

3. SELECTION OF TARGET INDUSTRIES AND POTENTIAL INVESTORS FOR THE LEAM CHABANG EPZ/GIE

This chapter consists of three sections and the first is "Theoretical Approach to Selecting Target Industries".

Although the first section is theoretical, the second is practical. It is an analysis of the questionnaire survey which was conducted to identify investors' potential demands.

The third is the final conclusion of this chapter and will list target industries for Laem Chabang by comparing the results of the above theoretical and practical analyses. This list seems to be useful for the further promotion activities of Laem Chabang.

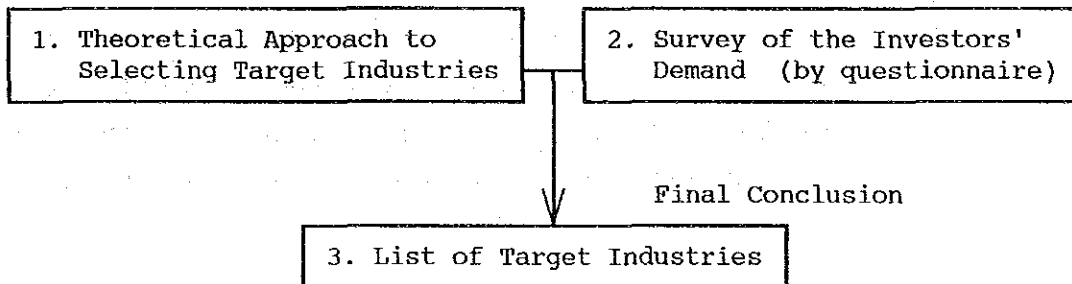


Fig.3-1 Mutual Relation between Three Sections and Flow Sheet for This Chapter

3-1 THEORETICAL APPROACH TO SELECTING TARGET INDUSTRIES

Different industries have different factors in deciding their location, and a variety of development methods according to the current stage of industrialization in a country and district.

Based on such features of industries and industrialization, this section theoretically studied industries to be located in Laem Chabang.

(1) BASIC CONCEPT AND METHOD FOR THE APPROACH

This is an approach to decide target industries from the industrial location theory. However, it seems to be proper to consider Thailand's industrial development policy as well as decisive factors for industrial location. Therefore, the following five approaches were taken for this study.

Five Approaches to Selecting Target Industries

1. Desirable industrial structure
2. Thailand's role in international production activities
3. Effect of industrial development
4. Industrial location policy in Thailand
5. Site conditions in Laem Chabang

The above approaches can be divided into two groups. One group, including the approaches 1 to 3, will study target industries at the national level of Thailand. The other group, consisting of the approach 4 and 5, will study them at the regional level, that is to say, from the viewpoint of Laem Chabang's site conditions and location in Thailand.

1) Approach from a desirable industrial structure for Thailand

The industrial structure varies according to the development stage of industrialization in each country. In the case of Japan in 1985, machinery industries constituted 40% of the total value of gross output in the manufacturing sector. (Machinery industries comprise electric, transportation, and precision machines in addition to general machinery.)

In the case of Thailand in 1984, machinery industries were only 6.7% of the gross output, of which 47% was accounted for by light industries including food, beverage, feed, textile and apparel.

Economical circulation and formation of industrial complexes should be considered in promoting industrialization. It seems to be ideal to establish an industrial structure in which the flow of industrial production follows consistently from resources, basic materials and parts to final products.

However, such a circulation cannot be realized in every country, and is also not always reasonable from the viewpoint of economic logic, since countries have different resources and are at different stages of industrialization. These actual situations bring about the inevitability or rationality of international division of production activities.

Thailand has made strategic efforts to establish a complex industrial structure. The Royal Thai government (RTG) is working to enhance incentives to those industries which use primary resources, such as agricultural products, to increase the local contents, mechanical parts, and to develop the basic chemical industry in Map Ta Put.

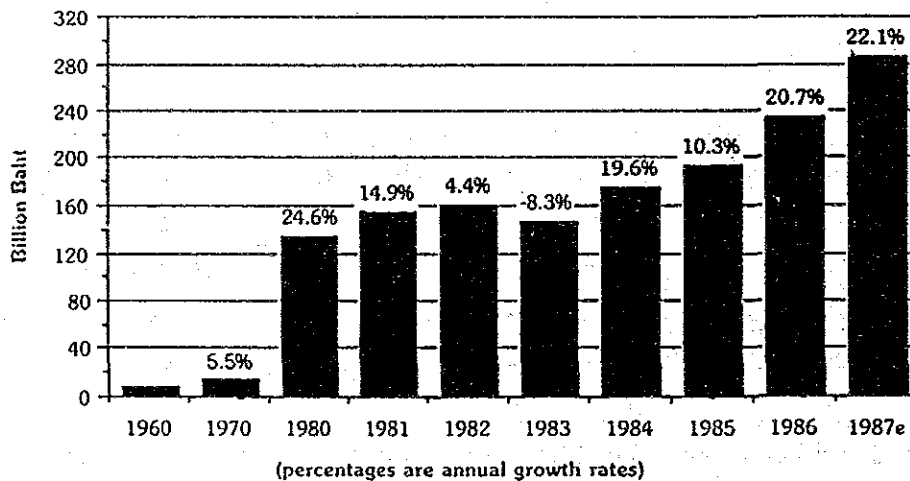
It is important in this approach to take in account not only the desirability and the formation of industrial complexes for Thailand but also industrial feasibility. Therefore, the following items will be examined:

1. Industrial structure, resources, technological level and market size of Thailand
2. Production mode, technological development stage or maturity, investment scale or risk and international competitiveness of industries

2) Approach from a Thailand's role in international production activities

Thailand is stepping toward to the second stage of industrialization, and the focus of its policy has shifted from import substitution to export orientation.

Thailand's exports have increased dramatically and the annual growth rates exceed 20% in the recent years, as shown in Fig. 3-2.



Note : e - estimate of the Department of Business Economics, Ministry of Commerce
Source : Customs Department

Fig.3-2 Rapid Growth of Exports Continuing into the 1980's

The most remarkable characteristic in recent years is a large increase of the exports from the manufacturing sector. They constituted 55.3% of the total in 1986 and are expected to continue to lead the growth of the export sector. Many foreign-affiliated companies have already positioned Thailand as "Export Base" and are actively doing business. (Table 3-1)

Table 3-1 A Selection of Foreign Producers already using Thailand as an Export Base

Company name	Country of Origin	Main Products
Krohn & Co., Bangkok Ltd.	Germany	Tapioca pellets
Peter Cremer Co., Ltd.	Germany	Tapioca pellets
Thai-Am Tobacco Ltd.	U.S.A.	Tobacco
Adams International Ltd.	U.S.A.	Tobacco
Noumea Food Co., Ltd.	U.S.A.	Canned seafood
Safcol (Thailand) Co., Ltd.	Australia	Canned seafood
Dole Thailand Ltd.	U.S.A.	Canned pineapple
Thai Kurabo Co., Ltd.	Japan	Textile products
Thai Toray Textile Mills Co., Ltd.	Japan	Textile products
Continental Fur Co., Ltd.	Great Britain	Wearing apparel of fur
Sharp Appliances (Thailand) Ltd.	Japan	Microwave ovens, refrigerators
A.M.D. (Thailand) Co., Ltd.	U.S.A.	Integrated circuits
National Semiconductor (Bangkok) Co., Ltd.	U.S.A.	Semi-conductors
Signetics Thailand Co., Ltd.	U.S.A.	Integrated circuits
Data General Thailand Co., Ltd.	U.S.A.	Integrated circuits, terminators
Hana Semiconductor (BKK) Co., Ltd.	Great Britain	Integrated circuits
AT&T Microelectronics (Thai) Co., Ltd.	U.S.A.	Integrated circuits
NMB Thai Co., Ltd.	Japan	Miniature ball bearings
Minebea Thai Co., Ltd.	Japan	Stepping motors, computer keyboards, printers, and fan motors
Seagate Technology (Thailand) Co., Ltd.	U.S.A.	Computer hard disc drives, head gimbal assembly & E-block assembly
Fujikura Thailand Co., Ltd.	Japan	Keyboard cords
National Thai Co., Ltd.	Japan	Magnetic relay, relay sockets
Technology Applications Co., Ltd.	Great Britain	Cord-free telephones (for GTE)
Inoue Rubber (Thailand) Co., Ltd.	Japan	Bicycle tyres
Thai-Yazaki Electric Wire Co., Ltd.	Japan	Electric wire
Thai Nippon Steel Engineering Co., Ltd.	Japan	Steel structures
Siam Matsushita Steel Co., Ltd.	Japan	Electrical conduit pipes
Nippondenso Co., Ltd.	Japan	Automobile parts
Thai Honda Manufacturing Co., Ltd.	Japan	Multi-purpose kerosene engines
MMC Sittipol Co., Ltd. (Mitsubishi Motors)	Japan	Automobiles and automobile parts
Siam Motors Co., Ltd. (Nissan Motors)	Japan	Automobiles and automobile parts
Hoya Lens Thailand Co., Ltd.	Japan	High quality ophthalmic lenses
Thai - Belgium Industry Co., Ltd.	Belgium	Finished polished diamonds
Yamaha Sport Co., Ltd.	Japan	Snow skis

Source: Board of Investment (BOI)

These companies are producing and exporting (or planning to export) the following manufacturing products from Thailand, as well as forestry, fishery, and agricultural products such as tapioca:

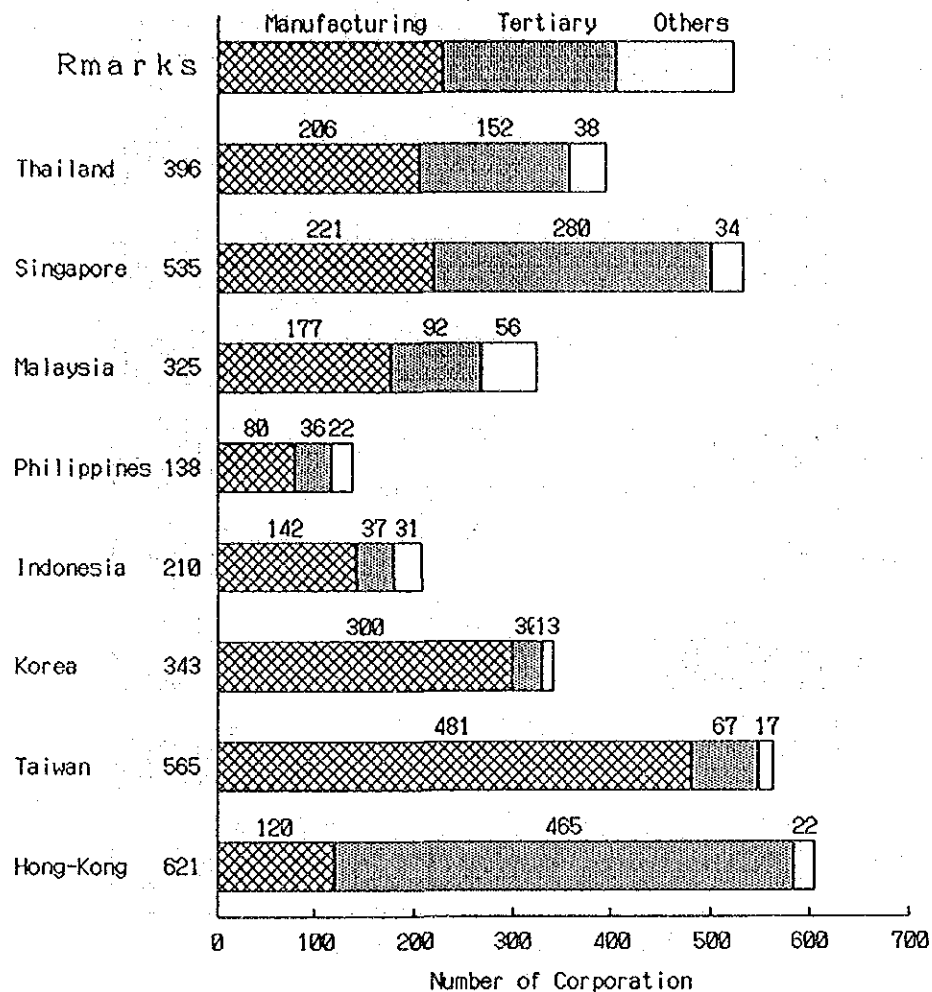
1. Household electric equipments, integrated circuits (assembly), manufacturing miniature bearings, and personal computer devices such as keyboard
2. Knock-down assembly of automobiles and their parts
3. Optical lenses and jewellery (polishing) and snow skis

Utilizing Thailand as an export base will be accelerated from now on by the promotional incentives for export.

As seen previously, Japanese companies stand recently in the first position of the foreign countries on the approval of investment encouragement by the BOI. The following data illustrate the trend of overseas investment by Japanese companies.

Trend of foreign companies established by Japanese investors

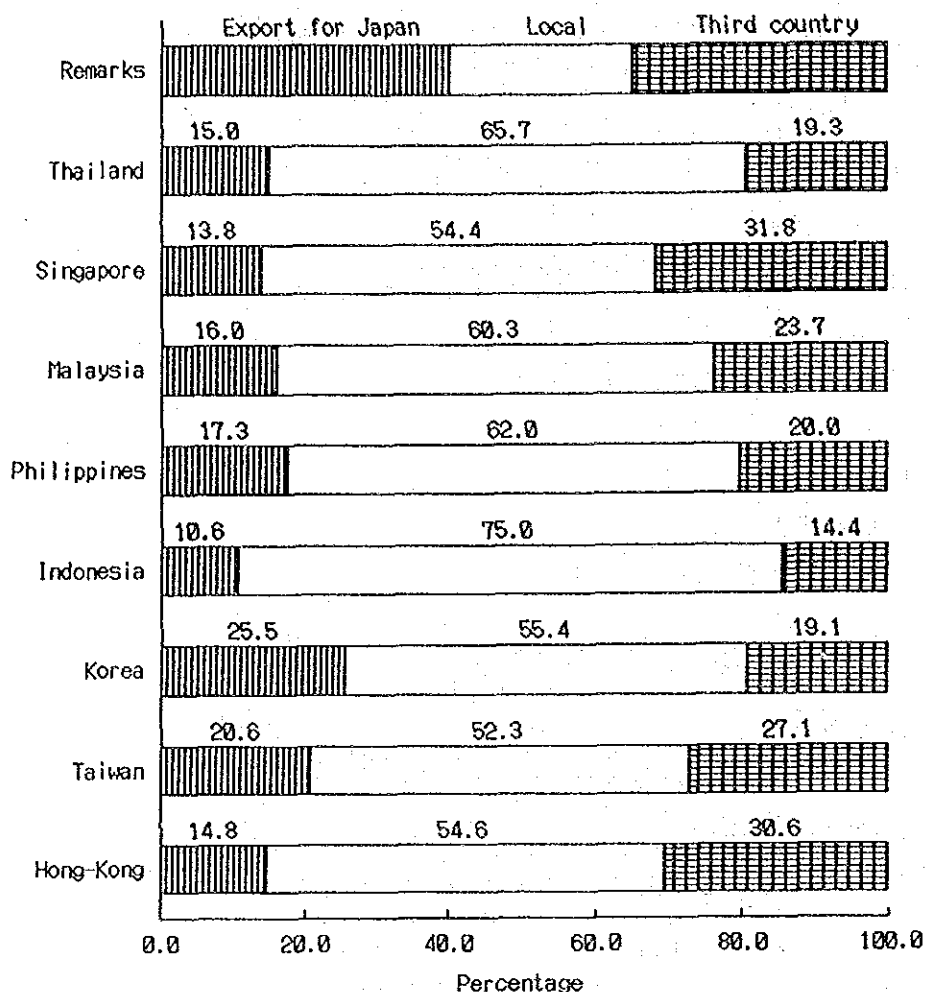
- The number of foreign companies established by Japanese investors is 8,933 world-wide, including 3,338 companies in Asia, 37% of the total.
- There are 396 companies in Thailand, the fourth position in Asia following Hongkong (621 companies), Taiwan (565 companies), and Singapore (535 companies). (Fig.3-2)
- There are 206 manufacturing companies in Thailand, the fourth position following Taiwan (481 companies), Korea (300 companies), and Singapore (221 companies).
- In Thailand, 66% of these companies manufacture products for the Thai market and 34% of them for exports. This shows a lower ratio of exporting companies compared with Singapore, Korea, Taiwan, and Malaysia. On the other hand, 47% of the companies prepare raw materials within Thailand and 53% of them import raw materials. The ratio of importing companies is no great difference with other countries, excluding Hongkong. (Fig.3-3 to 4)
- The enterprise activities have been remarkably globalized in both the marketing and preparation of raw materials.



