Table 3.2.1-2 Distribution of Establishments by Region and Employment Size (1976 Study)

Items	No. of Employees	Lee than 10	10-49	50-99	100-199	200 and over	Total
Greater Bangkok		110(16.8)	383(58.5)	91(13.9)	48(7.3)	23(3.5)	655(100.0) (62.4)
Central		23(16.5)	92(66.2)	11(7.9)	9(6.4)	4(2.9)	139(100.0) (13.3)
North		11(9.6)	66(57.4)	23(20.0)	7(6.1)	8(7.0)	115(100.0) (11.0)
Northeast		4(10.5)	22(57.9)	9(23.7)	2(5.3)	1(2.6)	38(100.0) (3.6)
South		26(25.5)	62(60.8)	4(3.9)	4(3.9)	6(5.9)	102(100.0) (9.7)
Whole Kingdom		174(16.6)	625(59.6)	138(13.2)	70(6.7)	42(4.0)	1,049(100.0) (100.0)

Source : Industrial Development in Thailand, Small-and Medium-scale Industries 1979/80 by International Development Center of Japan, originally from Saeng Sanguanruang, Somsak Tambunlertchai and Nit Summabhun, A study of small and Medium Scale Industries in Thailand, 1978 (in Thai).

In regard to the Large scale factories with employees over 200, 73.5% (227 factories) are distributed in the Central Region, and of these, 59.9% (185 factories) are concentrated in the Metropolitan Area of Bangkok, and of this latter, 27.5% (85 factories) are concentrated in Bangkok. In the Central Region except the Metropolitan Area, 13.6% (42 factories) are distributed.

As is above-stated, a portion equivalent to the 70.6% of the total factories is concentrated in the Central Region of Thailand, and of these, 54.4% is concentrated in the Metropolitan Area, 43.4% is concentrated in Bangkok. And of the factories with under 10 employees, 72.6% of the total factories is concentrated in the Central Region, and of this 54.9% is concentrated in the Metropolitan Area, and 46.8% is concentrated in Bangkok. Further, of the factories with 10—49 employees, 67.7% is concentrated in the Central Region, and of this, 54.6% and 40.3% are concentrated in the Metropolitan Area and Bangkok respectively. And further more, of the factories with 50—199 factories, 63.7% is concentrated in the Central Region, and of this, 53.8% and 25.3% are concentrated in the Metropolitan Area and in Bangkok respectively, and thus more than half of the medium scale factories are distributed in the 5 provinces neighbouring with Bangkok in the Metropolitan Area. Also of the factories with over 200 employees, 73.5% is concentrated in the Central Region, and of this, 59.9% is concentrated in the Metropolitan Area, and in Bangkok 27.5% is distributed and 32.4% is distributed in the neighbouring 5 provinces, and thus the dispersion is extending. According to the recent data of the Factory Control Division of MOI, the rate of the number of the registered factories in the Central Region in 1981 has come down to 40.8%, and of it the 21.8% is distributed in the Metropolitan Area of Bangkok. However, as for the large scale industries that have come enjoying the special favor of the Promotion of Investment Act, of the actual 897 cases in 1979, the 84.3% corresponds to the Central Region and its 55.6% is concentrated in the Metropolitan Area of Bangkok (Note).

Note: The Fifth Five Year Social and Economic Development Plan.

1) Degree of Concentration to Bangkok

The 68.4% of the factories located in the Bangkok is of a small scale with under 10 employees, and in comparison with the other three regions, the rate of concentration is showing somewhat higher. And of the factories that are located in the five provinces that constitute the Metropolitan Area of Bangkok, 45.2% is of the scale of under 10 employees and, compared with Bangkok, the degree of concentration is some what lower.

The small scale factories with 10–49 employees occupy the 27.6% of all the factories located in Bangkok, and the medium scale factories with 50–99 employees occupy only 2.3%, and the medium scale factories with 100–199 employees occupy scarcely 1.0%, and these medium scale factories occupy, even in their total, only 3.3% of the total. Accordingly, almost totality (99.3%) of the factories located in Bangkok are the factories of medium and small scale, and of these, 68.4% of factories are with less than 10 employees.

Of the factories located in the five neighbouring provinces integrating the Metropolitan Area of Bangkok, the factories with under 10 employees occupy the 45.2%, but compared with the factories with under 10 employees that are located in the other three regions respectively, the degree of concentration is found lower. Equally, of the factories located in the neighbouring five provinces, the small scale factories with 10–49 employees occupy 37.6%, the medium scale factories with 50–199 employees occupy the 13.9%, the large scale factories with over 200 employees occupy the 3.3%, and the degree of concentration of the factories of these scales results higher than the degree (percent) of concentration of the other three regions, and the small and medium scale factories with over 10 employees located in the neighbouring provinces occupy the 51.5% of the factories located in the same regions.

From the above-stated, we can deduced that: 1 For the purpose of promoting the small scale industries with under 10 employees, in its basic industrial conditions, that is electricity, gas, water works, roads, transport and communications, Banking and Finance Institution, Bangkok is in higher order than other regions. And as the stage of business transactions, and as market of large consumption it has also advantages. 2 The fact that the medium scale and the large scale factories located in the neighbouring five provinces have among all the factories the highest rate respectively of all other regions is causing the dispersion of the location of the factories in the neighbouring provinces rather than in Bangkok itself and at the same time the proper geographical restriction of Bangkok is making it difficult physically for the factories to have their location in Bangkok any more.

(3) Number of Major Industries in Each Region

The Table 3.2.1-3 "Major Industries in Each Region (1979)" shows the first to tenth numbers of the factories of major industries except rice cleaning mills in each region. As is shown in the Table 3.2.1-4 "Number of Rice Cleaning Mills and Other Factories in

Table 3.2.1-3 Major Industries in Each Region (1979)

Order	Bangkok		Central Region		Northe Region		North-east Region		South Region	
1	Metal product	1829	Grain mill	1283	Timber	282	Grain mill	1710	Engine manufacture/repair	419
2	Printing/ publication	1334	Engine manufacture/repair	757	Engine manufacture/repair	194	Engine manufacture/repair	267	Timber	200
3	Chemicals	826	Timber	726	Flour	169	Agricultural processing	240	Ice manufacture	138
4	Metal equipment for construction	542	Gravel for construction	400	Wood product	120	Timber	216	Car repair	126
5	Car manufacture /assembly	490	Textile	348	Car repair	112	Car repair	132	Clay product for construction	124
6	Engine manufacture/repair	466	Car manufacture /assembly	252	Drying tobacco	101	Flour food	79	Wood product	88
7	Car repair	436	Car repair	194	Ice manufacture	99	Furniture	75	Rubber product	85
8	Machinery	298	Ice manufacture	182	Flour food	83	Ice manufacture	72	Gravel for construction	73
9	Flour food	261	Metal product	180	Gravel for construction	72	Gravel for construction	68	Furniture	69
10	Timber	249	Flour food	156	Agricultural machinery	70	Non-metal mineral product	58	Metal product	63
	Total	6,731		4,478		1,302		2,917		1,385

Note : Rice cleaning is excluded.
Source : Factory Control Division, Ministry of Industry

Table 3.2.1-4 Numbers of Rice Cleaning Mills and Other Factories in Each Region

(as of end of 1978)
( ) : percentage

	Bangkok	Central Region (24 provinces) ex Bangkok	North Region (17 provinces)	North-East (16 provinces)	South Region (14 provinces)	Nation (72 provinces)
Rice Cleaning Mill	155(0.5) (1.2)	4,380(132) (37.4)	7,963(24.0) (80.2)	16,225(48.9) (83.4)	4,443(13.4) (70.9)	33,166(100.0) (55.0)
Others	12,799(47.2) (98.8)	7,321(27.0) (62.6)	1,966(7.2) (19.8)	3,222(11.9) (16.6)	1,822(6.7) (29.1)	27,130(100.0) (45.0)
Total	12,954(21.5) (100.0)	11,701(19.4) (100.0)	9,929(16.5) (100.0)	19,447(32.3) (100.0)	6,265(10.4) (100.0)	60,296(100.0) (100.0)

Note : The regions are demarcated according to the old administrative boundaries.

Source : Factory Control Division, Ministry of Industry
No. of Factories by Province, April 1979 (in Thailand)

Each Region", except in Bangkok, number of the mills is large in each region. The rate of numbers of the factories by industry in each region is as follows:

1) Bangkok

The metal product industry (27.2%) occupies the top and come next the printing and publication (19.8%), and the chemical industry (12.3%), etc. As for the metalworking industry (except the repairing industry), the metal product industry (27.2%) comes first and follow it the automobile manufacture and reparation (7.3%) in the fifth, the engine manufacture and reparation (6.9%) in the sixth and the machinery (4.4%) in the eighth, and these occupy the 45.8% of the 6,731 factories in total.

2) Central Region except Bangkok

The Grain mill (28.7%) comes first and the engine manufacture and reparation (16.9%), the sawmills (8.9%), etc., follow it, and in regard to the metalworking industry, the engine manufacture and reparation (16.9%) in the second, the automobile manufacture and reparation in the sixth and metal product industry, all together, occupy the 26.5% of the total of 4,478 factories.

3) North Region

The sawmills (21.7%) comes first and follow it the engine manufacture and reparation (14.9%), the manufacture of cerial flour (13.0%), etc. In regard to the metalworking-industry, the engine manufacture and reparation (14.9%) the second and the agricultural machinery (5.4%) the tenth occupy in total the 20.3%.

4) North-East Region

The Grain mills (58.6%) comes first, and the engine manufacture and reparation (9.2%), the agricultural product (8.2%) follow it in order. As for the metalworking industry, only the engine manufacture and reparation in the second exists there.

5) South Region

The engine manufacture and reparation (30.3%) comes first and the sawmills (14.4%), the ice production industry (10.0%) follow it. As for the metalworking industry, the engine industry (30.3%) of the top and the metal product industry (4.5%) in the tenth occupy the 34.8% of the total.

As is above-stated, in every region beginning with Bangkok, there exist the engine manufacture and reparation factories. In the four regions except Bangkok, it is ranked in the first or second position, but nearly all of these factories are dedicated mainly to the

reparation, and in a part of them are manufactured the agricultural engine (complete unit) and parts of the automobile. The manufacture of the Diesel engine for agricultural machinery was begun from the year 1980.

