few who were under the mistaken impression that once they introduced CAD/CAM system they would immediately be able to undertake true design.

1-4-2. Numbers and Role of Production Management Staff

There is no statistical survey data available which covers production management in the Thai mold and die industry, the numbers of staff, or the role of staff. The following information has been gathered on the basis of the interview survey.

Nearly all of the Japanese affiliated companies which have in-house mold manufacturing divisions adopt Japanese-style production management systems. What is more, because their systems are part of the companies' overall control system, staff have been put exclusively in charge of the various stages and groups of stages requiring control, such as product planning, processing, progress, delivery and supply of materials,maintenance of machines and tools, quality, inspection, etc. In most of these Japanese affiliated companies, Thai technical experts who have received guidance from Japanese staff from either the Japanese parent company or those in Thailand have been put in charge of such duties.

In the case of Thai mold and die companies, it is difficult to distinguish which employees work as production management staff, regardless of whether the staff attends to this task exclusively or performs other jobs as well. Out of the 21 companies interviewed for the survey there were four which said that they did not have any production management staff. Three companies said they had such staff (for the one company which provided actual figures: 1 staff member in charge of processes and 2 in charge of quality control). The other answers did not specify, but these include some who replied that the operator of the company himself takes charge of this task.

Two of the 3 companies which replied that they had production management staff are large Thai companies producing mainly finished items and which have in-house divisions, and it is thought that their control systems are the same as those used by Japanese companies.

It can therefore be concluded that the majority of Thai mold and die manufacturers do not have staff who are responsible for carrying out systematic and organized production management.

In contrast to this, both of the interviewed companies specializing in the manufacture of parts have staff who have been placed in charge of production management, and as much as 12.3% of their total employees have been assigned to control duties.