Source: "Foreign Investment Year Book 1988" (TOYO KEIZAI SHINPOSHA, Japan)

Fig. 3-2 Foreign Companies Established in Main Asian Countries by Japanese Investors (by sector of industry from 1960's to 1987)

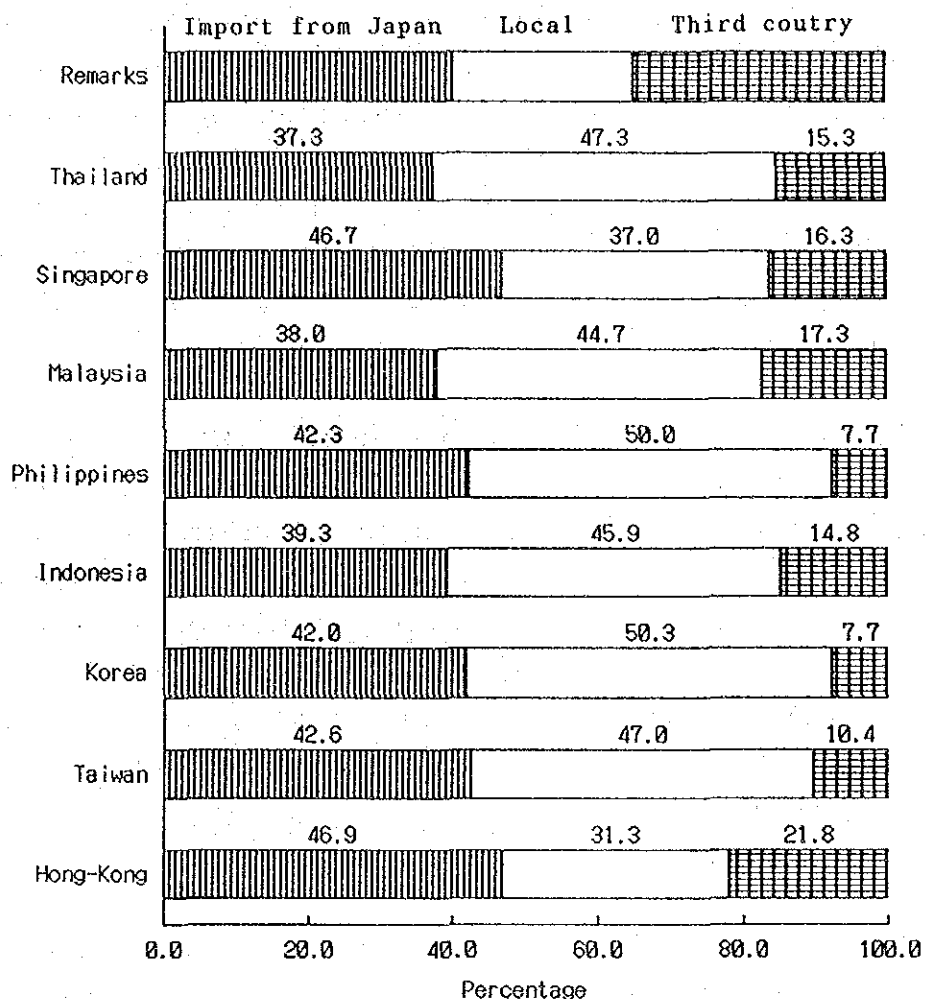
The above data cover the overall trend for approximately 30 years up to 1987. The ratio of exporting companies in Thailand is lower than those in other Asian countries. However, the details of the recent applications to the BOI from Japanese companies show an increase in the number of the companies which position Thailand as "Export Base".



Source: "Foreign Investment Year Book 1988" (TOYO KEIZAI SHINPOSHA, Japan)

Fig. 3-3 Main Destination of Products
(as of foreign companies established in main Asian countries by Japanese investors from 1960's to 1987)

Taiwan was in the second position following Japan in total applications to the BOI in 1987. Thailand is now watched by the whole world with interest and is becoming "a great center of globalization" of business activities, especially for securing international competitiveness and expanding exports.



Source: "Foreign Investment Year Book 1988" (TOYO KEIZAI SHINPOSHA, Japan)

Fig. 3-4 Main Regional Origin of Raw Materials
(as of foreign companies established in main Asian countries by Japanese investors from 1960's to 1987)

Thailand has attempted to enhance the incentives for promoting export industries, including the development of export processing zones (EPZ) throughout the country, one of which is prepared in Laem Chabang.

In selecting export-oriented industries, it is necessary to analyze tariffs (the import duty rate), in addition to comparison of Thailand's international competitiveness with neighboring countries and forecasts of export channel switching by foreign-affiliated companies (e.g., export through third-country or switching export channel from Japan to Thailand or from Taiwan and Korea to Thailand).

The analysis of the import duty rate is related to the basic incentive for industrial location in the EPZ. The EPZ is a kind of "foreign country" which is engaged in business activities. As long as the final products are exported, the import duty on raw materials and parts is exempted. The products exported from the EPZ have two advantages: the products themselves have nothing to do with the import duty and can avoid competing with existing domestic market-oriented industries promoted so far to substitute imports.

Therefore, it can be concluded that those industries which process and export goods with high import duty rates derive great benefit from using the EPZ. The analysis of the import duty rates will identify those industries which have a higher possibility of operating in the EPZ.

3) Approach from effects of industrial development

Industrial development has various economic effects such as creation of employments and increase of income/tax revenues in addition to establishing new industries and their associates. This approach will study target industries, focusing on the effect on employment, which is one of the main objectives of the Sixth National Economic and Social Development Plan. The industries with a larger employment effect are in general called "labor-intensive industries". This labor-intensiveness can be estimated from the following indexes:

Indexes for labor-intensiveness

(1) Labor-equipment ratio

- Calculation: $\text{Number of person engaged} / \text{book value of fixed assets at the end of the year}$
Book value of fixed assets = land + balance of depreciation on building, equipment, machinery, etc.
- Largeness of this ratio indicates that much manpower is used in the producing process.

(2) Amount paid ratio to value-added

- Calculation: $\text{Wages} / \text{Value-added} \times 100$
- Largeness of this ratio indicates that manpower plays an important role in creation of value-added.

In terms of either index, the industries with a larger ratio depend more on manpower. Therefore, wage decreasing is one of the effective measures for cost reduction, which assures the maintenance of domestic and international competitiveness of their products.

Thailand has an advantage for labor-intensive industries, since the wage standard is relatively lower than that in other Asian NIES countries, as seen previously.

On the basis of the above analysis, it can be said that the needs of the industries agree with the objective of the industrial development (which is to provide jobs for the people). Therefore, there will be a considerable success in the invitation of labor-intensive industries to Thailand for the time being.

4) Approach from industrial location policy in Thailand

This approach corresponds to the industrial decentralization policy in Thailand. The population and industry are heavily concentrated in the Bangkok area, resulting in various inefficiencies and expansion of regional income differences. In order to improve this situation, RTG has introduced the policy that restrains industrial activities in the Bangkok area and disperses them into the neighboring or rural areas by using such effective measures as the discriminative application of incentives and

the exclusion of industrial estate projects in the Bangkok area from the promotion activity.

Laem Chabang industrial estate project is also positioned as a part of the decentralization policy. Target industries expected from this approach are industries having a high possibility of moving out of the Bangkok area, and they will be studied based on the following indexes and methodology:

Indexes and methodology for studying industries with a high possibility of moving out of the Bangkok area

- | |
|---|
| <p>(1) Analysis of industrial concentration in the Bangkok area</p> <ul style="list-style-type: none">- Calculation: Ratio of the Bangkok area to the all of Thailand as for the employees and value of gross output of industries- This calculation was applied to establishments with more than 20 persons, since smaller scale establishments cannot easily move from the Bangkok area to Laem Chabang.- The data source is "Report of the 1985 Industrial Survey" of Thailand. <p>(2) Analysis by other factors</p> <ul style="list-style-type: none">- The high concentration of industry in the Bangkok area seems to be reasonable from the viewpoint of the industry location theory. However, industries with the following characteristics could be easily moved:<ol style="list-style-type: none">1. Export-oriented industries: There is no great difference in international transportation costs between Klong Toey port in Bangkok and Laem Chabang port and it is assumed to be negligible.2. Labor-intensive industries: These industries are not so heavily equipped and can move more easily from the Bangkok area. <p>Remark: Bangkok area includes Bangkok Metropolis, Nonthaburi, Pathumthani and Samutprakan.</p> |
|---|

Table 3-2 shows the share of the Bangkok area compared to the total of Thailand in 1984, by type of industry in the mid-classification base. Thailand's manufacturing sector has up to 76.5% of the employees and 77.5% of the value of gross output in the Bangkok area: the ratio of concentrated employees for each industry shows 100% in leather tanning products as well as in precision instrument and machinery, and near 100% in apparel, iron and steel, transportation equipment and miscellaneous industries.

Table 3-2 Manufacturing Industries in the Bangkok Area
in 1984

(Value unit: Mill. Baht)

Code	Types of Industry	Bangkok Area		Bangkok / Whole Kingdom	
		A	B	A	B
		NO. of engaged person	Value of gross output	(%)	(%)
	Total	978,059	722,003	76.5	77.5
~3121	Food products	36,625	36,284	25.8	34.5
~3142	Beverage, feed and tobacco products	128,847	193,525	71.6	94.3
321	Textile and its products	214,570	77,361	77.6	83.9
322	Apparel and other textile finished products	146,642	33,724	99.5	99.7
323	Leather tanning and its products	6,631	3,484	100.0	100.0
331	Lumber and wood products	20,424	7,263	48.5	61.1
332	Wooden furniture and fixtures	11,251	3,042	92.4	97.0
341	Pulp, paper and paper products	29,006	14,863	92.2	78.0
342	Publishing, printing and allied industries	19,118	4,405	99.3	99.9
351~2	Chemicals and allied products	48,255	59,283	83.0	89.1
353	Petroleum refineries	D	D	D	D
355	Rubber products	48,059	41,858	71.3	73.6
356	Plastic products	21,540	30,337	75.3	89.0
361~9	Ceramic, stone and clay products	58,868	47,726	84.3	96.6
371	Iron and steel	33,582	29,917	98.0	94.2
372	Non-ferrous metals and products	776	230	87.0	93.1
381	Fabricated metal products	54,659	32,369	95.5	99.2
382	General machinery	6,897	3,457	85.2	98.0
383	Electrical machinery, equipment and supplies	37,171	28,813	41.5	46.0
384	Transportation equipment	31,517	29,095	98.3	99.9
385	Precision instruments and machinery	4,047	434	100.0	100.0
390	Miscellaneous manufacturing industries	18,536	6,210	99.9	100.0

Remark: Total includes several concealed numbers and does not equal to the sum of the number in every type of industries.

Source: Report of the 1985 Industrial Survey (Establishment more than 20 persons)

On the other hand, the concentration of employees in food products, beverage, feed, wood products and electrical machinery is low: 25.8% to 50%. This illustrates that the food products, beverage and feed industries are resource-based industries. The electric machinery industry includes many labor-intensive sub sectors, and has been dispersed according to the regional distribution of manpower and the regional difference of wages.

5) Approach from site conditions in Laem Chabang

The factors of industrial location are theoretically classified into two groups. One group consists of regional and areal factors. The four approaches described above are used to study target industries from these regional and areal factors.

The other group includes site factors and this approach is to select target industries from the site conditions in Laem Chabang.

This approach to identifying target industries requires the consideration of two factors, namely, "attractive factors" and "restrictive factors" of Laem Chabang. This study limits the considerations to those factors which are related to the selection of target industries (namely, to those factors whose meanings depend on the industry types).

As for the attractive factors, it is important to consider whether Laem Chabang has or not unique attractive factors. Laem Chabang has them, such as the EPZ and GIE (general industrial estate) equipped with a large commercial deep-sea port, proximity to Bangkok and being situated halfway between Bangkok and Map Ta Phut. Laem Chabang has other attractive factors. For example, it is adjacent to Pataya beach and U-Tapao, which is being considered as a candidate site of an international airport. It has an excellent infrastructure which is being

constructed as an industrial estate and has strong incentives. However, all of them promote enterprises' investment activities in general and are slightly different from those factors which are important for specific industry selections.

It should be remarked that low wages and high availability of manpower, even though not only unique to Laem Chabang, are important factors in selecting industries as well as abundant resources in the hinterland.

As for restrictive factors, the water supply capacity in Laem Chabang should be examined in selecting industries. Considering the capacity of approximately 40,000 m³/day of industrial water, industries that consume little water are preferable. This type of industry will be studied by analysis of the water consumption per factory area.

The following summarizes the above considerations and gives the industries which are suitable for the site conditions of Laem Chabang.

Site conditions in Laem Chabang and industries suitable for them

- | |
|--|
| <p>(1) Attractive factors</p> <p>1) Unique conditions in Laem Chabang</p> <ul style="list-style-type: none">- EPZ and GIE equipped with large commercial deep-sea port (Export-oriented and port-oriented industries)- Proximity to Bangkok and being situated halfway between Bangkok and Map Ta Phut (market-oriented industries and products from basic chemicals: functional distribution with Ma Ta Phut). <p>2) Important factors in selecting industries, even though not only unique to Laem Chabang</p> <ul style="list-style-type: none">- Low wages and high availability of manpower (Labor-intensive industries)- Many agricultural resources in the hinterland and marine resources in the peripheral water area (Resource processing industries) <p>(2) Restrictive factor</p> <ul style="list-style-type: none">- Low water consumption industries |
|--|

(2) TARGET INDUSTRIES AT LAEM CHABANG FROM THEORETICAL APPROACH

This section will at first clarify the mutual relation among the five approaches already described, and then will study the target industries to be located in Laem Chabang from each approach.

1) Mutual Relation among the Five Approaches

Preceding the selection of specific industries, it is significant to clarify the mutual relation among the five approaches and the type and category of target industries corresponding to them as shown in Fig. 3-5.

The first approach is to seek a desirable industrial structure. It leads to such target industries as basic raw materials industries, machinery assembling industries and resource processing industries. These categories are established based on the flow and patterns of industrial production, and do not necessarily contain the decisive factors for industrial location.