3.2.2 Employment

(1) Number of Employees by Kind of Industry

As is shown in the Table 3.2.2-1 "Economic Characteristics of Establishments by Industry (1976 Study)", the number of the employees that work in the 1,049 establishments of object of the study, in total 52,309 employees in all the industries, is divided in the following order: the textile (15.8%) comes to the top, and the food (12.2%), tabacco (10.0%), metal product (7.3%), rubber product (7.2%) follow it. As for the number of the employees relative to the metalworking industry, it occupies the 13.2% (6,927 employees) in the following as metal product 7.3% (3,841), machinery 2.2% (1,175) and transport equipment 3.7% (1,911).

(2) Number of Employees by Size of Industry

As is shown in the Table 3.2.2-2 "Economic Characteristics of Establishments by Employment Size (1976 Study)", the large scale industries (with over 200 employees) that occupy the 4.0% (42 establishments) of the total of 1,049 establishments employ the 35% of the total of 52,309 employees. However, to our best of knowledge the share of the medium and small scale industries in the number of employees of the manufacturing industry in Thailand is estimated to be some 75−80%, including cottage industries (note).

Note: Original data from Saeng Sangunanruang, Nisa Xuto, Preeyanauch Saengpassorn and Chucheep Piputsitee, Development of Small & Medium Manufacturing Enterprises in Thailand, Dec. 1978, P. 18.

3.2.3 Capital

(1) Average Fixed Assets of Establishment by Kind of Industry

According to the Table 3.2.2-2, in the 1976 Study, the average fixed assets of the establishment are Bt 5,565,800. In regard to the average fixed assets by establishment, those of two industries, industrial chemical products (Bt 24,448,600) and textile (Bt 20,792,00) are outstanding, and glass products, food, etc., follow it. The industries with lower average assets are those of foot wares, wood products, iron and steel products and non-ferrous metal. As for the average fixed assets per establishment in metalworking industries Bt 3,532,000 of metal products (64% of the average of all kind of industry),

Table 3.2.2-1 Economic Characteristics of Establishments by Industry (1976 Study)

Industry	No. of Establish-ments (1)	No. of Employees (2)	Fixed Assets ($1,000) (3)	Production ($1,000) (4)	Value Added ($1,000) (5)	Share (%) No. of Establish-ments (1)'	No. of Employees (2)'	Fixed Assets ($1,000) (3)'	Production ($1,000) (4)'	Value Added ($1,000) (5)'
Food	150	6,380	744,014	1,638,005	171,145	14.3	12.2	12.7	19.0	6.1
Beverage	19	1,532	115,300	252,667	105,478	1.8	2.9	2.0	2.9	3.7
Tobacco	30	5,265	123,415	297,915	79,335	2.9	10.0	2.1	3.4	2.8
Textiles	116	8,274	2,411,872	2,188,593	941,381	11.1	15.8	41.3	25.3	33.3
Wearing Apparel	32	1,297	58,082	150,886	18,267	3.1	2.5	1.0	1.7	0.6
Leather Products	15	316	30,640	56,117	9,644	1.4	0.6	0.5	0.6	0.3
Footwear	10	169	7,197	15,746	8,036	1.0	0.3	0.1	0.1	0.3
Wood Products	26	2,078	20,433	66,389	32,576	2.4	4.0	0.3	0.8	1.2
Furniture	32	1,513	73,782	175,040	67,704	3.1	2.9	1.3	2.0	2.4
Paper Products	18	692	60,066	120,954	33,695	1.7	1.3	1.0	1.4	1.2
Industrial Chemicals	26	1,587	635,664	383,576	165,735	2.5	3.0	10.9	4.4	5.9
Other Chemical Products	37	2,586	212,617	651,419	369,185	3.5	4.9	3.6	7.5	13.1
Rubber Products	49	3,773	189,472	1,186,872	115,574	4.7	7.2	3.2	13.7	4.1
Plastic Products	34	1,212	87,190	125,029	65,748	3.2	2.3	1.5	1.4	2.3
Pottery	43	1,878	61,650	44,394	26,459	4.1	3.6	1.1	0.5	0.9
Glass Products	12	750	74,852	52,250	12,656	1.1	1.4	1.3	0.6	0.4
Non-metallic Mineral Products	81	2,399	241,550	166,217	57,893	7.7	4.6	4.1	1.9	2.0
Iron and Steel Products	36	676	26,722	39,311	4,378	3.4	1.3	0.5	0.5	0.2
Non-ferrous Metal	24	619	21,674	64,996	54,043	2.3	1.2	0.4	0.8	1.9
Fabricated Metal Products	82	3,841	289,590	380,217	189,879	7.8	7.3	5.0	4.4	6.7
Machinery	58	1,175	134,838	115,552	23,174	5.5	2.3	2.3	1.3	0.8
Electrical Appliances	31	1,463	66,872	101,916	41,731	3.0	2.8	1.1	1.2	1.5
Transport Equipment	45	1,911	116,512	297,510	200,258	4.3	3.7	2.0	3.4	7.1
Scientific Equipment	3	83	8,723	18,519	12,779	0.3	0.2	0.1	0.2	0.5
Miscellaneous	41	840	25,882	55,078	20,140	3.9	1.6	0.4	0.6	0.7
Total	1,049	52,309	5,836,519	8,641,168	2826,873	100.0	100.0	100.0	100.0	100.0

Table 3. 2. 2-1. (continued)

Industry	Average Employees per Estab. (6)=(2)/(1)	Average Fixed Assets per Estab. (7)=(3)/(1)	Average Fixed Assets to Worker Ratio (8)=(3)/(2)	Average Production per Estab. (9)=(4)/(1)	Average Value Added per Estab. (10)=(5)/(1)	Labor Productivity (11)=(5)/(2)	Capital Productivity (12)=(5)/(3)	Production to Worker Ratio (13)=(4)/(2)	Production to Fixed Assets Ratio (14)=(4)/(3)	Value Added to Production Ratio (15)=(5)/(4)
Food	42.5	4,960.1	116.6	10,920.0	1,141.0	26.83	0.23	256.74	2.20	10.4
Beverage	80.6	6,068.4	75.3	13,298.3	6,551.5	81.85	0.91	164.93	2.19	49.7
Tobacco	175.5	4,113.8	23.4	9,930.5	2,644.5	15.07	0.64	56.58	2.41	26.6
Textiles	71.3	20,792.0	291.5	18,867.2	8,115.4	113.78	0.39	264.51	0.91	43.0
Wearing Apparel	40.5	1,815.1	44.8	4,715.2	570.8	14.08	0.31	116.33	2.60	12.1
Leather Products	21.1	2,042.7	97.0	3,741.1	642.9	30.52	0.31	177.56	1.83	17.2
Footwear	16.9	719.7	42.6	1,174.6	803.6	47.55	1.12	69.50	1.63	68.4
Wood Products	83.1	817.3	9.8	2,655.6	1,303.0	15.68	1.59	31.96	325	49.1
Furniture	47.3	2,305.7	48.8	5,470.0	2,115.8	44.75	0.92	115.69	2.37	38.7
Paper Products	38.4	3,337.0	86.8	6,719.7	1,871.9	48.69	0.56	174.79	201	27.9
Industrial Chemicals	61.0	24,448.6	400.5	14,752.9	6,374.4	104.43	0.26	241.70	0.60	43.2
Other Chemical Products	70.0	5,746.4	82.2	17,605.9	9,978.0	142.76	1.74	251.90	306	56.7
Rubber Products	77.0	3,866.8	50.2	24,221.9	2,358.7	30.63	0.61	314.57	626	9.7
Plastic Products	35.6	2,564.4	71.9	3,677.3	1,933.8	54.25	0.75	103.16	1.43	52.6
Pottery	43.7	1,433.7	32.8	1,032.4	615.3	14.08	0.43	23.64	0.72	59.6
Glass Products	62.5	6,237.7	99.8	4,354.2	1,054.7	16.87	0.17	69.67	0.70	24.2
Non-metallic Mineral Products	29.6	2,982.1	100.7	2,052.1	714.4	24.12	0.24	69.29	0.69	34.8
Iron and Steel Products	18.8	742.3	39.5	1,092.0	121.6	6.48	0.16	58.15	1.47	11.1
Non-ferrous Metal	25.8	903.1	35.0	2,708.2	2,251.8	87.31	2.49	105.00	300	83.1
Fabricated Metal Products	46.8	3,531.6	75.4	4,636.8	2,315.6	49.43	0.66	98.99	1.31	49.9
Machinery	20.3	2,324.8	114.8	1,992.3	399.6	19.72	0.17	98.34	0.86	20.1
Electrical Appliances	47.2	2,157.2	45.7	3,287.6	1,346.2	28.52	0.62	69.66	1.52	40.9
Transport Equipment	42.5	2,589.2	61.0	6,611.3	4,450.2	104.79	1.72	155.68	2.55	67.3
Scientific Equipment	27.7	2,907.7	105.1	6,173.0	4,259.7	153.96	1.46	223.12	2.12	69.0
Miscellaneous	20.5	631.3	30.8	1,343.4	491.2	23.98	0.78	65.57	2.13	36.6
Total	49.9	5,565.8	111.6	8,237.5	2,694.8	54.04	0.48	165.19	1.48	32.7

Source : Industrial Development in Thailand, Small-and Medium-Scale Industries 1979/80 by International Development Center of Japan.

Table 3.2.2-2 Economic Characteristics of Establishments by Emplyment Size (1976 Study)

(Amount : Thousands of Baht)

Items	No. of Employees	Lee than 10	10-49	50-99 (MI-A)	100-199 (MI-B)	200 and over	Total
Number of Establishments	(1)	174 (16.6)	625 (59.6)	138 (13.2)	70 (6.7)	42 (4.0)	1,049 (100.0)
Number of Employees	(2)	1,187 (2.2)	14,060 (26.9)	9.393 (18.0)	9.344 (17.9)	18,325 (35.0)	52,309 (100.0)
Fixed Assets	(3)	94,457 (1.6)	888,567 (15.2)	662,264 (11.3)	798,339 (13.7)	3,394,892 (58.2)	5,838,519 (100.0)
Production	(4)	101,458 (1.2)	1,443,220 (16.7)	1,472,707 (17.0)	1,474,374 (17.1)	4,149,409 (48.0)	8,641,168 (100.0)
Value Added	(5)	26,674 (0.9)	409,819 (14.5)	437,915 (15.5)	484,997 (17.2)	1,467,468 (51.9)	2,826,873 (100.0)
Average Employees per Estab.	(2)/(1)	6.8	22.5	68.1	133.5	436.3	49.9
Average Fixed Assets per Estab.	(3)/(1)	542.9	1,421.7	4,799.0	11,404.8	80,830.8	5,565.8
Average Production per Estab.	(4)/(1)	583.1	2,309.2	10,671.8	21,062.5	98,795.5	8,237.5
Average Value Added per Estab.	(5)/(1)	153.3	655.7	3,173.3	6,928.5	34,939.7	2,694.8
Fixed Assets to Worker Ratio	(3)/(2)	79.6	63.2	70.5	85.4	185.3	111.6
Labor Productivity	(5)/(2)	22.47	29.15	46.62	51.90	80.08	54.04
Capital Productivity	(5)/(3)	0.28	0.46	0.66	0.61	0.43	0.48
Value Added to Production Ratio (%)	(5)/(4)	26.3	28.4	29.7	32.9	35.4	32.7

Source : Industrial Development in Thailand, Small-and Medium-scale Industries 1979/80 by International Development Center of Japan, originally, from Saeng Sanguanruang, Somsak Tambunlertchai and Nit Summabun, A study of Small and Medium Scale Industries in Thailand, 1978 (in Thai).

Table 3.2.3-1 Constitution of Fixed Assets byEmployment

No. of Employees	No. of Estab.	Fixed Assets (¥1,000)	Average Fixed Assets per Estab. (¥1,000)	Distribution among the Component of Fixed Assets (%)					Fixed Assets to Worker Ratio
				Land	Buildings	Machinery	Transport Equipment	Others	
Less than 10	174	94,457 (1.6%)	542.9	29.9	27.8	30.7	10.1	1.5	79.6
10-49	625	888,567 (15.2%)	1,421.7	28.3	20.9	36.2	11.3	3.3	63.2
50-99	138	662,264 (11.3%)	4,799.0	12.8	21.3	55.3	6.8	3.8	70.5
100-199	70	798,339 (13.7%)	11,404.8	15.9	17.2	50.8	8.5	7.6	85.4
200 and over	42	3,394,892 (58.2%)	80,830.8	4.7	14.6	77.3	1.6	1.8	185.3
Total	1,049	5,838,519 (100.0%)	5,565.8	11.2	16.9	64.1	4.8	3.0	111.6

Source : Same as Table 3. 2. 2-2.

Bt 2,325,000 of machinery (42% of the average of the same), Bt 2,589,000 of transport equipment (47% of the same), are ranked under the average of the value per establishment of all the industries, and it shows that the average fixed assets of the metalworking industry is not high.

(2) Fixed Assets by Size of Establishment

1) Fixed Assets

As is shown in the Table 3.2.2-2, of the total fixed assets of Bt 5,838,519,000 of the total of 1,049 establishments of object of the study, the large industry with over 200 employees occupy the 58.2%, and the small (10－49 employees) and medium (50－199 employees) industries occupy the 15.2% and 25.0% respectively.

As for the average fixed assets by establishment, it is Bt 1,422,000 of small industry, Bt 4,799,000 of medium industry-A (50－99 employees) and Bt 11,405,000 of medium industry-B (100－199 employees), and Bt 80,831,000 of large industry respectively. The average fixed assets of large industry is some 57 times the value of small industry, some 17 times the value of medium industry-A, some 7 times the value of medium industry-B, and this indicates the great difference between the large industry and the medium and small industries.

2) Constitution of Fixed Assets

As is shown in the Table 3.2.3-1 "Constitution of Fixed Assets by Employment Size (1976 Study)", the rate of the machinery installation is the most outstanding and occupies the 64.1% of the total fixed assets, and the real estate (land and building) occupies the 28.1%. According to the rise of the scale of the establishment, the investment into the real estate becomes smaller, and that of the machinery installation goes obtaining higher rate, and it is supposed that according to that the scale of industry gets smaller, the burden of the land and building becomes heavier, and this burden constitutes a restriction to the amplification of the machinery installation that is directly connected with the production. Consequently, in order to alleviate the burden for the medium and small sacle establishment of the land and building it is required to create a special zone for factories and a system of financing.

3.2.4 Amount of Production and Value Added

(1) Amount of Production

1) Amount of Production by Kind of Industry

According to the output by the industry shown in the Table 3.2.2-1 (1976 Study), the

Table 3.2.3-2 Production by Employment Size and Economic Goods Group (1976 Study)

(Amount unit : Baht thousand
Figures in parenthesis : percent)

Employment Size	Consumption Goods Group	Intermediate Goods Group	Capital Goods Group	Total Groups
Less than 10	72,084 (71.0)	16,509 (16.3)	12,865 (12.7)	101,458 (100.0) (1.2)
10 - 49	821,035 (56.9)	307,433 (21.3)	314,752 (21.8)	1,443,220 (100.0) (16.7)
50 - 99	687,239 (46.7)	626,397 (42.5)	159,071 (10.8)	1,472,707 (100.0) (17.0)
100 - 199	576,953 (39.1)	692,191 (47.0)	205,230 (13.9)	1,474,374 (100.0) (17.1)
More than 200	2,883,958 (69.5)	1,041,264 (25.1)	224,187 (5.4)	4,149,409 (100.0) (48.0)
Total	5,041,269 (58.3)	2,683,794 (31.1)	916,105 (10.6)	8,641,168 (100.0) (100.0)

Source: Same as the table 3.2.2-2

Table 3.2.7-3 Productivity, Value Added and Profits (1976 Study)

Size of Employees	Capital Productivity	Value Added Ratio (%)	Profit Ratio (%)
Less than 10	0.28	26.3	1.9
10 - 49	0.46	28.4	10.9
50 - 99	0.66	29.7	16.8
100 - 199	0.61	32.9	18.1
More than 200	0.43	35.4	22.3
Average	0.48	32.7	18.5

Note : Capital Productivity = Value Added/Fixed Assets,
Profit Ratio = Profits/Production,
Value Added Ratio = Value Added/Production

Source: Same as the table 3.2.2-2

rate of the output of each industry that occupies in the gross output of all the industries and all the establishments is as follows: textile 25.3%, food 19.0%, rubber goods 13.7%, other chemical products 7.5%, and this shows that the output of the primary products is large. In regard to the metalworking industry, the rates are 4.4% (Bt 380,000,000) of metal product, 1.3% (Bit 116,000,000) of machinery and 3.4% (Bt 117,000,000), and even in total it is only 9.1% (Bt 613,000,000).

The industries with large average output per establishment are the rubber goods (Bt 24,200,000), textile (Bt 18,900,000), other chemical products (Bt 17,600,000), industrial chemicals (Bt 14,800,000) in said order. The industries with smaller average output are pottery, steel, foot wares, machinery (Bt 1,992,000), non-metallic mineral products in said order. As for the metal working industry, beside the machinery, there are metal products (Bt 4,637,000) and transport equipment (Bt 4,637,000).

2) Amount of Production by Employment Size

See the Table 3.2.2-2 "Economic Characteristics of Establishments by Employment Size (1976 Study)". The small industries that occupy the 59.6% of the 1,049 establishments of the object of the study occupy only the 16.7% of the Bt 8,641,000,000, the total output. The medium industries occupy the 19.9% of the total establishments, but their output occupies only the 34.1% of the total output. On the other hand, the large industries occupy only the 4% of the total establishments but occupy the 48% of the total output and this shows that the monopolization by a smaller number of establishments is penetrating. The average output of the large industry is some 43 times the average output of the small industry, and it indicates the notable difference between the large industry and the small industry. If the average output by the employment size is observed divided in the economic goods, as consumer goods, intermediate goods and capital goods, as is shown in the Table 3.2.3-2 "Production by Employment Size and Economic Goods Group (1976 Study)", the consumer goods industry occupy the 58.3% of the total output. According to the growth of employment size, the rate of the consumer goods industry gets lower and, to the contrary the rate of the intermediate goods is getting higher. However, the cause of the rise in the output of consumer goods of the large industries is that, as is seen in the Table 3.2.1-1, the large industries are concentrated in the consumer goods industries such as textile, food and tabacco, etc. And the cause of rate lower than that of the medium industry of the large industry in the output of the intermediate goods is considered to consist in that the establishments of object of the study were not included in the chemicals, paper goods, non-metallic product industries.

(2) Amount of Value Added

1) Value Added by Kind of Industry

As is shown in the Table 3.2.2-1, the shares that the value added of each industry occupy in the Bt 2,827,000,000 of the total value added of all the industries are the textile (33.3%), other chemicals (13.1%), transport equipment (7.1%), metal products (6.7%), food (6.1%) in said order. As for the metalworking industry, beside what is above-mentioned, machinery (0.8%) is included and in total occupies the 14.6%, but it is less than the half of that of the textile industry (33.3%).

The industries of which the average value added per establishment is high are other chemicals, textiles, industrial chemicals, food, transport equipment industries in said order. The industries of which the average value added is low are iron and steel (Bt 122,000), machinery (Bt 400,000), wearing apparel (Bt 571,000), pottery (Bt 615,000) in said order. The output per establishment of the metalworking industries is ranked below the average output of the whole industries, and in their value added per establishment it is ranked below the Bt 2,695,000 of the average value added of the whole establishments, in all of them, with metal product (Bt 2,316,000), transport equipment (Bt 4,450,000), machinery (Bt 400,000), and the 1976 Study indicates the low productivity of the metal working industry.

2) Value Added by the Scale of Industry

As is shown in the Table 3.2.2-2, the large industry occupies the 51.9% of the total value added, and the small and medium industries occupy the 14.5% and 32.7% respectively. And in the average value added per establishment, against the Bt 656,000 of the small industry, the large industry has 53 times the value of the small industry, Bt 34,940,000, and this indicates the existence of a difference larger than that of the average output between the small and large industries.

As the rice cleaning mills, sawmills, ice producing factories were excluded from the establishment object of the 1976 Study, if we estimate the value added including these industries, the rate of the value added of the medium and small industries in the value added of the whole industries in manufacturing sector will be as follows:

Small industries (10 – 49 employees)	20%
Medium industries (50 – 99 employees)	10%
Large industries (100 – 199 employees)	15%

The rate of the value added of the whole establishments with under 10 employees is 10% in the commonly adopted estimation. Accordingly, the rate of the value added of the medium and small industries in the whole of the manufacturing industry of Thailand is estimated in 55% (note).