It is necessary to study the target industries in order to establish categories, covering theoretical tendencies of industrial location, such as port-oriented, labor-intensive, resource-based, market-oriented and low water consumption industries, which fall under the second to fifth approaches.

On the other hand, the export-oriented industries, Bangkok-concentrated industries and basic chemical processing industries do not necessarily reflect theoretical site orientation. However, they could be directed or oriented regionally by some of the other approaches and in the whole perspective of industrial location.

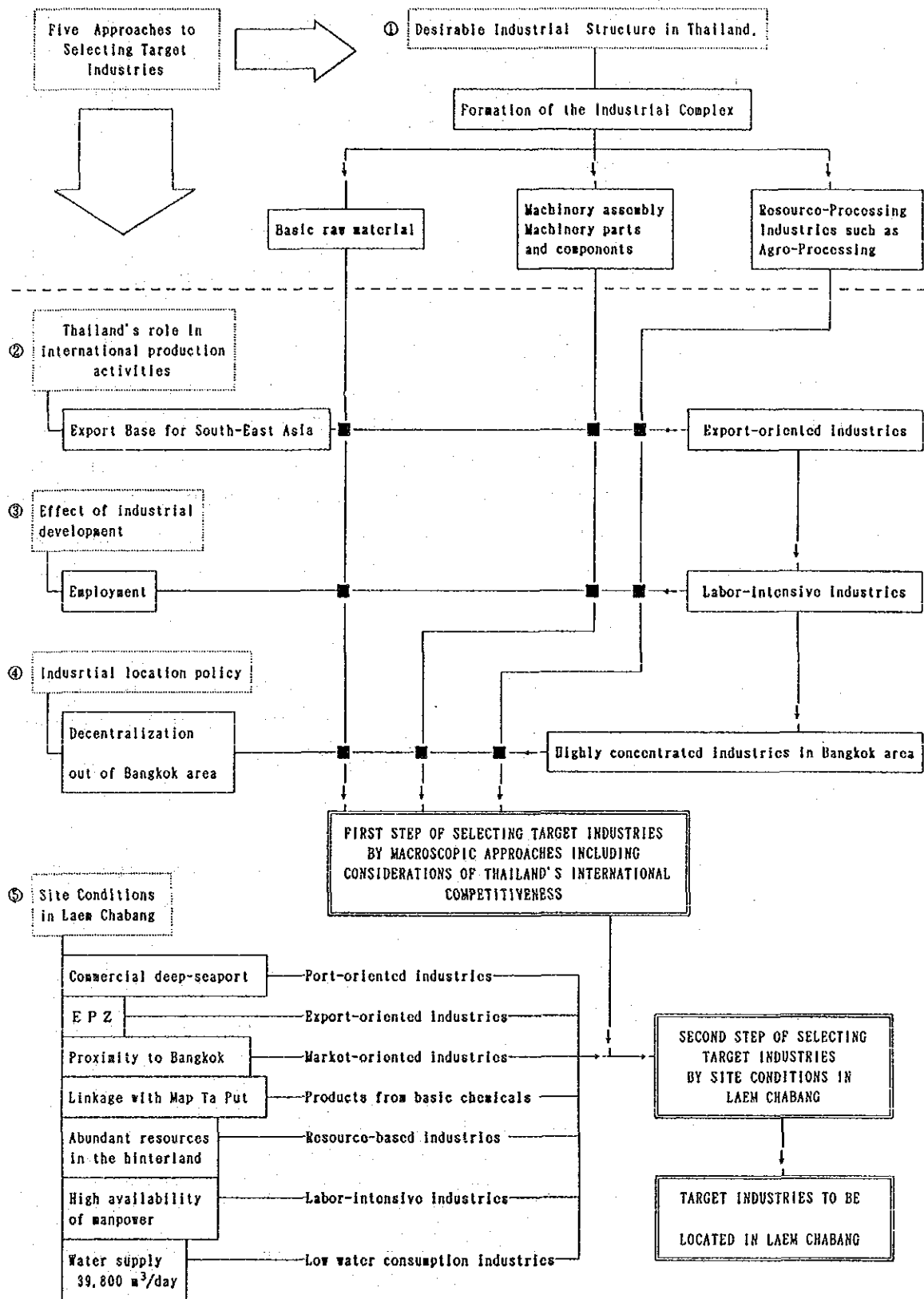


Fig.3-5 Perspective of Target Industries from Five Approaches and Their Mutual Relation

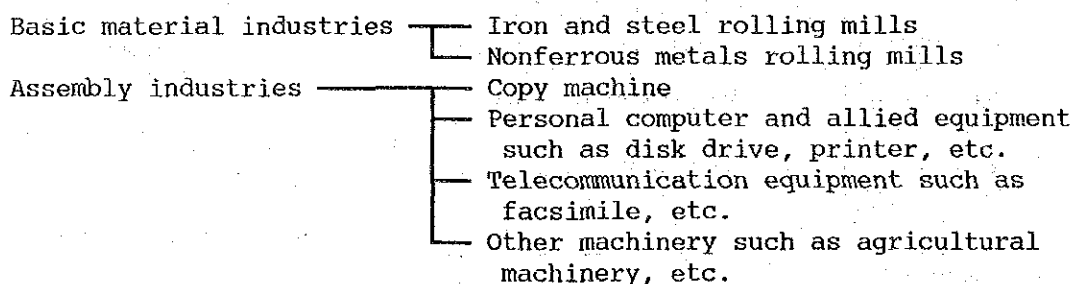
In simple terms, the first approach (concept on the industrial structure) belongs to a different concept from that of the second to fifth approaches (concept on industrial location), but they mutually cross each other in a study of target industries.

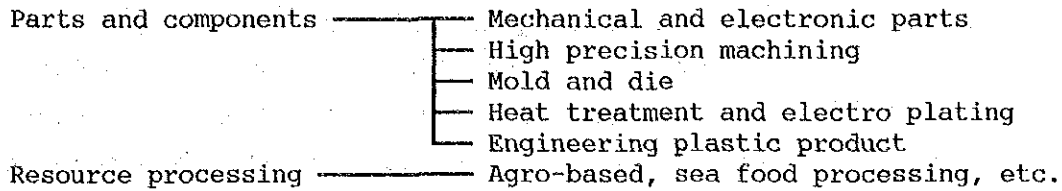
The fifth approach checks the possibility of locating the industries selected by the other four approaches in Laem Chabang. In other words, it has the role of narrowing the industry categories. Export-oriented and labor-intensive industries are overlapping in the approaches as shown in Fig.3-5. This overlapping is accounted for by the fact that the direction of Thailand's national industrial development matched the site conditions of Laem Chabang. Therefore, both the export-oriented and labor-intensive industries can be considered as the central (suitable) industries of Laem Chabang.

Especially, labor-intensive industries are the most prospective, since Thailand has a relatively large advantage in labor cost over other Asian countries and has better quality manpower.

2) Target Industries Desirable for Thailand's Industrial Structure

As a conclusion, the target industries derived from this approach are as follows:





a. Basic material industries

The promotion of basic material industries is important for the formation of industrial complexes. As for basic chemical products, a natural gas chemical complex is already under construction in Map Ta Phut. Therefore, iron and steel rolling mills and nonferrous metal rolling mills are expected to be developed.

There is not an integrated steelmaker in Thailand. Thailand's steel industry principally makes steel by using electric furnace technology.

An increasing demand for high-quality rolled steel is forecast from the expansion of production in automobile and household electric equipment industry, so that special steel rolling is promising.

Also, copper rolling mills can be expected, from the increase in the demand for electric wire and import substitution: actually, such a project is underway.

b. Assembly and parts industries

Factories assembling automobile and household electric equipment have already been operated in Thailand. Office automation equipment including computers, communication equipment, and agricultural machinery are expected to be developed in the near future.

This forecast is based on the following considerations:

- i) OA and communication equipment such as telephone set can be easily assembled, because the integration degree of integrated circuits has remarkably improved and parts are available in the form of kits.

Many companies have a lot of interest in utilizing Thailand's manpower, since in these fields, technological innovation is so rapid and research and development have become so important that advanced countries are actively transferring established technology and production itself to the countries with a larger advantage of cost reduction (the globalization of industrial activities).

- ii) In Thailand, these machine parts industries are expanding, and since some companies have high-level technology for part die casting and press processing, there is a good possibility for location of the assembly industries.
- iii) The agricultural machine industry has a large domestic market in Thailand. Its technology is already established and the mechanical parts factories including engines are operated.
- iv) For the formation of an industrial complex, there is a large expectation for supporting industries, such as precision machining, mold and die, jigs and tools, heat treatment and electro plating. These industries will tend to develop along with the expansion of the assembly industries.

c. Resource-processing industries

Thailand is rich in various fruits, wood such as para-wood, and fishery resources including shrimp and squid, in addition to rice and tapioca. "Development and export" by foreign countries is becoming more active in this field.

In addition to this trend, Thailand is aiming to be a new agricultural industry country (NAIC) and prepares special incentives in order to promote natural resource-processing industries including agriculture. Therefore, various resource-processing industries are expected to be developed further.

As for sea food processing, the freezing of shrimp etc. and preparing dried fish will be the main operations, except for some canning, because Thailand does not have many kinds of fish which are caught in large quantities and are suitable for industrial processing.

d. Trend of globalization of industrial production

The target industries desirable for Thailand's industrial structure were selected as above. However, it is meaningful, in forecasting the future direction of Thailand's industrial development, to survey the international trend of transfer or globalization of industrial production according to the development stage of industrialization.

The globalization of industrial production was once performed mainly by the United States. However, Japanese, Taiwanese, and Korean companies are now actively investing in Thailand. Thus, Japan will be sampled to study the companies' policy pertaining to the globalization in Asia.

Fig. 3-6 shows the objectives of Japanese investments in the main Asian countries and has the following characteristics. (Refer to Table 3-6)

Objectives of Japanese investment in main Asian countries

- In Thailand, the largest objective is to preserve and expand the local and third-country's market, the second is to reduce cost by utilizing manpower, and the third is to be given incentives.
- Expansion of the local and third country's market is the largest objective in Singapore, Malaysia, Philippines, Indonesia, and Hongkong.
- Utilizing manpower is the largest objective in Korea and Taiwan.

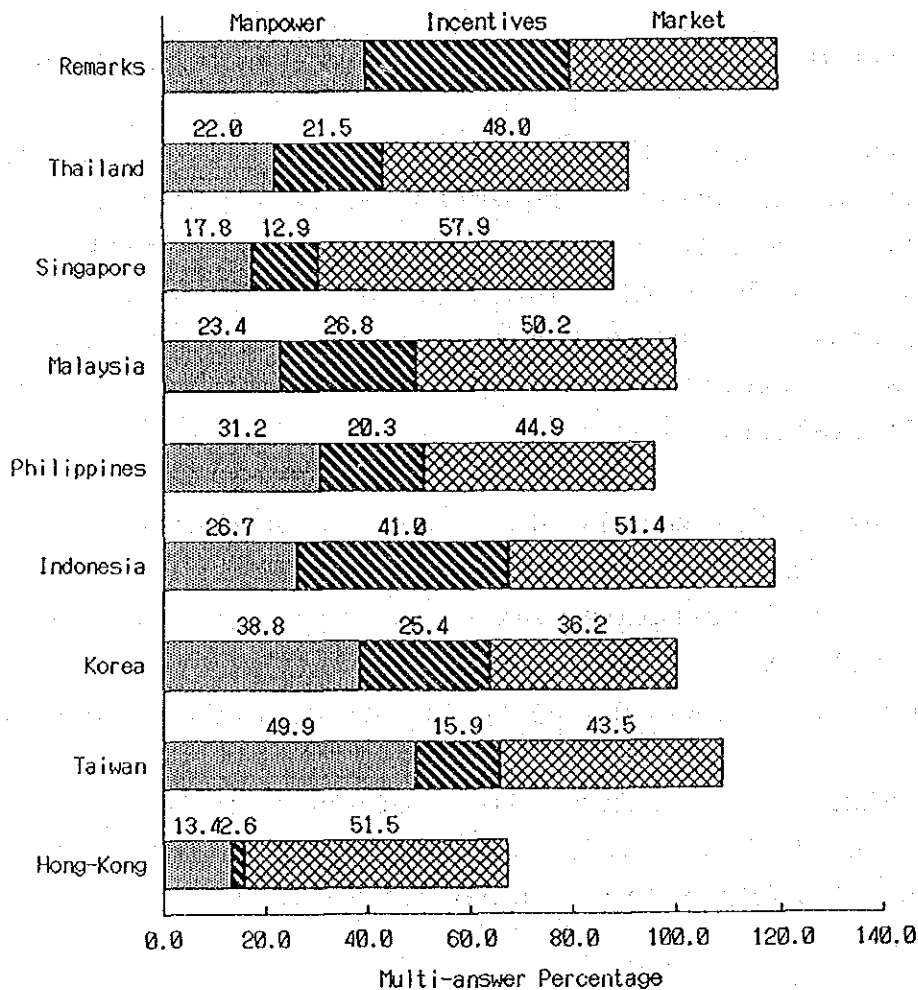


Fig.3-6 Objectives of Foreign Investment
(as of foreign companies established in main Asian countries
by Japanese investment from the 1960's to 1987)

Table 3-3 Objectives, etc. in Foreign Investment
(as of foreign companies established in main
Asian countries by Japanese investment from
the 1960's to 1987)

[Real Number]

		World- total	Asian total	THA	SIN	MAY	PHI	INDO	KOR	TWN	HKG
Investment objectives	Total(Number of company)	8933	3338	396	535	325	138	210	343	565	621
	Raw materials and resources	472	145	20	9	31	19	18	9	19	13
	Local processing of resources	229	70	6	12	16	6	9	2	9	2
	Utilizing manpower (Cost down)	1056	892	87	95	76	43	56	133	282	83
	Incentives for investment	886	593	85	69	87	28	36	87	90	16
	Local and third country's market	4218	1604	190	310	163	62	108	124	246	320
	Collecting information	1441	379	34	92	33	8	8	9	27	149
	Changing export channel	167	55	3	8	4	4	5	9	16	6
Royalty	321	161	23	13	26	4	17	18	26	20	
Main dest- nation of products	Total(Number of Answer)	4473	1988	233	340	219	75	132	204	411	304
	Export for Japan	687	337	35	47	35	13	14	52	86	45
	Local market	2862	1157	153	185	132	47	99	113	218	166
	Export for third country	924	494	45	108	52	15	19	39	113	93
Main orig- in of raw materials	Total(Number of Answer)	2794	1426	150	257	179	52	122	143	298	179
	Import from Japan	1232	604	56	120	68	22	48	60	127	84
	Local market	1199	620	71	95	80	26	56	72	140	56
	Import from third country	363	202	23	42	31	4	18	11	31	39

[Percentage to Total]

		World- total	Asian total	THA	SIN	MAY	PHI	INDO	KOR	TWN	HKG
Investment objectives	Total(Number of company)	100.0	100.0	1000	1000	1000	1000	1000	1000	1000	1000
	Raw materials and resources	5.3	4.3	5.1	1.7	9.5	13.8	8.6	2.6	3.4	2.1
	Local processing of resources	2.6	2.1	1.5	2.2	4.9	4.3	4.3	0.6	1.6	0.3
	Utilizing manpower (Cost down)	11.8	26.7	22.0	17.8	23.4	31.2	26.7	38.8	49.9	13.4
	Incentives for investment	9.9	17.8	21.5	12.9	26.8	20.3	41.0	25.4	15.9	2.6
	Local and third country's market	47.2	48.1	48.0	57.9	50.2	44.9	51.4	36.2	43.5	51.5
	Collecting information	16.1	11.2	8.6	17.2	10.2	5.8	3.8	2.6	4.8	24.0
	Changing export channel	1.9	1.6	0.8	1.5	1.2	2.9	2.4	2.6	2.8	1.0
Royalty	3.6	4.8	5.8	2.4	8.0	2.9	8.1	5.2	4.6	3.2	
Main dest- nation of products	Total(Number of Answer)	100.0	100.0	1000	1000	1000	1000	1000	1000	1000	1000
	Export for Japan	15.4	17.0	15.0	13.8	16.0	17.3	10.6	25.5	20.6	14.8
	Local market	64.0	58.2	65.7	54.4	60.3	62.7	75.0	55.4	52.3	54.6
	Export for third country	20.7	24.8	19.3	31.8	23.7	20.0	14.4	19.1	27.1	30.6
Main orig- in of raw materials	Total(Number of Answer)	100.0	100.0	1000	1000	1000	1000	1000	1000	1000	1000
	Import from Japan	44.1	42.4	37.3	46.7	38.0	42.3	39.3	42.0	42.6	46.9
	Local market	42.9	43.5	47.3	37.0	44.7	50.0	45.9	50.3	47.0	31.3
	Import from third country	13.0	14.2	15.3	16.3	17.3	7.7	14.8	7.7	10.4	21.8

Source: "Foreign Investment Year Book 1988" (TOYO KEIZAI SHINPOSHA, Japan)

Remarks: THA=Thailand, SIN=Singapore, MAY=Malaysia, PHI=Philippines, INDO=Indonesia, KOR=Korea, TWN=Taiwan

These data cover the term from the 1960's to 1987. In the early part of this term, Japanese investment was so active in Korea and Taiwan that utilizing manpower is the largest objective there. The main objective in Thailand is to secure and expand the local and third country's market. It may be said that this reflects the policy of import substitution.