Note: Original data from Saeng Sanguanruang, Nisa Xuto, Preeyanuch Saengpassorn and Chucheep Piputsitee, Development of Small and Medium Manufacturing Enterprises in Thailand, December 1978, P 14.

3.2.5 Structure of the Cost of Production

(1) Raw Material

As is shown in the Table 3.2.5-1 "Percentage Distribution of Cost and Profits (1976 Study)", the share that the raw materials occupy in the total cost is the highest of 67.8%, and the 11.0% of wages and salaries come next. The characteristics by scale of establishment for the raw material is not found.

(2) Wages and Salaries

According to the rise of the scale of the establishments, the rate of wages and salaries

Table 3.2.5-1 Percentage Distribution of Costs & Profits (1976 Study)

(Unit: %)

Item \ No. of Employees	Less than 10	10-49	50-99	100-199	200 and over	Total
Total Cost	100.0	100.0	100.0	100.0	100.0	100.0
Wages and Salaries	15.4	14.0	11.7	12.0	9.0	11.0
Raw Materials	61.6	67.7	70.0	68.3	67.0	67.8
Fuel	2.0	1.8	1.4	1.9	0.9	1.3
Taxes	1.9	2.1	1.3	3.1	4.0	3.0
Interest	6.3	2.7	1.8	2.1	3.2	2.7
Other Expenses	4.8	6.8	7.0	6.7	9.8	8.2
Depreciation	8.1	5.0	7.0	6.0	6.0	6.0
Production	100.0	100.0	100.0	100.0	100.0	100.0
Total Cost	98.1	89.1	83.2	81.9	77.7	81.5
Profits	1.9	10.9	16.8	18.1	22.3	18.5

Source : Same as Table 3. 2. 2-2.

against the total cost is getting lower, and as was stated in the Clause 3.2.3, (2) "Fixed Assets by Size of Establishment", according to the rise of the scale of the establishment, while the upward trend of the rate of the fixed assets in machinery is observed, the character more concentrative on the labor of the small industry is observed.

(3) Interests

There is not found the characteristic by scale of interest, but the rate that the interest occupies in the total cost is the highest in the small industries with under 10 employees and the rate against the output is 6.2%. Accordingly, *the rate of the burden of interest (rate of interest against the sales) is proved to be the highest in the small industries with under 10 employees. And it is also proved that in the establishment with under 10 employees, the rate of the cost of interest is higher than the rate of the profit, and the interest is a heavy burden.

*Note: According to the study by the Division of Small and medium Establishment MITI of Japan, in the decade from 1970, the ratio of burden of interest for the small and medium manufacturing industries is 2.2%.

(4) Profit

The rate of profit against the output is rising up rapidly according to the rise of the scale of the establishments. The characteristics of the scale that appear in the rate of profit is explained by: 1) The larger the scale of the establishment, the larger is its investment (See the Table 3.2.2-2 "Economic Characteristics of Establishments by Employment Size (1976 Study) – Average Fixed Assets"); 2) Accessibility to a finance more favorable; 3) Accessibility to more favor of the Governmental Promotion Policy; 4) Disposition of more favorable ground.

3.2.6 Labour Productivity, Productivity of Capital and Rate of Value Added

(1) Labour Productivity

1) Labour Productivity by Industry

Labour productivity, that is the value added per capita of the employees is, as is shown in the Table 3.2.2-1 "Economic Characteristics of Establishments by Industry (1976 Study)", is different between the industries, but the industries that have a high labour productivity are Scientific Equipments, other chemicals, textile, transport equipment, industrial chemicals in said order. The average labour productivity of the whole industries is Bt 54,000. In general, the labour productivity is strongly correlated with the rate of capital namely, in this case, the sum of the fixed assets per capita of the employees. Of the above-mentioned five industries, only the two industries, chemicals (Bt 401,000) and

Textile (Bt 292,000) have the high rate of capital equipment. All of the remaining three industries are ranked below the mean rate of capital equipment, Bt 112,000, of the whole industries.

Accordingly, the high labour productivity of these three (3) industries can be explained by the high level of their rate of value added (rate of value added against the output = productivity of value added) that comes from the high profit rate. And the high rate of value added also indicates that the quality of products or the technique of production is excellent in general.

The labour productivity of the metalworking industry, of all the products except that (Bt 105,000) of transport equipment, is ranked below Bt 54,000 of the average labour productivity of the whole industries. In particular, the low level in the machinery industry will be explained by the low rate of value added (20.1%) that comes from the low profit rate.

2) Labour Productivity by the Scale of Establishment

This is going upward according to the rise of the scale of the establishments. This is due to that the rate of capital equipment is also rising. The average labour productivity of large industry is Bt 80,100 which is equivalent to the 2.7 times of Bt 29,200 of the small industry and indicates the difference in the productivity. The labour productivity of the whole industry is Bt 54,000, and except the large industry, the labour productivity by the scale of industry of the small and medium industries is ranked below the said average value.

(2) Productivity of the Capital

1) Productivity of the Capital by Industry

The productivity of the capital, the value added per each unit of the capital, in this case the rate of value added to the fixed assets, is, as is shown in the Table 3.2.2-1, different against each other. The industries that have high capital productivity are non-ferrous metal, other chemicals, transport equipment, wood products scientific equipment in mentioned order. Those with low capital productivity are iron and steel, machinery, glass products, food, non-metallic mineral products, industrial chemicals in mentioned order, and all of these are ranked below the average value 0.48 of the whole industries.

In the metalworking industry, metal products (0.66) and transport equipment (1.72) are ranked above the average value, but machinery (0.17) is ranked below it. The electric machinery has the capital productivity higher than that of the machinery, it being higher

than the mean value. The low capital productivity will be explained by the fact that its capital productivity (Bt 115,000) is so low that it is ranked in the 22nd of the 25 industries, and also by the low value added rate (20.1%) that comes from the low profit rate.

2) Productivity of Capital by the Scale of Establishment

The characteristics that accompany the rise of the scale of the establishment are not found, but the medium industry-A with 50–99 employees shows the highest value (0.66) and the medium industry-B with 100–199 employees (0.61), the small industry (0.46), the large industry (0.43) follow it. The mean capital productivity of the whole industries is 0.48, and both medium industry-A and -B are ranked above this average value. Generally speaking, in Thailand the medium industry-A (with 50–99 employees) has the highest capital efficiency and shows also that it has the highest efficiency among all the small and medium industries (employee 50–199).

3.2.7 Characteristics by the Scale of Establishment

(1) Fixed Assets, Value Added, Cost of Production, Profit

In regard to the fixed assets (capital equipment rate), value added (labour productivity), wage, profit and output per capita, as is shown in the Table 3.2.7-1 "Fixed Assets, Value Added, Production, Wages and Profit per Employee by Employment Size (1976 Study)", the per capita fixed capital equipment (rate) of establishment with over 200 employees is some 2.5 times the average value Bt 74,100 of the small and medium industries (including those with under 10 employees).

As for the establishments with 10–199 employees, the per capita capital equipment rate is getting higher in the industries of which the per capita capital equipment is found higher. The average capital equipment, Bt 79,600 is ranked higher than the mean capital equipment of the establishments with 10–49 and 50–99 employees respectively, and also is higher than the average capital equipment, Bt 71,600 of the small and medium establishments with 10–199 employees. This is not due to the modernization and rationalization of the productive installation of the establishments with under 10 employees, but, as is shown in the Table 3.2.3-1, it is considered due to that 1) the rate of the land and building that occupies in the total fixed assets is high; and 2) in the small scale cottage industries, the private property and the assets of the establishment or of the factory are not clearly distinguished. This is reflected on that in the constitution of the productive installation, the rate of the productive installation of the small establishments with

under 10 employees is lower than that of any of the three groups with 10–199 employees. In view of that the average capital equipment in establishments with 10–99 employees is Bt 61,140 and that of establishments with 10–199 employees is Bt 71,600, observed on an average, it is estimated that the establishment with 10–150 employees are concentrative on labour.

As is above-stated, between the rate of capital equipment, labour productivity, wage and salaries per capita of employees and profit, there exists high interrelation, and in particular as for the profit per capita of employees, in parallel with the growth of the employment size, the per capita profit rate of the large industries is 1.8 times the value of the medium industry-B and 4.5 times the value of the small industry and just 31.5 times the value of the establishments with under 10 employees.

The interrelation of the indices of the Table 3.2.7-1 is the Table 3.2.7-2 "Characteristics of Management Index per Employee".

(2) Rate of Value Added

As in shown in the Table 3.2.7-3 "Productivity, Value Added and Profits (1976 Study)", it is noted that according to the growth of the scale of the establishment, the working quality (technique of working of the product) as well as the rate of value added goes getting higher. As for the profit rate, the difference between the establishment with under 10 employees and the large and small industry (10–49 employees) is notably grand. These differences reflect; 1) Price pressure from the market; 2) inferiority of the quality of product; 3) relatively high cost of production coming from the small scale production. Relatively low profit (profit rate) and depreciation (depreciation rate) in the small industry is due to that compared with the large industry, its investment capacity (capacity of procuring inner capital and capacity to obtain external credit), that is, its technical innovation or amplification of the productive scale represents a great handicap in competition with large industries. The industry with the highest capital productivity is the industry with 50–99 employees and this means that in Thailand the exploitation of medium scale industry results most efficient.

Table 3. 2. 7-1. Fixed Assets, Value Added, Production, Wages and Profits per Employee by Employment Size (1976 Study)

(Unit: 1,000 baht)

No. of Employees	Fixed Assets	Value Added	Wages and Salaries	Production	Profits
Less than 10	79.6	22.5	12.9	85.5	1.6
10 - 49	63.2	29.1	12.7	102.6	11.1
50 - 99	70.5	46.6	15.3	156.8	26.6
100-199	85.4	51.9	15.5	157.8	28.6
200 and over	185.3	80.1	15.8	226.4	50.4
Total	111.6	54.0	14.8	165.2	30.6

Source : Same as Table 3.2.2-2.

Table 3. 2. 7-2. Characteristics of Management Index per Employee

	Fixed Assets per Employee	Labor Productivity	Average Wages & Salaries	Production per Employee	Profits per Employee
SI Group (Less than 50 employees)	Low	Low	Low	Low	Low
MI Group (50 - 199 employees)	Low	Middle	High	Middle	Middle
LI Group (More than 200 employees)	High	High	High	High	High

Source : Table 3. 2. 7-1

Table 3.2.7-3 Productivity, Value Added and Profits (1976 Study)

Size of Employees	Capital Productivity	Value Added Ratio (%)	Profit Ratio (%)
Less than 10	0.28	26.3	1.9
10 - 49	0.46	28.4	10.9
50 - 99	0.66	29.7	16.8
100 - 199	0.61	32.9	18.1
More than 200	0.43	35.4	22.3
Average	0.48	32.7	18.5

Note : Capital Productivity = Value Added/Fixed Assets,
Profit Ratio = Profits/Production,
Value Added Ratio = Value Added/Production

Source: Same as the table 3.2.2-2

(3) Economic Characteristics by Employment Size Group

The Table 3.2.7-4 "Economic Characteristics by Employment Size Group (1976 Study)" is recomposition of the Table 3.2.2-2 "Economic Characteristics of Establishments by Employment Size, composed (1976 Study)" in the same way as the Table 3.2.7-2, into SI group (under 50 employees), MI group (50 – 199 employees) and MI group (over 200 employees).

Table 3. 2. 7-4. Economic Characteristics by Employment Size Group

(Unit: 1,000 baht in amount)

Item \ Group (No. of Employees)	SI Group (Less than 50)	MI Group (50-100)	LI Group (200 and over)	Total
Number of Establishments	799	208	42	1,049
No. of Employees	15,247	18,737	18,325	52,309
Fixed Assets	983,024	1,460,603	3,394,892	5,838,519
Production	1,544,678	2,947,081	4,149,409	8,641,168
Value Added	436,493	922,912	1,467,468	2,826,873
Profits	158,188	516,970	923,857	1,599,015
Wages & Salaries	194,039	288,634	289,762	772,435
Average Employees per Estab.	19.1	90.1	436.3	49.9
Average Fixed Assets per Estab.	1,230.3	7,022.1	80,830.8	5,565.8
Average Production per Estab.	1,933.3	14,168.7	98,795.5	8,237.5
Average Value Added per Estab.	546.3	4,437.1	34,939.7	2,694.8
Average Profits per Estab.	198.0	2,485.4	21,996.6	1,524.3
Average Personnel Expenses per Estab.	242.9	1,387.7	6,899.1	736.4
Fixed Assets to Worker Ratio	64.5	78.0	185.3	111.6
Production to Worker Ratio	101.3	157.3	226.4	165.2
Labor Productivity	28.6	49.3	80.1	54.0
Profits to Worker Ratio	10.4	27.6	50.4	30.6
Wages and Salaries 1/ per Employee	12.7	15.4	15.8	14.8

Source : Same as Table 3. 2. 2-2.

Note : 1/ Including fringe benefits.

Table 3.2.7-5 Structure of Expenditure by Employment Size Group (1976 Study)

(Unit: percent)

	SI Group	MI Group	LI Group	Average
Amount of Production	100.0	100.0	100.0	100.0
Expenses				
Raw Materials	60.3	57.0	52.1	55.3
Electricity and Water	2.4	1.0	1.0	1.2
Fuel	1.6	1.4	0.7	1.1
Wages and Salaries	12.6	9.8	7.0	9.0
Rents	0.4	0.2	0.2	0.2
Advertisement	0.2	0.3	0.1	0.2
Taxes	1.9	1.8	3.1	2.4
Interest	2.6	1.6	2.5	2.2
Patent Fees	0.4	0.1	0.2	0.2
Investment & Depreciation	4.7	5.3	4.7	4.9
Other Expenses	2.6	4.1	6.2	4.8
Profits	10.3	17.5	22.2	18.5

Source: Same as the table 3.2.2-2

As for the mean values per establishment of each group, 1) of the employees, the number of LI group is 23 times the number of SI group, of the fixed assets, the value of LI group is 66 times the value of SI group. Of the fixed assets per capita, the value of LI group is some 9 times the value of SI group, and it indicates that the difference of concentration on capital between SI group and LI group is great. 2) of the mean value added, the value of LI group is some 64 times the value of SI group, and as to the mean profit rate, the rate of LI group is just 111 times the value of SI group.

We can deduce from the above-mentioned that the growth of the scale of establishment coming from the amplification of the productive installation causes the accelerating increase of value added, and the increase of profit more rapid than value added. This fact suggests that the difference between the small industries and the medium and large industries goes growing through the modernization and rationalization of installation, amplification of the scale of production and technical innovation.

(4) Structure of Expenditure of Cost of Production by Group

As is shown in the Table 3.2.7-5 "Structure of Expenditure by Employment Size Group (1976 Study)", the rate of the direct cost of production (material, electricity, water, fuel, personnel expenses) in the output is getting smaller according to the growing size of the establishment, but the indirect cost (rental, advertisement, tax, interest, etc.) excluding other expenditures maintains almost the same rate. Accordingly, the difference between the groups in the rate of the direct cost in the output appears as the difference in the rate of the other expeditures and profit in the output. Therefore, for the elevation of the profitability in the small and medium industries it is necessary to reduce the direct cost, in particular the personnel cost. However, for the elevation of profitability without the saving of manpower or reduction of wage and salaries, it will be necessary to increase the value added by elevation of working technique of product and the quality of product through the modernization and rationalization of the productive installation, that is to elevate the labour productivity, namely the value added per capita of employees, and for this purpose a latest capital equipment with technique that considers to some extent the labour concentration will be required.

3.2.8 Characteristics by Industry

The Table 3.2.8-1 "Fixed Assets and Value Added per Employee by Industry" is the Table 3.2.2-1 "Economic Characteristics of Establishments by Industry (1976 Study)" modified with division of the various manufacturing Industry into 9 groups. Generally

Table 3. 2. 8-1. Fixed Assets and Value Added per Employee by Industry

Capital Intensity Ratio \ Labor Productivity	Low	Middle	High
Low	[Group 1-1] - Tobacco - Wearing Apparel - Wood Products - Rubber Products - Pottery - Iron and Steel - Electrical Appliances - Miscellaneous	[Group 1-2] - Footwear - Furniture	[Group 1-3] - Non-ferrous Metal - Transport Equipment
Middle	[Group 2-1] - Food - Leather Products - Glass Products - Non-metallic Mineral Products - Machinery	[Group 2-2] - Beverage - Paper Products - Plastic Products - Fabricated Metal Products	[Group 2-3] - Other Chemical Products 1/ - Scientific Equipment 1/
High	[Group 3-1] None	[Group 3-2] None	[Group 3-3] - Textiles - Industrial Chemicals 2/

Notes: Grouping has been made according to the standard deviation among various indicators.
1/ Labor productivity is quite high. Generalization of scientific equipment industries may not be accurate because of small sample size (n-3).
2/ Capital intensity ratio is very high.

Source : Table 3. 2. 2-1.

speaking, according to the increase in capital concentration, the labour productivity also increases, but with the following characteristics:

(1) Among the group of low capital equipment rate, the industries of foot wares, furniture, non-ferrous metal and transport equipment can be named as industry with high productivity, and in particular, the non-ferrous metal and transport equipment show the high labour productivity near to that of textile and industrial chemical industries that have high capital concentration.

(2) Among the industries that have medium grade of capital concentration, the other chemicals has a high labour productivity.

(3) As the industry with high capital concentration, textile and industrial chemicals can be named and these have also a higher labour productivity.

(4) Among the metalworking industry, as industry with low capital equipment rate, the transport equipment can be mentioned, but it has a high labour productivity. As for the metal product industry, it is ranked as medium as much in the capital equipment rate as in the labour productivity, but its labour productivity is ranked below the mean labour productivity, Bt 54,000, of the whole industries. As for the machinery industry, its capital concentration is ranked medium, but its labour productivity is low and among the group 2-1 it is of the lower labour productivity.

3.2.9 Features of Industrial Location

In Thailand most manufacturing industries are small or medium scale. Table 3.1.2-2 classifies all the enterprises by number of employees and region in 1979. As seen in the table, small scale enterprises called household industry with less than 10 employees account for 63.5% of the total and enterprises with less than 50 employees account for 93.2%. On the contrary, large scale industries with not less than 200 employees are 309 enterprises or only 1.2% of the total.

In this chapter, gross features of the whole manufacturing industries in Thailand are reviewed and discussions are not focused on the small and medium scale industries due to the limit to the data availability. However, considering the predominant share of the small and medium scale industries, the discussions in this chapter generally apply to these industries in Thailand.

In the following paragraphs, preliminary analysis is made on the past trend of the regional industrial development and also on major types of industries in each region. Statistics

Table 3.2.9-1 Value-added of Manufacturing Industry by Region

Unit : Percent

Number of Employees	Central Region			North Region	North-East Region	South Region	Nation
	Bangkok	Central Region ex. Bangkok	Total				
1960	35.7	35.5	71.2	11.7	8.7	8.4	100.0
1962	35.8	35.6	71.4	11.1	9.9	7.5	100.0
1969	39.3	36.7	76.0	8.2	8.7	7.1	100.0
1970	39.4	37.1	76.5	7.9	8.7	6.8	100.0
1976	40.2	40.6	80.8	6.2	7.5	5.5	100.0
1977	39.9	40.5	80.4	6.2	7.7	5.6	100.0
1980	51.7	36.0	87.7	4.0	4.6	3.7	100.0

Note : 1962 price is adopted for 1960-1976 and 1972 price is adopted for 1977

Source : Bank of Thailand, Industrial Situation 1977 (in Thai) and of 1980 NSEDB data

Table 3.2.9-2 Number of New Registration of Factories by Region

	1972	1973	1974	1975	1976
Number of Factories					
Bangkok	4,168	1,212	1,087	701	751
	(81.2)	(53.0)	(54.0)	(39.7)	(38.9)
Central Region	590	629	508	634	500
(exclude Bangkok)	(11.5)	(27.5)	(25.2)	(35.9)	(25.9)
North Region	75	75	95	90	118
	(1.5)	(8.5)	(4.7)	(5.1)	(6.1)
North-East Region	129	210	219	235	387
	(2.5)	(9.2)	(10.9)	(13.3)	(20.0)
South Region	170	161	103	107	176
	(3.3)	(7.0)	(5.1)	(6.1)	(9.1)
Nation	5,132	2,287	2,012	1,767	1,932
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Number of Employees					
Bangkok	71,673	59,726	17,137	18,197	22,754
	(75.4)	(72.0)	(40.3)	(48.5)	(44.2)
Central Region	11,575	10,434	13,327	4,872	15,236
	(12.2)	(12.6)	(31.3)	(13.0)	(29.6)
North Region	2,469	3,168	7,186	3,937	3,123
	(2.6)	(3.8)	(16.9)	(10.5)	(4.1)
North-East Region	6,100	6,723	3,483	8,359	9,082
	(6.4)	(8.1)	(8.2)	(22.3)	(17.6)
South region	3,268	2,943	1,418	2,141	2,337
	(3.4)	(3.6)	(3.3)	(5.7)	(4.5)
Nation	95,085	82,994	42,551	37,506	51,532
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)
Capital Amount					
Bangkok	3,869,926	2,773,756	1,682,477	3,522,762	5,279,327
	(65.4)	(77.3)	(57.0)	(64.0)	(22.5)
Central Region	1,493,433	465,963	959,096	1,188,255	17,028,404
(exclude Bangkok)	(25.2)	(13.0)	(32.5)	(21.6)	(72.7)
North Region	26,797	24,617	108,827	186,331	323,292
	(0.5)	(0.7)	(3.7)	(3.4)	(1.4)
North-East Region	173,892	219,653	108,826	441,610	585,886
	(2.9)	(6.1)	(3.7)	(8.0)	(2.5)
South Region	355,430	106,543	94,879	164,695	217,599
	(6.0)	(3.0)	(3.2)	(3.0)	(0.9)
Nation	5,919,478	3,590,532	2,954,105	3,503,653	23,434,508
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Note : Rice cleaning, sawing, service, and repair are excluded.