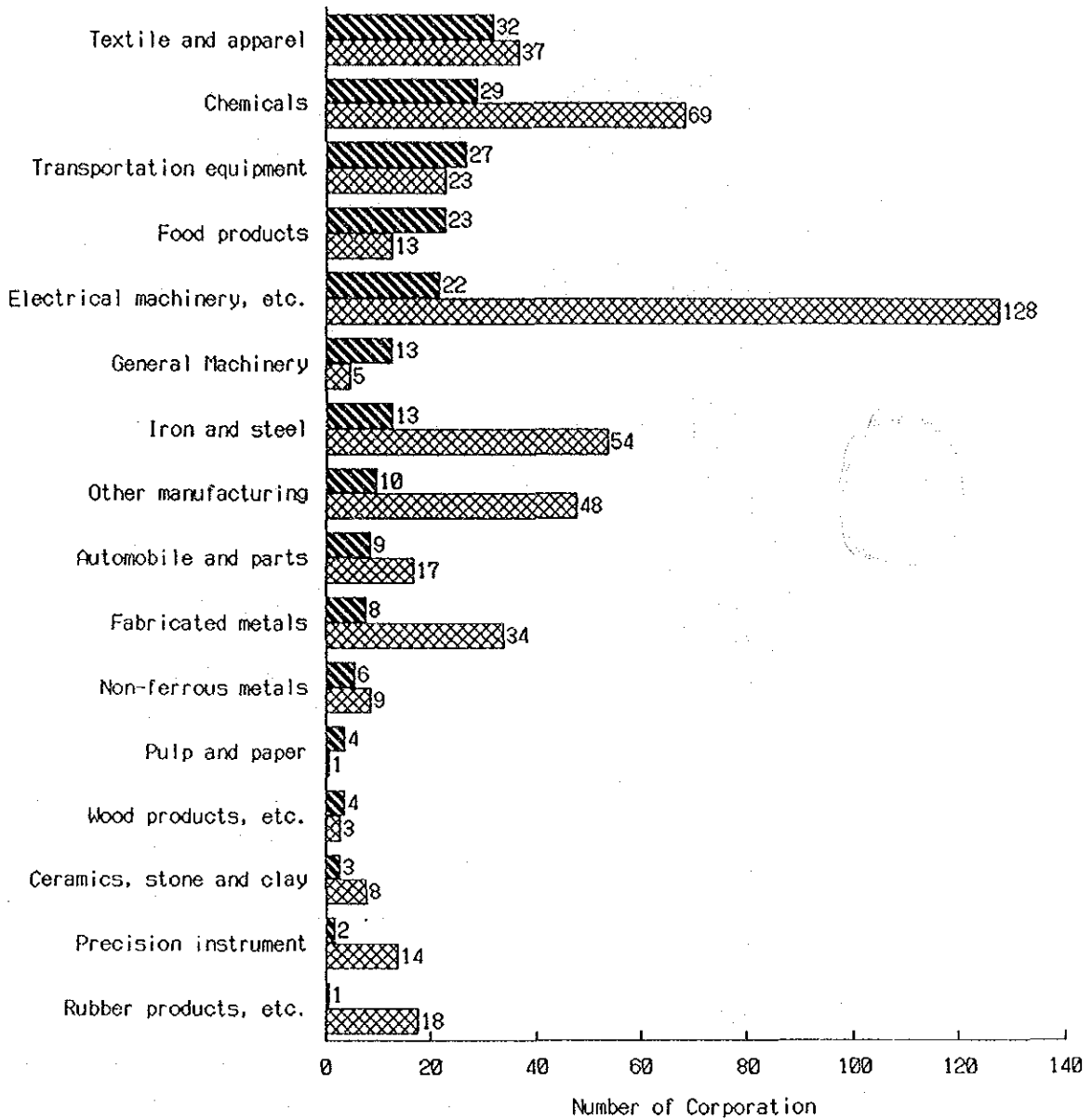
As seen from the fact that Taiwan and Korea, where the Japanese investment had been concentrated, are increasing the amount of investment in Thailand, the shift or transfer of industrial production is taking place globally.

The trend of Japanese investments to industries in Taiwan and Korea can be regarded as a guide for forecasting the future direction of Thailand's industrial development.

Fig. 3-7 gives the number of companies of various manufacturing industries established in Thailand by Japanese investments. The upper bars indicate the figures in Thailand, while the lower bars indicate those of Taiwan.

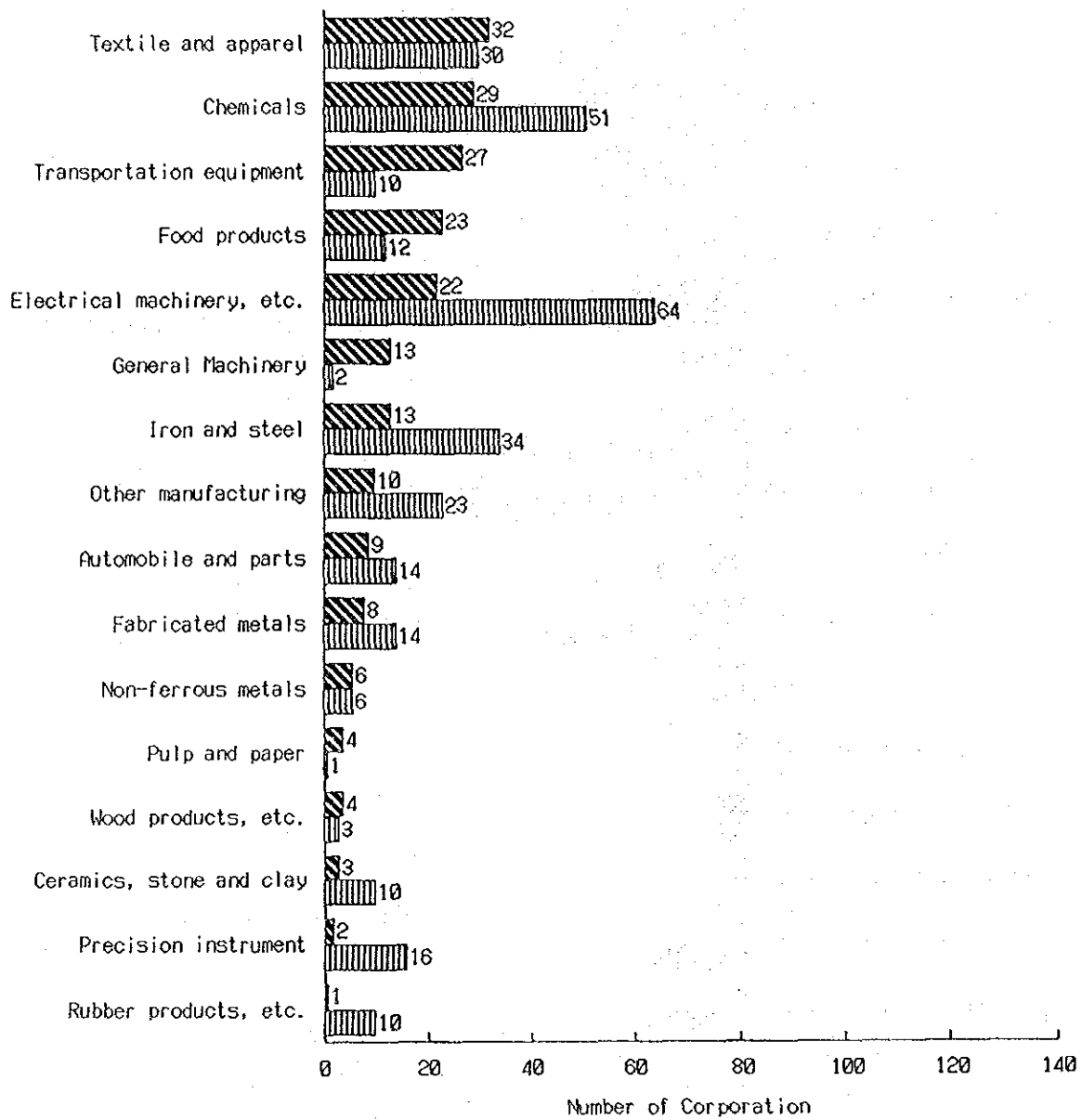
In Thailand, the textile and apparel industry is the top and is followed by chemicals, transportation equipment, food products and electrical machinery in this order. In Taiwan, electric machinery is by far the top (128 companies) and is followed by chemicals and steel. The three major industries in Korea are electric machinery, chemical, and steel industries, the same as Taiwan (Fig. 3-8).

As shown in Table 3-4, the same three industries are also first in Singapore. It is worth noting that more importance is placed on the same fields of manufacturing industry in these three countries representing NIES.



Source: "Foreign Investment Year Book 1988" (TOYO KEIZAI SHINPOSHA, Japan)

Fig. 3-7 Distribution of Industrial Investment by Japanese Companies in Thailand and Taiwan (from the 1960s to 1987, upper section: Thailand, lower section: Taiwan)



Source: "Foreign Investment Year Book 1988" (TOYO KEIZAI SHINPOSHA, Japan)

Fig. 3-8 Distribution of Industrial Investment by Japanese Companies in Thailand and Korea (from 1960s to 1987, upper section: Thailand, lower section: Korea)

Table 3-4 Distribution of Industrial Investment by Japanese Companies
(by sector of industries from the 1960s to 1987)

[Real Number of Corporation]

	World-total	Asian total	THA	SIN	MAY	PHI	INDO	KOR	TWN	HKG
Total	8933	3338	396	535	325	138	210	343	565	621
Agriculture, Forestry and Fishery	105	35	4		6	5	9	5	1	
Mining	135	19	3		4	5	3	2		1
Construction	308	161	29	25	40	10	19	4	7	13
Manufacturing	3197	1858	206	221	177	80	142	300	481	120
Food products	192	96	23	13	4	7	6	12	13	8
Textile and apparel	269	178	32	5	11	9	21	30	37	18
Wood products, furniture and fixtures	53	34	4	3	12	2	4	3	3	1
Pulp and paper products	40	17	4	3	4		2	1	1	2
Chemicals	470	293	29	40	31	16	28	51	69	12
Rubber and leather products	74	46	1	3	5	4	2	10	18	2
Ceramics, stone and clay products	84	59	3	7	11	4	6	10	8	3
Iron and steel	126	52	13	5	10	1	9	2	5	
Non-ferrous metals and products	98	48	6	12	5	3	3	6	9	3
Fabricated metal products	133	93	8	15	10	3	3	14	34	4
General machinery	313	159	13	22	7	3	13	34	54	5
Electrical machinery, equipment and supplies	641	379	22	64	36	10	8	64	128	20
Transportation equipment	216	120	27	7	14	10	16	10	23	
Automobile and parts	128	74	9		8	6	12	14	17	
Precision instrument and machinery	119	68	2	8	5	1		16	14	18
Other manufacturing	241	140	10	14	4	1	9	23	48	24
Commerce	3044	699	96	162	49	20	1	8	52	299
Financing and insurance	811	237	22	52	21	7	22	8	1	92
Real estate	157	27	8	4	2		3		2	6
Warehousing/transport	490	130	18	37	9	4	5	2	5	47
Service	394	118	8	25	11	5	6	12	7	21
Stock-hold only	62	7			3					4
Others	230	47	2	9	3	2		2	9	18

[Percentage to Total]

	World-total	Asian total	THA	SIN	MAY	PHI	INDO	KOR	TWN	HKG
Total	100.0	100.0	1000	1000	1000	1000	1000	1000	1000	1000
Agriculture, Forestry and Fishery	1.2	1.0	1.0		1.8	3.6	4.3	1.5	0.2	
Mining	1.5	0.6	0.8		1.2	3.6	1.4	0.6		0.2
Construction	3.4	4.8	7.3	4.7	12.3	7.2	9.0	1.2	1.2	2.1
Manufacturing	35.8	55.7	52.0	41.3	54.5	58.0	67.6	87.5	85.1	19.3
Food products	2.1	2.9	5.8	2.4	1.2	5.1	2.9	3.5	2.3	1.3
Textile and apparel	3.0	5.3	8.1	0.9	3.4	6.5	10.0	8.7	6.5	2.9
Wood products, furniture and fixtures	0.6	1.0	1.0	0.6	3.7	1.4	1.9	0.9	0.5	0.2
Pulp and paper products	0.4	0.5	1.0	0.6	1.2		1.0	0.3	0.2	0.3
Chemicals	5.3	8.8	7.3	7.5	9.5	11.6	13.3	14.9	12.2	1.9
Rubber and leather products	0.8	1.4	0.3	0.6	1.5	2.9	1.0	2.9	3.2	0.3
Ceramics, stone and clay products	0.9	1.8	0.8	1.3	3.4	2.9	2.9	2.9	1.4	0.5
Iron and steel	1.4	1.6	3.3	0.9	3.1	0.7	4.3	0.6	0.9	
Non-ferrous metals and products	1.1	1.4	1.5	2.2	1.5	2.2	1.4	1.7	1.6	0.5
Fabricated metal products	1.5	2.8	2.0	2.8	3.1	2.2	1.4	4.1	6.0	0.6
General machinery	3.5	4.8	3.3	4.1	2.2	2.2	6.2	9.9	9.6	0.8
Electrical machinery, equipment and supplies	7.2	11.4	5.6	12.0	11.1	7.2	3.8	18.7	22.7	3.2
Transportation equipment	2.4	3.6	6.8	1.3	4.3	7.2	7.6	2.9	4.1	
Automobile and parts	1.4	2.2	2.3		2.5	4.3	5.7	4.1	3.0	
Precision instrument and machinery	1.3	2.0	0.5	1.5	1.5	0.7		4.7	2.5	2.9
Other manufacturing	2.7	4.2	2.5	2.6	1.2	0.7	4.3	6.7	8.5	3.9
Commerce	34.1	20.9	24.2	30.3	15.1	14.5	0.5	2.3	9.2	48.1
Financing and insurance	9.1	7.1	5.6	9.7	6.5	5.1	10.5	2.3	0.2	14.8
Real estate	1.8	0.8	2.0	0.7	0.6		1.4		0.4	1.0
Warehousing/transport	5.5	3.9	4.5	6.9	2.8	2.9	2.4	0.6	0.9	7.6
Service	4.4	3.5	2.0	4.7	3.4	3.6	2.9	3.5	1.2	3.4
Stock-hold only	0.7	0.2			0.9					0.6
Others	2.6	1.4	0.5	1.7	0.9	1.4		0.6	1.6	2.9

Source: "Foreign Investment Year Book 1988" (TOYO KEIZAI SHINPOSHA, Japan)

Remarks: THA=Thailand, SIN=Singapore, MAY=Malaysia, INDO=Indonesia, KOR=Korea, TWN=Taiwan, HKG=Hong-Kong

It is said that the increased wages in Taiwan and Korea are the cause of active capital investments in Thailand. Since there are a number of labor intensive industries, especially, in the electric machinery field, electric machinery can be competitive from the viewpoint of shifting the production from Japan, Taiwan, and Korea to Thailand. Labor-intensive industries in chemicals and steel are also promising.