Source : Narongchai Akrasanee, Industrial Development in Thailand originally from Factory Control Division, Ministry of Industry

Table 3.2.9-3 Number of Factories of Major Industries (1978)

	Number of Factories(Bangkok)		Percentage(%)
Rice Cleaning	33,166	(155)	55.0
Flour	2,896	(4)	4.8
Engine Manufacture /Repair	2,100	(519)	3.5
Sawing	2,091	(654)	3.5
Metal Products	2,051	(1,798)	3.4
Printing/Publishing	1,537	(1,342)	2.5
Car Repair	941	(427)	1.6
Chemicals	918	(820)	1.5
Manufacture & Assembly of Car & Parts	841	(474)	1.4
Metal Material for Construction	738	(545)	1.2
Textile	720	(358)	1.2
Flour Food (Bread etc)	623	(260)	1.0
Gravel etc for Construction	586	(42)	1.0
Furniture	586	(298)	1.0
Ice Manufacture	504	(44)	0.8
Others	9,998	(5,214)	16.6
Total	60,296	(12,954)	100.0

Source : Factory Control Division, Ministry of Industry

from Ministry of Industry and Bank of Thailand are the basis of the review.

(1) Past Trend of Industrial Accumulation and New Establishment

In Thailand industries have been accumulated at a satisfactory rate under economic and social development plan and act for promotion of investment since 1960. As a result, the average annual growth rate of manufacturing industry recorded 9 to 11% that exceeded the rate of 1950's (4 to 5%) by far.

Such growth was brought about mainly by industrial accumulation in the Central Region, especially in Bangkok. Table 3.2.9-1 shows the past trend of value added of manufacturning industry in each year from 1960 to 1980. The value added of Bangkok alone accounts for 35 to 50% of the total, the Central Region including Bangkok accounts for 70 to 90%, and the remaining 10 to 30% are almost equally divided into the other three regions, that is, the North Region, the North-east Region and the South Region. The concentration to the Central Region and Bangkok was increased considerably in that period.

However, Table 3.2.9-2, which shows the numbers of newly established factories in each year from 1972 to 1976 by region, implies new trends.

Firstly, numbers of new establishments and their employees in each year decreased rapidly in Bangkok and the corresponding numbers increased in the North, the North-east and the South Regions. The increase was particularly remarkable in the North-east Region.

Secondly, capital amounts of new establishments have a different trend from numbers of new establishments and their employees. The capital amounts in the Central Region and Bangkok increased rapidly although in the Central Region the numbers of new establishments and their employees increased only slightly and in Bangkok they actually decreased. The increase of the capital amount in the Central Region excluding Bangkok is the most remarkable. On the other hand, the other three regions had only slight increase of the capital amount.

The above observation of the industrial accumulation and the establishment trend in Thailand can be summarized as follows:

Manufacturing industries in Thailand were almost exclusively accumulated in the Central Region. In other words, the North, the North-east and the South Regions have very little accumulation so far.

However, the recent trend shows some signs for decentralization. Number of enterprises in the North, North-east and the South Regions started to increase although the growth

rate has not been so high to date. On the contrary, number of new establishments in Bangkok is decreasing. Instead, Neighboring provinces on Bangkok are absorbing rapid increase of the new establishment, especially large scale enterprises.

We think that the recent trend reflects saturation of Bangkok's urbanization and the resultant difficulty to establish new enterprises especially large scale enterprises, pushing new development to the neighboring provinces.

(2) Types of Industries by Region

Industries of Thailand consist mostly of processing of agricultural or forestry products such as rice cleaning, grain milling and sawing. Industries of relatively high technical standards such as metal products, car manufacturing and assembly, and machine manufacture account for only a small portion.

Numbers of factories and their share in Thailand in 1978 classified by type are shown in Table 3.2.9-3. Rice cleaning mills account for 55.0%, that is more than half of the total, followed by grain mills (4.8%), engine manufacturers and repair shops (3.5%) and sawmills (3.5%). This manifests the major share of products of the primary industries.

High processing industries such as metal products, chemical products, car manufacture and assembly concentrate heavily in Bangkok. The Central region excluding Bangkok also has this type of industries but the number is relatively small so far. The North, North-east and South Regions do not have any considerable number of factories of that type, and are predominated by rice cleaning mills and factories related to the primary industry.

Table 3.2.1-4 and Table 3.2.1-3 show numbers of factories by region and type of industry in 1978 and 1979 respectively.

Table 3.2.1-4 features rice cleaning mills. The share by rice cleaning mills of all the factories in Bangkok is as low as 1.2%, while the shares in the North, North-east and South Regions are between 70% and 80%. In other words, most factories in these regions are rice cleaning mills.

Table 3.2.1-3 shows numbers of factories of the top ten types of industries excluding rice cleaning in each region. It is shown that in Bangkok the first place is held by metal products followed by printing and publication, chemicals, metal equipment for construction, and car manufacture and assembly. In general Bangkok has high processing industries and urban type industries. On the contrary, the North, North-east, and the South Regions

have processing industries of local agricultural or forestry products such as grain milling, sawing, agro-industries and manufacture of wood products.

It is noted that in all regions except Bangkok, engine manufacture and repair hold the first or the second place. They are thought to be predominated by assembly or repair shops of engines for vehicles or boats. These workshops can be expected to be the basis of future industrial development of metal manufacture and machine manufacture in local areas.

4. METALWORKING INDUSTRY IN THAILAND

4. Metalworking Industry in Thailand

The metalworking industry in Thailand has been gradually winning recognition over the past 20 to 30 years in its relation to economic activities of the country. From the macro-economic standpoint, however, the industry as a whole is thought to have just started building itself up on a full scale, having established itself as an industry, although there are some modern technology intensive industries existing.

The present state of affairs with the metalworking industry in Thailand is introduced item by item in the following pages.

4.1 Definition

Generally speaking, the metalworking industry can be defined in many ways according to applications and purposes of its products. This report provides that products of the metalworking industry fall in the three broad categories listed below.

Metal products
Machinery
Transport equipment

When considered in comparison with the definition of engineering industry by NESDB, these products can be classified as shown below (Table 4.1-1). As such, they represent industrial groups outside the following categories according to the definition of engineering industries.

Basic metals
Electrical machinery

Table 4.1-1

Classification of Engineering Industries based on Input-Output by National Economic and Social Development Board (NESDB)

Designation No.	Industrial Group
106	Secondary steel products
107	Non-ferrous metals
108	Cutlery and handtools
109	Metal furniture and fixtures
110	Structural metal products
111	Other fabricated metal products
112	Engines and turbines
113	Agricultural machinery
114	Wood and metalworking machinery
115	Special industrial machinery
116	Office and household machinery
123	Ship building and repairing
124	Railroad equipment
125	Motor vehicles
126	Motorcycles and bicycles
127	Repairing of vehicles
128	Aircraft
129	Scientific equipment
130	Photographic and optical goods
131	Watches and clocks

From the process standpoint, they comprise the following.

Casting

Forging and heat treatment

Sheetwork and welding

Plating

Machining

Machine assembly

Presswork

The survey covered by this report aimed to pick up strategic products which have closer relation to the socioeconomic structure of Thailand, and find facts surrounding them. Concretely, the said strategic products are as follows.

Agricultural machinery

Pumps and valves

Molds and dies

Hand tools

Machine tools (simple type)

Gears

Automobile related parts

In principle, the survey was conducted in the 100 km zone centering on Bangkok.

4.2 Position in national economy

4.2.1 Size of Contribution to the GDP

In this clause, the size of contribution of the metalworking industry of Thailand to the GDP will be seized, analyzing it time-systematically, considering the value-added productivity, the value-added of the manufacturing industry and the share that the metalworking industry occupies in the GDP, including the international comparison, by its each line and product.

(1) Productivity of value-added

According to the commonly accepted idea, a high rate of value-added or high productivity of value-added of an industry indicates that the quality of products, efficiency, method of manufacture for example productive technique such as a knowhow, etc., and the productive technique represented in the modern installation that permits mass production (but to be based on the economical productive scale and also to control the procedure of production in a labor intensive form is also considered as an adequate technique) of said industry is excellent.

Table 4.2.1-1, "Productivity of Value Added" shows international comparison of the productivity of value-added of the manufacturing industry (hereinafter referred to as productivity) of ISIC381 – metal product industry of Thailand is increased from 19.2% of 1969 to 49.9% of 1977. That of ISIC-382 machinery industry is increased during the same period from 28.5% to 20.1%. That of transport equipment is increased from 33.8% to 67.3%. In the comparison with other countries of 1977, in metal product industry, Thailand is in the top followed by Japan, Korea, Singapore in said order. This is considered to be due to elevation in the technical level and rising of the profit ratio going with the technical level. This period corresponds to the period of the 3rd Economic Development Plan (October, 1971 to September, 1976), by which the industrial activities with their center in Bangkok have become very active owing to the success of the policy of Import-replace industrialization under the Industrial Investment Promotion Act, through the period of the 1st Economic Development Plan and the 2nd Economic Development Plan (1961 to 1971), and in the 3rd Plan period the Export Promotion Act

was introduced also, and accordingly, the nationalization rate (rate of production against demand) of the metal products of 1977 attained 81%, as is stated in the clause 4.2.2 "Structure of the Foreign Trade".