Thailand's manpower is among the best in the world, and it is not only because of wages. As a result of interview investigations of companies in Thailand, the quality of the manpower receives remarkably high evaluations, saying, "nimble-fingered", "hard worker with concentration", "specially excellent in welding technique", "satisfactory line speed like Japanese", and "high labor productivity".

As investigated in details in Chapter 6, this is an ideal form resulting from the association between Thai government's policy and the national enthusiasm. It is reflected in the fact that many vocational schools have been opened all over the country.

In addition, political stability, linking of an exchange rate with the US dollar, a preferential duty to the United States, as well as low risk of natural disasters, etc., are major elements of the globalization. There is little need of concern about such elements in Thailand. Thailand is considered to be under advantageous conditions in comparison with neighboring countries. In this relationship, Thailand is the "gateway" from the free world to Burma, Laos, Cambodia, and Vietnam. This situation is considered to become one of the elements that trigger investments in Thailand.

In consideration of the globalization of industrial production, the international trend of the transfer of productivity and the site conditions of Thailand, it may be

said that the development of the target industries derived from "the desirable industrial structure" is highly realistic and feasible.

3) Expected Industry from the Viewpoint of the Thai Role in the International Division of Export-Oriented Industry

Thailand aims to be "the export base" in southeast Asia. As seen already, there are many companies that position Thailand as the export foothold in their own globalization. Cargo can be directly transported to and from foreign countries by large vessels without transfer in Singapore and Hongkong, due to planned preparation of the deep large harbor in Laem Chabang. Therefore, Thailand is expected to be a center of international freight and to have an enhanced competitive position.

Owing to the progress of the construction of these foundations, it is expected that Japanese, Taiwanese and Korean companies consider Thailand as the foothold for "transit and third country trade" to U.S.A. and Europe. Similarly, European companies regard that Thailand has the same role to U.S.A. and Japan. Therefore, they will begin even more active investments. Since the products manufactured in Thailand tend to be exported to the mother countries, bi-directional and shuttle (round-trip) division of labor will be popular instead of the former one-way labor division.

Although the EPZ is attractive for the expansion of the export-oriented industry, expected industries will be studied by the analysis of the import duty rates. This is based on the idea that those industries which process and export materials with higher import duty rates receive greater merits from utilizing the EPZ. First, the relationship between the import duty rates and the Thai industrial policy is as follows:

Relationship between the characteristics of the import duty rate for each material and the Thai industrial policy:

— Higher — Import duty rate — Lower —		
Characteristics of material	<ul style="list-style-type: none"> - Machine assembly - Other final products 	<ul style="list-style-type: none"> - Machine parts - Other industrial raw materials
Relationship with the industrial policy	<ul style="list-style-type: none"> - Protected and promoted as domestic industry due to import substitution - Export type as domestic industry - With importance on utilization of rich domestic resources 	<ul style="list-style-type: none"> - With enhanced competitive position due to progress of nationalization - Types of necessities with difficult domestic preparation

Passenger cars have the highest import duty (200%) in Thailand, and perfume and cosmetics, cases and bags, leather products, apparel, knit products, shoes, umbrellas, and color TV (100%) are second. The following products have an import duty rate of 80%: soap, surface-active agents, burners, textiles, ceramic ware, masonry handicrafts, common glassware, pumps and compressors, washing machines, household electric products, black and white TV, some bicycle parts, vehicles for children, dolls, and toys.

On the other hand, the tax rate for telephones, zinc bars, television transmitters, electric locomotives, containers, and airplanes is 5%, the tax rate for pig iron and crude steel, ferroalloys, scrap iron, and iron ore is 6%, and the tax rate for pulp, petrolic coke, silk thread, and sports equipment is 10%. (See the references for details on the tax rate of each item.)

Thailand has attempted import substitution and promotion of domestic industry by effectively making use of the import duty rates and investment encouragement. Thailand has adopted a policy of promoting domestic investments in

some fields by giving incentives to encourage investments, while increasing the import duty rates in the same fields. The incentives include measures for guaranteeing a domestic market reservation to the early investing corporations and not allowing investments of later-started companies, in addition to tax reductions and exemptions.

When the consideration of the competitive position of the industries (cost reduction by the investment encouraging measures) is added to the investigation of the export-oriented industry, it is necessary to take into consideration the position of each industry in such policy operation. There are two patterns of positioning:

Pattern 1 (high import duty rate: industries excluded from investment encouragement):

A typical example is the KD production of cars, which is no longer the industry for investment encouragement, but has the highest import duty rate. The reason why the KD production is excluded from encouraged industries is the policy decision that no more competition is desired because many manufacturers are already located in Thailand. However, it is necessary to reserve the domestic market. Therefore, the import duty was increased to suppress the import of passenger cars.

Some investment encouraging measures are available for 100% export automobiles, however, the scale merit of automobile production is a problem. In fact, it is considered that a 100% export factory cannot be located in the EPZ from the viewpoint of the relationship with the existing corporations and the national policy. The industries suitable for the EPZ are those with multi-item, minor-production and high tax rate.

Pattern 2 (high import duty rate: investment-encouraged industries):

This is a typical pattern of the EPZ type. The import duty rate is quite high, but the advantages for corporations are large because the investment encouraging measures can be taken advantage of. This pattern includes many products, i.e. household electric products, such as color TV.

In consideration of the recent export trend in Thailand, the corporate globalization, as well as the above analysis, the following are expected as export-oriented industries:

Expected Export-oriented Industry Types

Machine assembly industry: <ul style="list-style-type: none">- Household electric equipment including color TVs, audio equipment, electric refrigerators, microwave ovens, and air conditioners- Copy machines, personal computers, disk drives, facsimiles, telephones, and transceivers- Watches, cameras, and other optical equipment
Machine parts, etc.: <ul style="list-style-type: none">- Electronic parts, automotive parts, lenses, engines and other machine parts, plastic products, batteries
Light industrial products: <ul style="list-style-type: none">- Cases and bags, leather products, apparel, knit products, other textiles, shoes, umbrellas, toys, sports equipment, stationary, jewelry, ornaments
Resource utilizing industry: <ul style="list-style-type: none">- Frozen shrimp, squid, etc., canned fruit, etc., cotton and cotton products.

4) Expected Industry from the Viewpoint of Industrial Development Effects - Labor Intensive Industries

This approach focuses on the employment effect among the other industrial development effects. As described already, Tables 3-5 and 3-6 show the labor intensive rate for each industry type using the two indexes of labor preparation rate and labor equipment productivity.

We calculated these indexes in the Bangkok district, which accounted for 76.5% of the industrial employees in Thailand in 1984. The labor preparation rate is 440 persons/million bahts in all industries and the labor equipment productivity is 21.6%.

The top ten industry types of labor preparation rate include tanned leather and leather products, hats, rice polishing, ceramic ware, silver handiwork, lime and plaster, textiles, jewelry, wooden boxes, and gem grinding. In addition to these industry types, cotton spinning, plastic containers, air conditioners, sports equipment, apparel, spinned thread, radios, and TV sets show a value which is several times the average of the all industry types.

On the other hand, the top ten industry types of labor equipment productivity include spinning, silver handiwork, wooden boats, other apparel, precision equipment, rattan furniture, cardboard, shipbuilding and repair, gem grinding, and medical supplies. Since the maximum value of the labor-preparation rate is 250 times the minimum value and the maximum value of the labor equipment productivity is 56 times the minimum value, the labor preparation rate is proper for comprehending the characteristics of the industry types. It is necessary to add the growth rate of industries to the labor intensiveness from the viewpoint of employment effect by industrial development. From this view, the leather product, textiles, apparel, jewelry, sports equipment, and the machine assembly industry, including electric and electronic equipment, are considered to have the best prospective.

According to the Japanese data in 1985, the top labor intensive industry types include apparel, leather products, textiles, furniture, wood, and miscellaneous goods. This shows the same trend as in Thailand. However, although the labor preparation rate of the electric machinery industry exceeded the average of all the industry types, the labor

equipment productivity of the electric machinery industry was slightly under the average value, reflecting the progress of mechanical and automatic production. (See the references.)

5) Expected Industry Type from the Viewpoint of Industry Placement Policy in Thailand - Distribution of Bangkok-concentrated Industries

This approach aims at the distribution (transfer and expansion) of the industries heavily concentrated in the Bangkok area to the Laem Chabang industrial base in accordance with the industry distribution policy of Thailand.

The number of employees is approximately 980,000 and the total of the industrial gross output was 722 billion bahts in the Bangkok area in 1984, which accounted for 76.5% and 77.5% of the total in Thailand, respectively. The industry type having the largest number of employees was cotton textiles, which had 176,594 persons.

It is followed by other apparel (131,924), soft drink (58,785), steel making/rolling (26,620), and medical supplies (25,566). (See Table 3-7, and the references for the 51st and subsequent positions.) The industry type having the largest industrial shipments was cotton textiles with 68.5 billion bahts in the same way as the number of employees. It was followed by feed (60.5 billion bahts), Tobacco (54.8 billion bahts), distilled and blended liquor (45.3 billion bahts), and tires and tubes (37.7 billion bahts). The automotive assembly industry was in the 18th position with 8.9 billion bahts. (See Table 3-8, and the references for the 51st and subsequent positions).

When the effects of distributing industries from the Bangkok area are considered, attention should be paid not only to industrial activities, but also to the suppression

of the concentration of population. Therefore, the analysis based on the number of employees is better than that based on the total of industrial shipments. Industry distribution is considered to be easy for export-oriented and labor intensive industries, as described already, from the viewpoint of the locational theory in addition to industries with a high concentration in the Bangkok area and with a large volume.

Such characteristics of industries should be studied. In this case, it is considered proper to use the labor preparation rate because the labor intensive industries were selected because of the relative ease of equipment moving. The criteria for distribution possibility are set as follows to investigate the distribution possibility of industries in the Bangkok area (Tables 3-9 to 3-10).

Criteria for industry with high distribution possibility in the Bangkok area

- Concentration in the Bangkok area (share of industrial employees in the Bangkok area to all Thailand): Industry types with concentration of approximately 80%
- Number of industrial employees in the Bangkok area: Industry types with approximately 10,000 persons
- Labor preparation rate in the Bangkok area: Approximately 1,000 persons/million bahts or more (approximately 2.5 times the average of all industry types)

According to the above criteria, the following industry types have a high distribution possibility.

Industry types with high distribution possibility among those concentrated in the Bangkok area.

- 32130 Knit products
- 32202 Apparel (men's wear, lady's wear, and children's wear)
- 34120 Cardboard, etc. (paper, cardboard containers, and boxes)
- 33201 Other manufacturing industries
- 38120 Wooden furniture and equipment, etc.
- 35592 Rubber footwear (shoes)
- 32120 Final textiles

The main industry types of these distributable industries are textiles and clothes, which are also export-oriented industries. Although the main market of cardboard is domestic, it is related to the site conditions of the Laem Chabang industrial base. In other words, it is related to export (related to the port) and the acquisition of raw materials (import).

6) Narrowing the Range of Expected Industries on the Basis of the Site Conditions in Laem Chabang

The previous sections (1) to (5) investigated the expected industry types from the viewpoint of the four approaches. This section selects the industry types expected to be located in the Laem Chabang industrial base by performing the following operation:

- a. Examining the adaptability of the expected industry types identified by the four approaches to the site conditions in Laem Chabang.
- b. Studying some industry types which could not be covered by the four approaches as to their possibility of locating in Laem Chabang.

As described already, the following types of industries are adaptable to the site conditions of the Laem Chabang industrial base.

- a. Export-oriented industry: Examined already
- b. Harbor-oriented industry: Industries using the shoreline and wharf including related industries such as harbor material distribution
- c. Market-oriented industry: Industry whose major factor is the neighborhood to the domestic market around Bangkok
- d. Chemical material processing industry: Functional distribution with Map Ta Phut
- e. Labor intensive industry: Examined already
- f. Resource-oriented industry: Processing agricultural, forestry, and fishery resources around Laem Chabang and expanding factories in areas with rich resources
- g. Industry with low water consumption: Those industries with daily water consumption of less than 50 m³/line on the water supply basis were considered adaptable for location (Japanese industrial statistics were used. See Chapter 4).

The results of the investigation based on the four approaches are summarized. At the same time, industry types are classified into nine types so that types which were set according to the above site conditions will not be duplicated with those set by other approaches. Then, the industry types expected to be located in the Laem Chabang industrial base were selected. The result of summarizing is shown in Tables 3-11 to 3-12. The question mark, "?" in the tables shows the industry types with a problem of location in Laem Chabang from the viewpoint of water supply. The industries of this type were finally excluded from the industry types expected to be located there.