In 1977, the productivity of the machinery industry was as low as 20.7% which was lower than the 32.0% of Indonesia. Of the machinery industry, the self-sufficiency ratio was low and was still at the initial stage of industrialization. The average annual growth rate of GDP in real terms during the 3rd Plan was 7.1% and was the lowest since the 1st Plan, but the GDP growth rate of the whole manufacturing industry was high being 11% in its mean annual rate. Already in the beginning of 1970's, the investment for the import-replace industry has completed a cycle, and in this period, due to the import inflation caused by the 1st oil crise that continued till after the years 1973–1974, the rapid slowdown of the investments from abroad caused by the change of the governmental policy from the high growth to the stabilized growth of national economy and the retreat of U.S.A. army from Vietnam, etc., it was not possible to realize the various objects such as "Improvement of the role of private sectors in the economy" and "Establishment of large scale manufacturing industry such as Petrochemical industry, Iron and steel industry, Food processing industry and Machinery industry, etc., by the private (industrial) sectors". Accordingly, during this period, the development of the machinery industry suffered a great delay.

Table 4. 2. 1-1. PRODUCTIVITY OF VALUE ADDED (Unit: Percent)

ISIC	Manufacturing Industries by Commodities	Indonesia		Philippines		Thailand		Singapore		Korea		India		Japan	
		1974*1	1977	1974	1977*2	1974	1977	1974	1977	1974	1977	1974	1977	1974	1977
311/312	Food Products	37.2	29.1	33.5	35.3	25	10.4	15.8	16.3	18.1	31.4	10.1	10.5	30.3	30.6
313	Beverages	52.9	38.0	49.5	73.4	77	41.7	46.9	41.1	57.2	58.1	34.2	25.5	31.2	29.5
314	Tobaco	43.8	21.7	45.0	54.2	72	26.6	29.4	22.3	42.3	65.6	27.1	16.2	-	-
321	Textiles	30.0	27.4	34.0	40.6	30	43.0	29.5	31.4	35.2	35.2	27.3	21.3	38.1	37.6
322	Wearing Apparel, except Footwear	43.0	36.6	40.4	41.6	47	12.1	29.4	32.7	31.6	32.2	18.2	18.0	45.2	46.3
323	Leather and Fur Products	31.2	25.9	30.0	33.3	29	17.2	23.1	29.5	32.6	25.2	13.5	10.2	35.1	34.1
324	Footwear	37.8	53.3	41.4	34.5		68.4	33.3	35.5	40.7	31.1	34.6	27.0	42.1	29.3
331	Wood Products except Furniture	40.7	35.9	37.9	46.9	37	49.1	27.2	32.2	18.1	26.3	26.0	23.6	32.7	34.5
332	Furniture and Fixture, except Metal	36.8	45.2	38.9	42.1	47	38.7	42.2	39.7	39.2	49.0	29.0	26.1	41.1	42.2
341	Paper and Paper Products	23.3	36.8	34.9	43.3	17	27.9	34.6	36.2	28.6	32.7	38.9	25.7	36.8	33.9
342	Printing and Publishing	43.7a)	46.7	39.4	26.7	51		54.8	51.3	47.4	54.6	37.9	34.6	55.6	55.1
351	Industrial Chemicals	43.0	64.4	24.8	35.8	43	43.2	28.8	26.7	38.3	33.9	30.8	17.6	37.4	32.1
352	Other Chemical Products	50.4	39.5	39.1	29.3		56.7	49.8	49.9	44.2	51.1	25.8	21.8	51.9	53.0
3522	(Drugs and Medicines)	(22.1)a)	(38.8)							(51.1)	(55.9)			(61.9)	(62.4)
353	Petroleum Refining	-	-	20.1	17.5	-		15.2	11.0	17.7	17.6	10.0	10.1	12.2	10.0
354	Miscellaneous Products of Petroleum and Coal	-	-	40.6	20.3	-				24.5	21.7	18.6	16.8	21.8	14.3

Source: 1. UN Statistical Year Book for Asia and the Pacific
2. K Taniguchi, Asian Institute of Developing Economies "Industrial Development of Asean and the Regional Cooperation" in 1979
3. Mr K Shishido, the same "Terms for the Development of Thai Economy"

Note: Year *1 - 1972
*2 - 1975
a) - 1976

Table 4. 2. 1-1. PRODUCTIVITY OF VALUE ADDED (Continued.)

(Unit: Percent)

ISIC	Manufacturing Industries by Commodities	Indonesia		Philippines		Thailand		Singapore		Korea		India		Japan	
		1974 *1	1977	1974 *2	1977 *3	1974	1977	1974	1977	1974	1977	1974	1977	1974	1977
355	Rubber Products	38.9	46.8	38.4	36.2	36	9.7	8.0	8.1	29.9	37.1	25.1	18.0	46.1	44.7
356	Plastic Products	37.3	32.7	33.3	33.2	-	52.6	32.2	34.1	33.7	32.9	21.7	17.8	40.9	37.5
361	Pottery, Chinaware and Earthwear	58.7	44.1	55.0	72.6	54	59.6	50.0	42.5	53.3	63.0	38.2	32.2	60.1	61.5
362	Glass and Glass Products	37.1	47.1	53.2	35.1		24.2	7.1		53.6	57.6	32.5	27.7	59.3	58.5
369	Other Non-metallic Mineral Products	65.8	63.4	44.2	37.1		34.8	35.5	36.2	43.5	44.2	28.6	26.2	48.2	45.1
371	Iron and Steel Basic Industries	29.2 a)	32.1	28.6	26.0	-	11.1	57.2	46.2	32.2	26.9	29.7	18.9	32.0	27.8
372	Non-ferrous Metal basic Industries	-	-	35.7	49.4	-	83.1	26.5	24.1	40.0	30.7	27.9	17.1	29.8	26.8
381	Metal Products, except Machinery, etc.	38.6	25.9	32.0	34.0	26	49.9	34.0	35.7	39.8	39.9	27.0	23.4	44.6	44.6
382	Machinery except Electrical	53.4	32.0	47.7	-	38	20.1	48.6	50.1	38.3	42.1	31.9	27.8	44.3	45.4
383	Electical Machinery and Apparatus, etc.	37.9	30.4	37.9	36.4	52	40.9	31.4	30.2	38.2	40.9	30.7	24.9	37.7	38.7
384	Transport Equipment	47.9	33.4	25.7	36.1	42	67.3	46.8	48.2	31.9	41.7	32.6	33.6	32.3	32.8
3841	(Shipbuilding and Repairing)	a) (54.1)	(53.8)					(50.4)	(49.1)	(37.0)	(52.6)	(45.6)	(37.4)	(40.9)	(41.6)
3843	(Motor Vehicles)	(62.2)	(50.6)					(29.3)	(28.0)	(30.3)	(33.5)	(29.2)	(28.0)	(28.5)	(30.1)
385	Professional, Photographic Goods, etc	68.7	41.7	47.6	38.2	-	-	-	-	40.0	33.6	35.7	30.9	45.8	44.1
390	Other Manufacturing Industries	47.6	41.4	43.8	33.6	44	36.6	22.8	26.2	43.2	43.1	37.1	27.6	42.2	42.7
	Average Manufacturing Industry	-	31.8	35.9	35.9	43	32.7	24.9	24.7	32.7	36.3	25.4	19.6	36.8	35.6

The productivity of ISIC384, 3841 and 3843-transport equipment was 67.3% in 1977, the highest of Thailand, but as it was impossible to obtain the data on the productivity of ship building and its reparation and automobile industries, the background of this figure is not known. However the ship building consists mainly in the construction and reparation of wooden ships for the rivers, and the construction of mercantile ships is up to 2,000 gross tons, by some companies as Bangkok Dock, etc., and the reparation industry is only up to 4,000 gross tons. The automobile industry was created as assembly industry, and the policy for promotion of national automobile industry was introduced that aims at the gradual nationalization to 50%, within five years starting the passenger cars in 1978 and the commercial cars in 1979 respectively. And the automobil industry is included in the structural improvement program of determined industries in the 5th Economic Development Plan (1982–1986).

Table 4.2.1-2 Value Added of Metalworking Industries

(Value: Millions of Bhat at 1972 constant prices)

Year	GDP		Manufacturing Sector		Value Added of Metalworking Related Industries				
	Amount	Annual Growth (%)	Value Added	Annual Growth (%)	Basic Metals	Metal Products (MP)	Machinery (M)	Electrical Machinery	Transportation Equipment (T)
1960	70,139	7.3 (Average)	8,389	11.2 (Average)	29 (0.3)	57 (0.7)	38 (0.5)	48 (0.6)	68 (4.6)
1965	99,544	8.6 (Average)	14,249	10.4 (Average)	60 (0.4)	170 (1.2)	152 (1.1)	114 (0.8)	739 (5.2)
1970	150,092	6.3 (Average)	23,320	9.5 (Average)	392 (1.7)	439 (1.9)	534 (2.3)	318 (1.4)	1,200 (5.1)
1975	203,514		36,787		409 (1.1)	475 (1.3)	612 (1.7)	479 (1.3)	2,419 (6.6)
1976	221,225	8.7	42,529	13.0	454 (1.1)	517 (1.2)	792 (1.9)	656 (1.5)	2,996 (7.0)
1977	237,173	7.2	48,071	13.0	512 (1.1)	488 (1.0)	856 (1.8)	780 (1.6)	3,768 (7.8)
1978	261,097	10.1	52,521	9.3	577 (1.1)	488 (0.9)	872 (1.7)	989 (1.9)	4,141 (7.9)
1979	276,907	6.1	57,841	10.1	667 (1.2)	618 (1.1)	997 (1.7)	1,094 (1.9)	4,382 (7.6)
1980	292,852	5.8	60,597	4.8	710 (1.2)	632 (1.0)	1,102 (1.8)	1,237 (2.0)	4,812 (7.9)
1981	311,270	6.3	64,490	6.4	593 (0.9)	612 (0.9)	1,223 (1.9)	1,322 (2.0)	5,549 (8.6)
1982	324,290	4.2	68,224	5.8	530 (0.8)	573 (0.8)	1,304 (1.9)	1,402 (2.1)	5,473 (8.0)
Average Annual Growth (%)									
1960 - 70	7.9	-	10.8	-	29.7	22.6	30.2	20.8	33.3
1970 - 82	6.6	-	9.4	-	2.5	3.9	7.7	13.2	13.5
1975 - 81	6.3	-	9.8	-	5.5	3.7	10.4	14.3	12.6

(1)

(2) Continued

Value Added of Metalworking Industries (MP + M + T)	Annual Growth (%)	As of Manufacturing Industries (%)	As of GDP (%)	Year
163	45.4 (Average)	5.8	0.23	1960
1,061	15.4 (Average)	17.4	1.07	1965
2,173	10.0 (Average)	9.3	1.45	1970
3,506		9.6	1.72	1975
4,305	22.8	10.1	1.95	1976
5,112	18.7	10.6	2.16	1977
5,501	7.6	10.5	2.11	1978
5,997	9.0	10.4	2.17	1979
6,546	9.2	10.7	2.24	1980
7,384	12.8	11.4	2.37	1981
7,350	-0.5	10.7	2.27	1982

				Average Annual Growth (%)
29.6	-	-	-	1960 - 70
10.7				1970 - 82
11.2				1975 - 81

Note : Figures in parenthesis are shares (%) of value added in the manufacturing sector.