Table 3-5 Degree of Labor Intensiveness by Type of Industries in Bangkok Area 1984 - 1

	Code	Number of person engaged per book value of fixed assets (Person / 100 Mill Baht)		Code	Amount paid ratio to value added (%)		
	TOTAL	440		TOTAL		21.6	
1	32310	Tanneries, leather finishing, fur dressing	19,066	1	32112	Cotton ginning	84.2
2	32203	Headgear	16,418	2	39013	Silverware and nielloware	76.4
3	31161	Rice mills	15,802	3	38412	Building and repairing of wooden boats	70.1
4	36100	Pottery	7,180	4	32209	Other wearing apparel and accessories	61.6
5	39013	Silverware and nielloware	6,994	5	38500	Precision instruments and machinery	60.4
6	36922	Lime and plaster	6,737	6	33202	Rattan furniture	57.9
7	32120	Made-up textile goods	5,313	7	34120	Containers and boxes of paper and paperboard	54.4
8	39012	Jewellery	5,096	8	38419	Other shipbuilding and repairing	53.0
9	33120	Wooden and cane containers, etc.	4,944	9	39011	Cutting and polishing of gem stones	52.7
10	39011	Cutting and polishing of gem stones	4,892	10	35220	Drugs and medicine	52.6
11	32209	Other wearing apparel and accessories	4,720	11	32118	Textile finishing	52.0
12	32112	Cotton ginning	3,575	12	36100	Pottery	52.0
13	35601	Plastic containers	3,275	13	32120	Made-up textile goods	51.6
14	38292	Airconditioning machines	3,188	14	32130	Knitting mills	50.9
15	39030	Sporting and athletic goods	3,003	15	35592	Rubber footwear	50.0
16	32130	Knitting mills	2,542	16	33111	Sawmills and planing mills	49.8
17	32202	Women's, girls' and infants clothes	2,413	17	31161	Rice mills	49.0
18	35294	Matches	2,207	18	32203	Headgear	47.8
19	32113	Spinning of cotton and man-made fibres	2,098	19	34201	Printing and publishing of newspaper	46.7
20	38320	Radio, television and communication equipment and apparatus	1,977	20	36200	Glass and glass products	46.1
21	38240	Special industrial machinery and equipment	1,945	21	31149	Other sea foods products	44.8
22	34204	Printing other printed matters	1,926	22	33112	Veneer, plywood and veneered panel	42.7
23	34120	Containers and boxes of paper and paperboard	1,789	23	32150	Cordage, rope and twine	41.7
24	35592	Rubber footwear	1,758	24	39012	Jewellery	41.6
25	31142	Fish sauce	1,694	25	31111	Slaughtering	41.4
26	33201	Wood furniture, fixture and flooring	1,627	26	35294	Matches	41.1
27	34201	Printing and publishing of newspaper	1,585	27	38130	Structural metal products	40.8
28	31411	Tobacco curing	1,569	28	32115	Weaving of cotton and man-made fibres	40.4
29	38500	Precision instruments and machinery	1,562	29	38220	Agricultural machinery and equipment	40.2
30	38419	Other shipbuilding and repairing	1,558	30	35601	Plastic containers	40.0
31	37120	Iron and steel foundries	1,496	31	32202	Women's, girls' and infants clothes	38.2
32	35599	Other rubber products	1,389	32	38411	Building and repairing of steel steel ships	37.8
33	31190	Confectionery	1,355	33	35992	Asbestos-cement products	37.4
34	35292	Glues	1,277	34	37200	Non-ferrous metal basic industries	37.1
35	32118	Textile finishing	1,276	35	38393	Electrical lamps	35.6
36	38198	Coating, engraving and allied services	1,228	36	38110	Cutlery, hand tools and general hardware	35.2
37	38411	Building and repairing of steel ships	1,212	37	34207	Printing	34.7
38	31119	Other meat products	1,186	38	35599	Other rubber products	34.5
39	38120	Furniture and fixture primarily of metal	1,182	39	32117	Textile printing	34.4
40	39090	Industries not elsewhere classified	1,154	40	35299	Other chemical products	33.5
41	33202	Rattan furniture	1,143	41	38292	Airconditioning machines	33.0
42	37200	Non-ferrous metal basic industries	1,113	42	38192	Wire and wire products	32.8
43	36200	Glass and glass products	974	43	34204	Printing other printed matters	32.6
44	32150	Cordage, rope and twine	924	44	38320	Radio, television and communication equipment and apparatus	32.4
45	38392	Electric accumulators and batteries	893	45	39030	Sporting and athletic goods	32.2
46	31111	Slaughtering	849	46	37120	Iron and steel foundries	32.1
47	38130	Structural metal products	843	47	39090	Industries not elsewhere classified	32.1
48	35120	fertilizers and pesticides	839	48	31212	Manufactured ice	32.0
49	33111	Sawmills and planing mills	809	49	31190	Confectionery	31.7
50	36991	Concrete products	802	50	33201	Wood furniture, fixture and flooring	30.6

Source: Report of the 1985 Industrial Survey (Establishment more than 20 persons)

Table 3-6 Degree of Labor Intensiveness by Type of Industries in Bangkok Area 1984 - 2

	Code	Number of person engaged per book value of fixed assets (Person / 100 Mill Baht)		Code	Amount paid ratio to value added (%)		
51	31340	Soft drinks and carbonated waters	800	51	36991	Concrete products	30.4
52	31420	Tobacco products	774	52	38191	Metal cans and shipping containers	30.2
53	34207	Printing	744	53	38199	Other fabricated metal products	30.2
54	32330	Leather and leather substitutes products	696	54	31411	Tobacco curing	30.0
55	31139	Fruit and vegetables products	686	55	38392	Electric accumulators and batteries	29.8
56	38412	Building and repairing of wooden boats	667	56	38431	Assembly of automobiles	29.8
57	38220	Agricultural machinery and equipment	617	57	38298	Repair shops	29.0
58	38191	Metal cans and shipping containers	587	58	38240	Special industrial machinery and equipment	28.8
59	35210	Paints, varnishes and lacquers	585	59	31123	Ice-cream	28.7
60	38393	Electrical lamps	564	60	32330	Leather and leather substitutes products	28.7
61	38110	Cutlery, hand tools and general hardware	552	61	31121	Dairies	26.7
62	33112	Veneer, plywood and veneered panel	548	62	35510	Tyre and tube industries	26.6
63	37110	Iron and steel works and rolling mills	508	63	35120	fertilizers and pesticides	26.2
64	38298	Repair shops	486	64	36922	Lime and plaster	25.9
65	38192	Wire and wire products	466	65	34111	Pulp, paper and paperboard by machine	25.7
66	38330	Electrical appliances and housewares	464	66	31181	Sugar factories	25.0
67	35220	Drugs and medicine	449	67	37110	Iron and steel works and rolling mills	24.8
68	31121	Dairies	434	68	33120	Wooden and cane containers, etc.	24.5
69	32115	Weaving of cotton and man-made fibres	415	69	32113	Spinning of cotton and man-made fibres	23.3
70	35231	Soap and cleaning preparation	404	70	38198	Coating, engraving and allied services	22.7
71	38199	Other fabricated metal products	398	71	35111	Basic industrial chemicals	22.3
72	38440	Motorcycles, tricycles and bicycles	392	72	38330	Electrical appliances and housewares	22.0
73	36992	Asbestos-cement products	388	73	38120	Furniture and fixture primarily of metal	21.3
74	38439	Other motor vehicle industries	382	74	34190	Pulp, paper and paperboard articles	21.1
75	31123	Ice-cream	377	75	38439	Other motor vehicle industries	19.7
76	38399	Other electrical apparatus and supplies	294	76	31139	Fruit and vegetables products	19.5
77	34111	Pulp, paper and paperboard by machine	282	77	35292	Glues	19.3
78	35609	Other plastic products	279	78	31151	Oils and fats	18.9
79	31122	Milk factories	264	79	31122	Milk factories	18.4
80	35299	Other chemical products	263	80	31340	Soft drinks and carbonated waters	17.1
81	38431	Assembly of automobiles	251	81	35210	Paints, varnishes and lacquers	17.1
82	38310	Electrical industrial machinery and apparatus	242	82	31142	Fish sauce	17.0
83	34190	Pulp, paper and paperboard articles	238	83	38399	Other electrical apparatus and supplies	16.7
84	31219	Other food products	223	84	31219	Other food products	15.7
85	31172	Biscuits	199	85	35231	Soap and cleaning preparation	15.5
86	32117	Textile printing	186	86	36921	Cement	15.1
87	31149	Other sea foods products	183	87	38310	Electrical industrial machinery and apparatus	14.2
88	31220	Prepared animal feeds	174	88	35609	Other plastic products	12.3
89	31310	Distilling, rectifying and blending sprits	157	89	35130	Synthetic resins, plastic materials and artificial fibres	11.7
90	31212	Manufactured ice	132	90	38440	Motorcycles, tricycles and bicycles	11.1
91	35111	Basic industrial chemicals	129	91	31220	Prepared animal feeds	9.9
92	31181	Sugar factories	127	92	31310	Distilling, rectifying and blending sprits	8.0
93	31151	Oils and fats	119	93	31310	and blending sprits	8
94	36921	Cement	98	93	31420	Tobacco products	7.9
95	35510	Tyre and tube industries	83	94	31172	Biscuits	7.6
96	35130	Synthetic resins, plastic materials and artificial fibres	76	95	31119	Other meat products	4.5
			76	96	32310	Tanneries, leather finishing, dressing	1.5
97	31132	Soy sauce and soy curds	D	97	31132	Soy sauce and soy curds	D
98	35300	Petroleum refineries	D	98	35300	Petroleum refineries	D

Source: Report of the 1985 Industrial Survey (Establishment more than 20 persons)

Table 3-7 Manufacturing Industries in Bangkok Area
in 1984
(Top 50 in Ranking of Persons Engaged)

(Remark:Accum. = Accumulated percentage adding a percentage of the following industries)

	Code	Types of industry	Number of persons engaged	Percentage to total amount	
				(%)	Accu.
		TOTAL	978,059	100.0	100.0
1	32115	Weaving of cotton and man-made fibres	176,594	18.1	18.1
2	32209	Other wearing apparel and accessories	131,924	13.5	31.5
3	31340	Soft drinks and carbonated waters	58,785	6.0	37.6
4	37110	Iron and steel works and rolling mills	26,620	2.7	40.3
5	35220	Drugs and medicine	25,566	2.6	42.9
6	31220	Prepared animal feeds	23,425	2.4	45.3
7	31310	Distilling, rectifying and blending spirits	23,170	2.4	47.7
8	35510	Tyre and tube industries	22,506	2.3	50.0
9	31420	Tobacco products	22,229	2.3	52.2
10	35609	Other plastic products	20,315	2.1	54.3
11	35592	Rubber footwear	19,817	2.0	56.3
12	36921	Cement	17,634	1.8	58.1
13	36200	Glass and glass products	17,338	1.8	59.9
14	32202	Women's, girls' and infants clothes	14,652	1.5	61.4
15	32120	Made-up textile goods	14,338	1.5	62.9
16	39090	Industries not elsewhere classified	14,228	1.5	64.3
17	38191	Metal cans and shipping containers	14,038	1.4	65.8
18	33112	Veneer, plywood and veneered panel	13,736	1.4	67.2
19	34120	Containers and boxes of paper and paperboard	12,480	1.3	68.5
20	38431	Assembly of automobiles	12,112	1.2	69.7
21	34111	Pulp, paper and paperboard by machine	10,676	1.1	70.8
22	36991	Concrete products	10,194	1.0	71.8
23	38399	Other electrical apparatus and supplies	10,030	1.0	72.8
24	33201	Wood furniture, fixture and flooring	10,024	1.0	73.9
25	38199	Other fabricated metal products	9,979	1.0	74.9
26	38439	Other motor vehicle industries	9,855	1.0	75.9
27	38330	Electrical appliances and housewares	9,627	1.0	76.9
28	38120	Furniture and fixture primarily of metal	9,093	0.9	77.8
29	35120	Fertilizers and pesticides	9,040	0.9	78.7
30	31149	Other sea foods products	8,761	0.9	79.6
31	32130	Knitting mills	8,669	0.9	80.5
32	38130	Structural metal products	8,622	0.9	81.4
33	34204	Printing other printed matters	7,192	0.8	82.2
34	36100	Pottery	7,776	0.8	83.0
35	38440	Motorcycles, tricycles and bicycles	7,344	0.8	83.7
36	37120	Iron and steel foundries	6,962	0.7	84.5
37	38320	Radio, television and communication equipment and apparatus	6,811	0.7	85.2
38	32150	Cordage, rope and twine	6,473	0.7	85.8
39	38198	Coating, engraving and allied services	6,389	0.7	86.5
40	33111	Sawmills and planing mills	6,078	0.6	87.1
41	34207	Printing	6,014	0.6	87.7
42	34190	Pulp, paper and paperboard articles	5,850	0.6	88.3
43	35599	Other rubber products	5,636	0.6	88.9
44	31123	Ice-cream	5,588	0.6	89.5
45	36992	Asbestos-cement products	5,506	0.6	90.0
46	34201	Printing and publishing of newspaper	5,312	0.5	90.6
47	38392	Electric accumulators and batteries	4,848	0.5	91.1
48	32310	Tanneries, leather finishing, fur dressing	4,820	0.5	91.5
49	32117	Textile printing	4,472	0.5	92.0
50	31151	Oils and fats	4,465	0.5	92.5

Source: Report of the 1985 Industrial Survey (Establishment more than 20 persons)

Table 3-8 Manufacturing Industries in Bangkok Area
in 1984
(Top 50 in Ranking of value of gross output)

(Remark:Accum. = Accumulated percentage adding a percentage of the following industries)
(Unit:Mill. Baht)

	Code	Types of Industry	Value of gross output	Percentage to total amount	
				(%)	Accm.
		TOTAL	722,003	100.0	100.0
1	32115	Weaving of cotton and man-made fibres	68,516	9.5	9.5
2	31220	Prepared animal feeds	60,521	8.4	17.9
3	31420	Tobacco products	54,838	7.6	25.5
4	31310	Distilling, rectifying and blending spirits	45,307	6.3	31.7
5	35510	Tyre and tube industries	37,686	5.2	37.0
6	31340	Soft drinks and carbonated waters	32,521	4.5	41.5
7	32209	Other wearing apparel and accessories	30,550	4.2	45.7
8	35809	Other plastic products	30,104	4.2	49.9
9	36921	Cement	29,937	4.1	54.0
10	37110	Iron and steel works and rolling mills	29,717	4.1	58.1
11	35120	Fertilizers and pesticides	19,063	2.6	60.8
12	35220	Drugs and medicine	18,768	2.6	63.4
13	38399	Other electrical apparatus and supplies	14,418	2.0	65.4
14	31151	Oils and fats	10,933	1.5	66.9
15	38440	Motorcycles, tricycles and bicycles	10,174	1.4	68.3
16	38191	Metal cans and shipping containers	10,113	1.4	69.7
17	35231	Soap and cleaning preparation	9,696	1.3	71.0
18	38431	Assembly of automobiles	9,383	1.3	72.3
19	38439	Other motor vehicle industries	8,966	1.2	73.6
20	34111	Pulp, paper and paperboard by machine	7,064	1.0	74.6
21	38198	Coating, engraving and allied services	6,865	1.0	75.5
22	38330	Electrical appliances and housewares	6,568	0.9	76.4
23	36992	Asbestos-cement products	6,521	0.9	77.3
24	36200	Glass and glass products	6,091	0.8	78.2
25	33112	Veneer, plywood and veneered panel	5,494	0.8	78.9
26	31122	Milk factories	5,459	0.8	79.7
27	34190	Pulp, paper and paperboard articles	5,349	0.7	80.4
28	38199	Other fabricated metal products	5,018	0.7	81.1
29	31149	Other sea foods products	4,662	0.6	81.8
30	36991	Concrete products	4,304	0.6	82.4
31	38130	Structural metal products	4,288	0.6	82.9
32	31123	Ice-cream	3,843	0.5	83.5
33	35130	Synthetic resins, plastic materials and artificial fibres	3,551	0.5	84.0
34	39090	Industries not elsewhere classified	3,380	0.5	84.4
35	31219	Other food products	3,336	0.5	84.9
36	35210	Paints, varnishes and lacquers	3,212	0.4	85.3
37	32202	Women's, girls' and infants clothes	3,169	0.4	85.8
38	32310	Tanneries, leather finishing, fur dressing	3,096	0.4	86.2
39	35111	Basic industrial chemicals	2,975	0.4	86.6
40	38192	Wire and wire products	2,913	0.4	87.0
41	33201	Wood furniture, fixture and flooring	2,879	0.4	87.4
42	38292	Airconditioning machines	2,866	0.4	87.8
43	35592	Rubber footwear	2,842	0.4	88.2
44	38120	Furniture and fixture primarily of metal	2,670	0.4	88.6
45	32120	Made-up textile goods	2,526	0.3	88.9
46	38392	Electric accumulators and batteries	2,519	0.3	89.3
47	38910	Electrical industrial machinery and apparatus	2,498	0.3	89.6
48	38920	Radio, television and communication equipment and apparatus	2,473	0.3	90.0
49	34120	Containers and boxes of paper and paperboard	2,450	0.3	90.3
50	32130	Knitting mills	2,033	0.3	90.6

Source: Report of the 1985 Industrial Survey (Establishment more than 20 persons)

Table 3-9 Indicators for Possibility of Industrial Decentralization out of Bangkok Area as of 1984 - 1

Remark: Indicator A = Number of persons engaged per book value of fixed assets (Person / 100 Mill. Baht)
Indicator B = Amount paid ratio to value added (%)

Rank	Code	Types of Industry	Bangkok / Whole Kingdom (%)	Number of persons engaged	Indicator	
					A	B
	TOTAL		76.5	978,059	440	21.6
1	31111	Slaughtering	100.0	3,314	849	41.4
2	31122	Milk factories	100.0	2,779	284	18.4
3	31190	Confectionery	100.0	841	1355	31.7
4	31340	Soft drinks and carbonated waters	100.0	58,785	800	17.1
5	32118	Textile finishing	100.0	1,938	1276	52.0
6	32130	Knitting mills	100.0	8,669	2542	50.9
7	32150	Cordage, rope and twine	100.0	6,473	924	41.7
8	32202	Women's, girls' and infants clothes	100.0	14,652	2413	38.2
9	32203	Headgear	100.0	66	16418	47.8
10	32209	Other wearing apparel and accessories	100.0	131,924	4720	61.6
11	32310	Tanneries, leather finishing, fur dressing	100.0	4,820	19066	1.5
12	32330	Leather and leather substitutes products	100.0	1,811	696	28.7
13	33120	Wooden and cane containers, etc.	100.0	610	4944	24.5
14	33202	Rattan furniture	100.0	1,227	1143	57.9
15	34120	Containers and boxes of paper and paperboard	100.0	12,480	1789	54.4
16	34190	Pulp, paper and paperboard articles	100.0	5,850	238	21.1
17	34201	Printing and publishing of newspaper	100.0	5,312	1585	48.7
18	34207	Printing	100.0	6,014	744	34.7
19	35111	Basic industrial chemicals	100.0	2,929	129	22.3
20	35231	Soap and cleaning preparation	100.0	3,988	404	15.5
21	35292	Glues	100.0	770	1277	19.3
22	35299	Other chemical products	100.0	1,139	263	33.5
23	35601	Plastic containers	100.0	1,225	3275	40.0
24	36200	Glass and glass products	100.0	17,338	974	48.1
25	36921	Cement	100.0	17,634	98	15.1
26	36922	Lime and plaster	100.0	420	6737	25.9
27	37110	Iron and steel works and rolling mills	100.0	26,620	506	24.8
28	38110	Cutlery, hand tools and general hardware	100.0	3,537	552	35.2
29	38130	Structural metal products	100.0	8,622	843	40.8
30	38191	Metal cans and shipping containers	100.0	14,038	587	30.2
31	38192	Wire and wire products	100.0	3,001	466	32.8
32	38198	Coating, engraving and allied services	100.0	6,389	1228	22.7
33	38292	Airconditioning machines	100.0	4,220	3188	33.0
34	38298	Repair shops	100.0	324	486	29.0
35	38310	Electrical industrial machinery and apparatus	100.0	4,336	242	14.2
36	38320	Radio, television and communication equipment and apparatus	100.0	6,811	1977	32.4
37	38330	Electrical appliances and housewares	100.0	9,627	464	22.0
38	38392	Electric accumulators and batteries	100.0	4,848	893	29.8
39	38393	Electrical lamps	100.0	1,519	564	35.6
40	38399	Other electrical apparatus and supplies	100.0	10,030	294	16.7
41	38411	Building and repairing of steel ships	100.0	1,711	1212	37.8
42	38419	Other shipbuilding and repairing	100.0	231	1558	53.0
43	38431	Assembly of automobiles	100.0	12,112	251	29.8
44	38439	Other motor vehicle industries	100.0	9,855	382	19.7
45	38500	Precision instruments and machinery	100.0	4,047	1562	60.4
46	39012	Jewellery	100.0	880	5096	41.6
47	39013	Silverware and nielloware	100.0	396	6994	76.4
48	39030	Sporting and athletic goods	100.0	519	3003	32.2
49	39090	Industries not elsewhere classified	100.0	14,228	1154	32.1
50	31123	Ice-cream	99.4	5,588	377	28.7
51	39011	Cutting and polishing of gem stones	99.2	2,513	4892	52.7
52	38440	Motorcycles, tricycles and bicycles	98.9	7,344	392	11.1
53	36992	Asbestos-cement products	98.8	5,506	388	37.4
54	35220	Drugs and medicine	98.6	25,566	449	52.6
55	34204	Printing other printed matters than newspapers	98.2	7,792	1926	32.6
56	35120	Fertilizers and pesticides	97.7	9,040	839	26.2
57	31420	Tobacco products	97.0	22,223	774	7.9
58	33112	Veneer, plywood and veneered panel	96.7	13,736	548	42.7
59	38120	Furniture and fixture primarily of metal	96.3	9,093	1182	21.3
60	33201	Wood furniture, fixture and flooring	91.5	10,024	1627	30.6

Source: Report of the 198 Industrial Survey (Established more than 20 persons)

Table 3-10 Indicators for Possibility of Industrial Decentralization out of Bangkok Area as of 1984 - 2

Remark: Indicator A = Number of persons engaged per book value of fixed assets (Person / 100 Mill. Baht)
:indicator B = Amount paid ratio to value added (%)

Rank	Code	Types of Industry	Bangkok / Whole Kingdom (%)	Number of persons engaged	Indicator	
					A	B
61	37120	Iron and steel foundries	91.1	6,962	1496	32.1
62	38240	Special industrial machinery and equipment	90.5	572	1945	28.8
63	32115	Weaving of cotton and man-made fibres	89.9	176,594	415	40.4
64	31121	Dairies	87.5	864	434	26.7
65	35592	Rubber footwear	87.1	19,817	1758	50.0
66	31220	Prepared animal feeds	87.0	23,425	174	9.9
67	37200	Non-ferrous metal basic industries	87.0	775	1113	37.1
68	35210	Paints, varnishes and lacquers	85.0	3,101	585	17.1
69	32120	Made-up textile goods	84.1	14,338	5313	51.6
70	35510	Tyre and tube industries	83.7	22,606	83	26.5
71	31142	Fish sauce	81.9	1,946	1694	17.0
72	38199	Other fabricated metal products	81.5	9,979	398	30.2
73	34111	Pulp, paper and paperboard by machine	81.3	10,676	282	25.7
74	36100	Pottery	78.8	7,776	7180	52.0
75	32117	Textile printing	76.6	4,472	186	34.4
76	35609	Other plastic products	74.2	20,315	279	12.3
77	31219	Other food products	74.0	2,876	223	15.7
78	35599	Other rubber products	73.4	5,636	1389	34.5
79	31310	Distilling, rectifying and blending spirits	73.2	23,170	157	8.0
80	31119	Other meat products	72.0	288	1186	4.5
81	38220	Agricultural machinery and equipment	69.6	1,781	617	40.2
82	36991	Concrete products	65.2	10,194	802	30.4
83	31172	Biscuits	64.7	369	199	7.6
84	38412	Building and repairing of wooden boats	57.4	264	667	70.1
85	31139	Fruit and vegetables products	46.4	2,133	666	19.5
86	31151	Oils and fats	42.8	4,465	119	18.9
87	31149	Other sea foods products	41.8	8,761	183	44.8
88	31212	Manufactured ice	39.0	986	132	32.0
89	35130	Synthetic resins, plastic materials and artificial fibres	35.2	958	76	11.7
90	35294	Matches	33.6	770	2207	41.1
91	33111	Sawmills and planing mills	22.3	6,078	809	49.8
92	32113	Spinning of cotton and man-made fibres	15.2	1,764	2098	23.3
93	32112	Cotton ginning	11.4	322	3575	64.2
94	31161	Rice mills	5.9	515	15802	49.0
95	31411	Tobacco curing	3.1	1,244	1569	30.0
96	31181	Sugar factories	2.1	900	127	25.0
97	31132	Soy sauce and soy curds	D	D		
98	35300	Petroleum refineries	D	D		
99	31131	Canning of fruit and vegetables	--	--		
100	31141	Canning of fish	--	--		
101	31162	Drying of maize	--	--		
102	31164	Tapioca mills	--	--		
103	31171	Bakeries	--	--		
104	31173	Noodles and similar products	--	--		
105	32111	Silk reeling	--	--		
106	32114	Silk weaving	--	--		
107	32116	Jute mills	--	--		
108	32119	Other spinning and weaving	--	--		
109	32201	Men's and boys' clothes	--	--		
110	35112	Charcoal	--	--		
111	35591	Rubber sheets and block rubber	--	--		
112	36910	Structural clay products	--	--		
113	36999	Other non-metallic mineral products	--	--		
114	38299	Other machinery except electrical	--	--		
115	38432	Motor vehicle bodies	--	--		

Source: Report of the 198 Industrial Survey (Established more than 20 persons)

Table 3-11 Target Industries to be Located at the Laem Chabang-1
(derived from theoretical approach)

Remarks: Symbols have the following meaning relating to the target industries.
 □ : Industries determined by the Approach. "Desirable Industrial Structure"
 ◇ : Export-oriented industries
 ⊙ : Labor-intensive industries
 ○ : Industries with a high possibility of decentralization outside of Bangkok area
 ■ : Port-oriented industries including port-related industries
 ● : Market-oriented industries
 ▲ : Products from basic chemicals (linked with Map Ta Put)
 ★ : Resource-based industries
 ? : High water consumption industries (compared to the Laem Chabang's water-supply capacity)
 → LAEM CHABANG : Industries to be located in Laem Chabang from a theoretical approaches

Code	Type of Industry	Types/categories of industry set by the five approaches to be target industries	Industries to be located in Laem Chabang
31119	Meat products	□◇⊙ ● ★ ?	
31123	Ice-cream	● ?	
31131	Canning of fruit and vegetables	□◇⊙ ● ★ ?	
31139	Fruit and vegetable products	□◇ ● ★ ?	
31141	Canning of fish	□◇ ● ★ ?	
31149	Frozen sea foods products, etc.	□◇ ● ★ ?	
31164	Tapioca mills	□◇ ● ★	→ LAEM CHABANG
31171	Bakeries	●	→ LAEM CHABANG
31172	Biscuits	●	→ LAEM CHABANG
31173	Noodles and similar products	● ?	
31190	Confectionery	⊙ ●	
31219	Other food products	⊙ ● ?	
31220	Prepared animal feeds	□◇ ● ★ ?	→ LAEM CHABANG
31340	Soft drinks and carbonated waters	● ?	
32115	Weaving of cotton and man-made fibers	□◇⊙ ● ?	
32120	Made-up textile goods	□◇⊙○ ●	→ LAEM CHABANG
32130	Knitting mills	□◇⊙○ ●	→ LAEM CHABANG
32201	Men's and boys' clothes	□◇⊙○ ●	→ LAEM CHABANG
32202	Women's, girls' and infants clothes	□◇⊙○ ●	→ LAEM CHABANG
32209	Other wearing apparel and accessories	□◇⊙○ ●	→ LAEM CHABANG
33120	Wooden and cane containers	□◇ ●	→ LAEM CHABANG
32330	Leather and leather substitutes products	□◇ ●	→ LAEM CHABANG
33201	Woody furniture, fixture and flooring including rattan furniture	⊙○ ● ★	→ LAEM CHABANG
34120	Containers and boxes of paper and paperboard	○■●	→ LAEM CHABANG
34207	Printing	○ ●	→ LAEM CHABANG
35120	Chemical fertilizer	□ ● ▲ ?	
35210	Paints, varnishes and lacquers	● ▲ ?	→ LAEM CHABANG
35220	Drugs and medicine	● ▲ ?	
35231	Soap and cleaning preparation	● ▲ ?	→ LAEM CHABANG
35299	Other chemical products	□ ● ▲ ?	
35510	Tyre and tube industries	□ ● ▲ ★	→ LAEM CHABANG
35591	Rubber sheets and block rubber	□ ● ▲ ★	→ LAEM CHABANG
35592	Rubber footwear	◇⊙○ ●	→ LAEM CHABANG
35599	Other rubber products	◇⊙○ ●	→ LAEM CHABANG
35601	Plastic containers	⊙ ● ▲	→ LAEM CHABANG
35609	Other plastic products	● ▲	→ LAEM CHABANG
36200	Glass and glass products	□ ⊙○ ● ★	→ LAEM CHABANG
36991	Concrete products	○ ●	→ LAEM CHABANG
37110	Iron and steel rolling mills	□ ●	→ LAEM CHABANG
37120	Iron and steel foundries	□ ⊙ ●	→ LAEM CHABANG
3711	Iron and steel shearing/splitting, etc	□ ●	→ LAEM CHABANG
3712	Non-ferrous metal rolling mills	□ ●	→ LAEM CHABANG
	Non-ferrous metal casting and its products	□ ●	→ LAEM CHABANG
38120	Furniture and fixture primarily of metal	◇⊙○ ●	→ LAEM CHABANG
38130	Structural metal products	⊙ ●	→ LAEM CHABANG
38191	Metal cans and shipping containers	□ ●	→ LAEM CHABANG
38192	Wire and wire products	□◇⊙○ ●	→ LAEM CHABANG
38198	Coating, engraving and allied services	□ ⊙ ●	→ LAEM CHABANG
	Heat treatment and electro plating	●	
38199	Other fabricated metal products	⊙ ●	→ LAEM CHABANG

Table 3-12 Target Industries to be located at the Laem Chabang-2
(derived from theoretical approach)

Remarks: Symbols have the following meaning relating to the target industries.
 □ : Industries determined by the Approach, "Desirable Industrial Structure"
 ◇ : Export-oriented industries
 ⊙ : Labor-intensive industries
 ○ : Industries with a high possibility of decentralization outside of Bangkok area
 ■ : Port-oriented industries including port-related industries
 ● : Market-oriented industries
 ▲ : Products from basic chemicals (linked with Map Ta Put)
 ★ : Resource-based industries
 ? : High water consumption industries (compared to the Laem Chabang's water-supply capacity)
 → LAEM CHABANG : Industries to be located in Laem Chabang from a theoretical approaches

Code	Type of Industry	Types/categories of industry set by the five approaches to be target industries	Industries to be located in Laem Chabang
38220	Agricultural machinery and equipment	□◇	→ LAEM CHABANG
38292	Airconditioning machines and their parts	□◇⊙○	→ LAEM CHABANG
38298	Repair shops	□ ○ ■ ●	→ LAEM CHABANG
38299	Other machinery except electrical	□	→ LAEM CHABANG
	:Mold and die		
	:High precision machining		
38310	Electrical industrial machinery and apparatus	□◇⊙	→ LAEM CHABANG
	:Micromotor and microtransformer		
	:Various switches and wiring instruments		
	:Control panel, generators, etc.		
38320	Radio, television and communication equipment and apparatus	□◇⊙	→ LAEM CHABANG
	:Various audio apparatus		
	:CRT (cathod-ray tube)		
	:Telephone and its switching equipment		
	:Video tape recorder		
	:Facsimile		
38330	Electrical appliances and housewares	□◇⊙	→ LAEM CHABANG
38392	Electric accumulators	□◇⊙	→ LAEM CHABANG
	:Dry cell		
38399	Other electrical apparatus and supplies	□◇⊙ ●	→ LAEM CHABANG
	:Electronic copy machines		
	:Personal computer, etc		
	:Floppy disk drive		
	:Electric printer		
	:Electronic calculators		
	:Assembly of integrated circuit		
	:Electronic parts (tuner, transistor, ferrite core, key board, speaker, condenser, resistor, LED, magnet head, lead frame, printed board, etc.)		
38411	Ship-repairing	⊙ ■ ●	→ LAEM CHABANG
38419	Other shipbuilding such as watercraft		
38432	Motor vehicle bodies	⊙ ●	→ LAEM CHABANG
38439	Other motor vehicle industries	□◇⊙ ●	→ LAEM CHABANG
	:Motor vehicle parts and accessories		
	:Engines, bearing, etc.		
38500	Precision instruments and machinery	□◇⊙	→ LAEM CHABANG
	:Optical instruments such as cameras and lenses		
	:Ophthalmic goods including frames		
	:Watches, clocks and parts		
39011	Cutting and polishing of gem stones	□◇⊙	→ LAEM CHABANG
39012	Jewellery	□◇⊙	→ LAEM CHABANG
39030	Sporting and athletic goods	□◇⊙	→ LAEM CHABANG
39090	Industries not elsewhere classified	□◇⊙	→ LAEM CHABANG
	:Toys		
	:Stationery		
	:Antique, handicraft and others		
Others	Warehousing/transport	■ ●	→ LAEM CHABANG
	wholesale trade	■ ●	→ LAEM CHABANG

3-2 SURVEY ON THE INVESTORS' DEMAND

The main purpose of these surveys were:

- to find potential investors for Laem Chabang
- to clarify the location factors which the potential investors require
- to clarify supporting services and facilities which the potential investors require.

These surveys were conducted from July to September, 1988, and focused on manufacturing, commerce, shipping, and warehouse industries both in Thailand and Japan. The surveys were conducted by mail. The number of dispatch and of respondents were as follows.

	Thailand	Japan
N. of dispatch(a)	1,000	10,000
N. of respondents(b)	269	500
b/a(%)	26.9	5.0

The rate of return in Thailand was 26.9%, which was a high return rate as a demand survey. On the other hand, the rate of that in Japan was only 5.0%. However, the results can be regarded as generally satisfactory in view of the fact that the objective of the survey was mainly to find potential investors and their requirements.

As the results of the surveys, 64 companies in Thailand and 149 companies in Japan have interests in Laem Chabang as summarized in Table 3-13.

The types of potential investors in Japan were mainly processing and assembly industries, such as electrical machinery (32 companies), machinery(20 companies), clothing (15 companies), and metal products(13 companies). In Thailand, those were also electrical machinery, garments & textiles, and food industries. The Japanese investors were interested in EPZ.

Table 3-13 Potential Investors by Sectors

Japanese Companies		
	Number	%
Food	10	6.7
Textiles	6	4.0
Clothing, except footwear	15	10.1
Furniture and fixtures	3	2.0
Chemicals and chemical products	7	4.7
Rubber and rubber products	2	1.3
Leather, leather products, and footwear	1	0.7
Ceramics	3	2.0
Basic metal industries	11	7.4
Metal products	13	8.7
Machinery	20	13.4
Electrical machinery	32	21.5
Transport equipment	8	5.4
Precision equipment	6	4.0
Miscellaneous	6	4.0
Commerce	1	0.7
Shipping	2	1.3
Airlines	1	0.7
General warehouses	2	1.3
Total	149	100.0
Thai Companies		
Food	6	9.4
Garment, Textile	7	10.9
Machines	4	6.3
Electrical/ Electronics	8	12.5
Metals/ Alloys	5	7.8
Non-Metal	1	1.6
Chemicals	4	6.3
Jewelry, Stoneware, Silverware	1	1.6
Wholesale trade	3	4.7
Warehousing/ transport	1	1.6
Others	33	51.6
Total	64	100.0

3-3 LIST OF TARGET INDUSTRIES

This third chapter studied target industries to be located in Laem Chabang. The first section (3-1) approached them from industrial location theory, keeping in mind the direction of Thailand's policies for industry and industrial location, and the globalization of industrial activities. The second section (3-2) has attempted to determine the actual needs for Laem Chabang by questionnaire survey.

This section is the conclusion of this chapter and the study results are arranged, as shown in Tables 3-14 and 3-15. The questionnaire survey asked the companies what extent of interest do they have in Laem Chabang. Answers from them are arranged in the tables, according to the following considerations:

- 1) As for the industrial classification of potential investors or companies, they are classified by products to be manufactured in Laem Chabang, which were specified in the questionnaire form for companies in Japan.
- 2) If the products were not specified in the questionnaire form for both of Japan and Thailand, the companies are classified by the products they are making or business they are engaged in at present.
- 3) As for the degree of their interest in Laem Chabang, if more than one company which belong to the same type of industry have interest in Laem Chabang, the tables exhibit the stronger interest they showed.

Target industries for Laem Chabang are listed in Tables 3-14 and 3-15 and the following three points are outstanding.

The first is that Japanese companies interested in Laem Chabang are distributed in many and various type of industries. There are 67 types of target industries in total. Thailand's companies interested in Laem Chabang are classified into 25 types of industries, which only constitute 37% of the total. On the other hand, Japanese companies interested are classified into 44 types of industries, which constitute 66% of the total. This is because Japanese companies have a high evaluation of Thailand, and because foreign investment or industrial location in foreign countries is an urgent issue for a large part of the Japanese companies, even though the number of companies interested in Laem Chabang is larger in Japan than in Thailand. It is supposed, based on the recent trend of investment, that companies in advanced countries and NIES such as Taiwan and Korea are under the same situations.

The second feature is that there are a few companies belonging to the industries targeted because of decentralization from the Bangkok who are interested in Laem Chabang. 16 types of industries are listed as this target industry, but companies with an interest are distributed only within 7 industries such as apparel, furniture, paperboard, rubber foot ware, and glass products. In order to cope with such a situation, it is expected that some incentives for industrial decentralization will be established, in addition to the expansion of Laem Chabang's publicity (PR) and the active sales promotion.

The third is that a relatively large part of the industries classified into "High water consumption industries" have an interest in Laem Chabang. This brings about an issue to be discussed and resolved, and is also related to the criteria for the selection of investors, which will be studied in the next chapter.

Table 3-14 Target Industries to be Located at the Laem Chabang-1
(Final outputs of theoretical approach and questionnaire survey)

Remarks: Symbols have the following meaning relating to the target industries.
 □ : Industries determined by the Approach, "Desirable Industrial Structure"
 ◇ : Export-oriented industries
 ⊙ : Labor-intensive industries
 ○ : Industries with a high possibility of decentralization outside of Bangkok area
 ■ : Port-oriented industries including port-related industries
 ● : Market-oriented industries
 ▲ : Products from basic chemicals (linked with Map Ta Put)
 ★ : Resource-based industries
 ? : High water consumption industries (compared to the Laem Chabang's water-supply capacity)
 → LAEM CHABANG : Industries to be located in Laem Chabang from a theoretical approaches
 QUESTIONNAIRE : THA=Thailand JPN=Japan G=G I E E=E P Z
 Number means company's interest toward the Laem Chabang : 1 → Plan to invest
 2 → Very interested
 3 → Moderate interested

Code	Types of Industry	Types/categories of industry set by the five approaches to be target industries	Industries to be located in the Laem Chabang	QUESTIONNAIRE			
				THA		JPN	
				G	E	G	E
31119	Meat products	□◇○ ● ★ ?				3	3
31123	Ice-cream	○ ● ?				3	
31131	Canning of fruit and vegetables	□◇○ ● ★ ?				3	3
31139	Fruit and vegetable products	□◇ ● ★ ?					3
31141	Canning of fish	□◇ ● ★ ?				3	3
31149	Frozen sea foods products, etc.	□◇ ● ★ ?					3
31164	Tapioca mills	□◇ ● ★	→ LAEM CHABANG				
31171	Bakeries	●	→ LAEM CHABANG				
31172	Biscuits	●	→ LAEM CHABANG				
31173	Noodles and similar products	● ?					
31190	Confectionery	○ ●				3	3
31219	Other food products	○ ● ?				2	2
31220	Prepared animal feeds	□◇ ● ★	→ LAEM CHABANG			3	3
31340	Soft drinks and carbonated waters	○ ● ?					
32115	Weaving of cotton and man-made fibers	□◇○ ● ?				2	2
32120	Made-up textile goods	□◇○ ●	→ LAEM CHABANG			3	1
32130	Knitting mills	□◇○ ●	→ LAEM CHABANG				
32201	Men's and boys' clothes	□◇○ ●	→ LAEM CHABANG			1	1
32202	Women's, girls' and infants clothes	□◇○ ●	→ LAEM CHABANG			3	2
32209	Other wearing apparel and accessories	□◇○ ●	→ LAEM CHABANG			2	2
33120	Wooden and cane containers	□◇ ●	→ LAEM CHABANG				
32330	Leather and leather substitutes products	□◇ ●	→ LAEM CHABANG			1	1
33201	Woody furniture, fixture and flooring including rattan furniture	○ ● ★	→ LAEM CHABANG			1	1
34120	Containers and boxes of paper and paperboard	○ ●	→ LAEM CHABANG			3	
34207	Printing	○ ●	→ LAEM CHABANG				
35120	Chemical fertilizer	□ ● ▲ ?				3	
35210	Paints, varnishes and lacquers	● ▲ ?	→ LAEM CHABANG				3
35220	Drugs and medicine	● ▲ ?					3
35231	Soap and cleaning preparation	● ▲ ?	→ LAEM CHABANG				3
35299	Other chemical products	□ ● ▲ ?				3	1
35510	Tyre and tube industries	□ ● ▲ ★	→ LAEM CHABANG			1	3
35591	Rubber sheets and block rubber	□ ● ▲ ★	→ LAEM CHABANG			2	2
35592	Rubber footwear	◇ ● ○	→ LAEM CHABANG			3	3
35599	Other rubber products	◇ ● ○	→ LAEM CHABANG				
35601	Plastic containers	○ ● ▲	→ LAEM CHABANG				
35609	Other plastic products	○ ● ▲	→ LAEM CHABANG			2	1
36200	Glass and glass products	□ ● ○ ● ★	→ LAEM CHABANG			3	3
36991	Concrete products	○ ● ●	→ LAEM CHABANG				3
37110	Iron and steel rolling mills	□ ● ●	→ LAEM CHABANG				3
37120	Iron and steel foundries	□ ● ●	→ LAEM CHABANG				3
3711	Iron and steel shearing/slitting, etc.	□ ● ●	→ LAEM CHABANG			1	3
3712	Non-ferrous metal rolling mills	□ ● ●	→ LAEM CHABANG				3
	Non-ferrous metal casting and its products	□ ● ●	→ LAEM CHABANG				3
38120	Furniture and fixture primarily of metal	◇ ● ○ ●	→ LAEM CHABANG				2
38130	Structural metal products	○ ● ●	→ LAEM CHABANG				3
38191	Metal cans and shipping containers	○ ● ●	→ LAEM CHABANG				2
38192	Wire and wire products	□◇○ ●	→ LAEM CHABANG			3	2
38198	Coating, engraving and allied services :Heat treatment and electro plating	□ ● ●	→ LAEM CHABANG				
38199	Other fabricated metal products	○ ● ●	→ LAEM CHABANG				

Table 3-15 Target Industries to be Located at the Laem Chabang-2
(Final outputs of theoretical approach and questionnaire survey)

Remarks: Symbols have the following meaning relating to the target industries.
 : Industries determined by the Approach, "Desirable Industrial Structure"
 : Export-oriented industries
 : Labor-intensive industries
 : Industries with a high possibility of decentralization outside of Bangkok area
 : Port-oriented industries including port-related industries
 : Market-oriented industries
 : Products from basic chemicals (linked with Map Ta Put)
 : Resource-based industries
 ? : High water consumption industries (compared to the Laem Chabang's water-supply capacity)
 →LAEM CHABANG: Industries to be located in Laem Chabang from a theoretical approaches
 QUESTIONNAIRE: THA=Thailand JPN=Japan G=G I E E=E P Z
 Number means company's interest toward the Laem Chabang: 1→Plan to invest
 2→Very interested
 3→Moderate interested

Code	Types of Industry	Types/categories of industry set by the five approaches to be target industries	Industries to be located in the Laem Chabang	QUESTIONNAIRE			
				THA		JPN	
				G	E	G	E
38220	Agricultural machinery and equipment	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG			3	2
38292	Airconditioning machines and their parts	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG			3	
38298	Repair shops	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
38299	Other machinery except electrical	<input checked="" type="checkbox"/>	→LAEM CHABANG	3	3	2	2
	:Mold and die					3	3
	:High precision machining					2	2
38310	Electrical industrial machinery and apparatus	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG			2	2
	:Micromotor and microtransformer					3	2
	:Various switches and wiring instruments					2	2
	:Control panel, generators, etc.					2	2
38320	Radio, television and communication equipment and apparatus	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG	3	3	3	3
	:Various audio apparatus						3
	:CRT (cathod-ray tube)			1			
	:Telephone and its switching equipment					3	3
	:Video tape recorder						
	:Facsimile						
38330	Electrical appliances and housewares	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG	2	2	3	3
38392	Electric accumulators	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
	:Dry cell					3	3
38399	Other electrical apparatus and supplies	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
	:Electronic copy machines						
	:Personal computer, etc			2	2	3	2
	:Floppy disk drive					3	3
	:Electric printer					3	3
	:Electronic calculators						
	:Assembly of integrated circuit					3	
	:Electronic parts(tuner, transistor, ferrite core, key board, speaker, condenser, resistor, LED, magnet head, lead frame, printed board, etc.)			3	2	2	2
38411	Ship-repairing	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
38419	Other shipbuilding such as watercraft	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>					2
38432	Motor vehicle bodies	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
38439	Other motor vehicle industries	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG			2	2
	:Motor vehicle parts and accessories			3	3	2	2
	:Engines, bearing, etc.			1	2	2	2
38500	Precision instruments and machinery	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
	:Optical instruments such as cameras and lenses					3	3
	:Ophthalmic goods including frames				3		
	:Watches, clocks and parts					3	3
39011	Cutting and polishing of gem stones	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
39012	Jewellery	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG	3	2		
39030	Sporting and athletic goods	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG				
39090	Industries not elsewhere classified	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG			2	
	:Toys			3	3	3	3
	:Stationery						3
	:Antique, handicraft and others			1	1		3
Others	Warehousing/transport	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG	3	2		
	wholesale trade	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	→LAEM CHABANG	1	1	1	1