Source: NSEDB, National Account

(2) Share of Value-added

The Table 4.2.1-2 "Value Added of Metalworking Industries" shows share of value-added that the metalworking industry occupies in the calculation of the national income.

1) Share occupied in GDP

The weight that the total value-added (invariable price of 1972) of the metal products, machinery (except electric machinery) and transport equipment industries occupy in GDP has risen only 2.1%, from 0.2% of 1960 to 2.3% of 1982, during 22 years, and the rise of weight is very slow, being its mean annual of 0.1%.

2) Share that is occupied in the value-added of manufacturing industry

Likely, the weight that the metal working industry (except electric machinery) occupies in the value-added of manufacturing industry has risen in 4.9%, from 5.8% of 1960 to 10.7% of 1982, and this means the rise in mean annual of 0.2%, and this indicates the very slow rise of weight of the metalworking industry against the manufacturing industry. When this is analized by industries, during the period of 1960 to 1982, transport equipment occupied the 4.6% – 8.6% and this is the highest among the metalworking industry, and in 1982 it is 8.0%.

Of the machinery industry, the weight rose from 0.5% of 1960 to 2.3% of 1970, but after that period, it repeated up and down, and in 1982 it is 1.9%. Of the metal product industry, it rose from 0.7% of 1960 to 1.9% of 1970, but after that period the weight fell to the 0.8% of 1982.

Of the manufacturing industries, the industry that occupied the highest share during 1960 – 1970's was the food industry and its share fell from 42.1% of 1960 to 15.3% of 1979, and following it, the share of tobacco industry fell from 10.1% to 7.1%, but the share of beverage industry rose from 7.8% to 11.7%.

All of these industries are consumer goods. The industry of which the share rose most in 1970's is the textile industry, rising from 4.6% of 1960 to 13.3% of 1979, and occupied the second place after the 15.3% of the food industry. The beverage industry occupied the third place. During this period, the shares of consumer goods industries, except furnitures, printing and publication, rose comparatively. And the weight of the capital goods industry, such as basic metals, as steel, aluminum, etc., metal products, machinery, electric machinery, except transport equipment, was low, and intermediate goods industry, such as petroleum and petroleum products, chemical and chemical products, and non-metallic mineral products as pottery, glass, cement, etc., rose also following the consumer goods.

The 4th Economic Development Plan (1976 – 1981) was to take over the objectives that could not be attained during the 3rd Plan, to attain the economic recovery and to resolve the various problems derived from the industrial structure. The target to attain the average annual growth grow of GDP in real terms of 7.0% was fulfilled obtaing 7.1% surpassing slightly the aimed goal, but of the manufacturing industry, its growth remained at 8.9% lower than the aimed average annual of 9.6%. The weight in the GDP of agriculture was 29.8%, and that of manufacturing industry was 19.2%, and the goal in 1981 of agriculture was aimed at 23.9% and that of manufacturing industry was aimed at 22.9% respectively, but that of manufacturing industry could not be attained and remained at 20.7%. And during the period of the 4th Plan, due to the second oil crise in 1978, the prices recorded the rise of annual 12% and it prolonged the recovery of the business, and the depression of the main trading countries, Japan, USA, etc., continuing into the year 1982, the full scale recovery of times in Thailand economy was postponed till the beginning of 1983.

4.2.2 Structure of the Foreign Trade

In this clause the outline of the foreign trade of Thailand is explained and its structural characteristics and problems are clarified, and further the export-import structure of the products of the metal fabrication industry, including the products of the steel industry, department of the basic material of it, is grasped macroscopically in relation with the demand and supply, and thus its features are explicated. Lastly, the export-import structure of the mercahndises, object of the proposal for the pormotion of metal fabrication industry, is grasped.

(1) Outline of Export and Import of the Foreign Trade of Thailand

1) Transition of the Amount of Foreign Trade and the Pattern of Foreign Trade

As is shown in the Table 4.2.2-1 "Transition of the Amount of Foreign Trade of Thailand", the amount of foreign trade, both in import and export, is growing every year, but due to the increase of the import caused by the development of national industry and increase in the consumptive demand, the trade balance is recording deficit constantly since 1952, and especially since 1966, when the second 5 year development plan was started, parallel with the ac-celeration of the industrialization, the deficit is rapidly growing.

As is shown in the Table 4.2.2-2 "Amount of Export by Main Goods", the trade of Thailand consists in the export of the primary products, such as rice, tapioka, raw rubber, sugar and maize, and their processed goods, and the mineral products as tin, and the import of the capital goods as machinery, electric furnace, fertilizer, etc., the raw material and intermediate goods as chemical products, basic metals as steel and alminum, textiles, etc., and consumptive goods as foods beverages, clothing, electrical appliances, etc., a common pattern for the countries on the way of development.

The cause of the inversed trade balance is that, the main export goods being, as is above stated, the agricultural products and their processed goods and tin, that is liable to be affected by the influence of international prices due to the demand and supply, and as is shown in the Table 4.2.2-3 "Price of Merchandise", it suffered from the influence of the depression in the conditions of the international market of goods since 1978. Also the double oil crisis in 1973 and

4.2.2.-1 Transition of the Amount of Foreign Trade of Thailand

(Baht million)

Year	1960	1970	1975	1977	1978	1979	1980	1981	1982	1983
Export	8,614	14,772	45,007 (10.6)	71,198 (17.1)	83,065 (16.7)	108,179 (30.2)	133,197 (23.1)	153,030 (14.9)	159,728 (4.4)	146,438 (-8.3)
Import	9,622	27,009	66,835 (4.3)	94,177 (29.2)	108,899 (15.6)	146,161 (34.2)	188,686 (29.1)	216,246 (14.6)	196,616 (-9.3)	n.a.
Balance	-1,008	-12,237	-21,828 (59.1)	-22,979 (90.2)	-25,834 (12.4)	-37,982 (47.0)	-55,489 (46.1)	-63,216 (13.9)	-36,888 (-42.1)	n.a.

Note: 1. The figure that is included in the month of actual import of aircraft is excluded.

2. The figure in parenthesis is the comparison with the preceding year (%)

3. P means provisional

Source: Bank of Thailand

Table 4.2.2-2 Amount of Export by Main Goods

(Unit: Baht million)

Item \ Year	1960		1970		1975		1977		1978		1979		1980		1981	
	Sum	Share (%)	Sum	Share (%)	Sum	Share (%)	Sum	Share (%)	Sum	Share (%)	Sum	Share (%)	Sum	Share (%)	Sum	Share (%)
1 Rice	2,570	29.8	2,516	17.0	5,852	13.0	13,382	18.8	10,425	12.6	15,592	14.3	19,508	14.6	26,366	17.2
2 Products of Tapioca	288	3.3	1,223	8.3	4,597	10.2	7,720	10.8	10,892	13.1	9,891	8.8	14,887	11.2	16,446	10.7
3 Crude Rubber	2,579	29.9	2,232	15.1	3,474	7.7	6,164	8.7	8,030	9.7	12,351	11.4	12,351	9.3	10,841	7.1
4 Sugar	8	0.1	94	0.6	5,696	12.7	7,445	10.4	3,969	4.8	8,797	5.1	2,975	2.2	9,572	6.3
5 Tin	537	6.2	1,618	11.0	2,247	5.0	4,541	6.4	7,229	8.7	9,253	8.5	11,347	8.5	9,091	5.9
6 Maize	551	6.4	1,969	13.3	5,705	12.7	3,345	4.7	4,275	5.1	5,643	8.3	7,299	5.5	8,349	5.5
Others	2,087	24.2	5,120	34.7	17,436	38.7	28,601	40.2	38,245	4.6	47,164	43.5	64,830	48.7	72,336	47.3
Total Export	8,612	100.0	14,772	100.0	45,007	100.0	71,198	100.0	83,065	100.0	108,179	100.0	133,197	100.0	153,001	100.0

Note : The order is of 1981.
Source : Bank of Thailand.

4.2.2-3 Price of Merchandise

Economist Index (US$ base 1975 = 100)

		Synthetic Index	Foods	Industrial Material (Synthetic)	Textiles	Nonferrous Metals	
1978		149.4	158.8	130.7	129.7	116.6	
1979		182.0	188.1	171.8	149.0	165.7	
1980		214.5	232.2	184.0	172.0	175.7	Peak
1981		189.8	203.4	166.2	161.2	153.5	
1982		157.7	167.2	142.0	145.5	133.1	
1983		171.5	183.7	151.8	153.0	135.3	
1982	Jun.	153.8	166.3	137.0	152.0	121.0	
	Jul.	153.4	161.3	139.9	152.0	127.5	
	Aug.	150.2	156.2	139.4	147.8	128.8	
	Sept.	148.0	154.0	137.1	143.0	128.3	
	Oct.	146.7	153.2	135.0	137.8	129.1	
	Nov.	149.1	159.3	132.4	135.8	126.6	Bottom
	Dec.	151.1	161.6	133.8	137.0	128.0	
1983	Jan.	152.8	161.8	137.6	139.6	132.8	
	Feb.	156.8	164.8	142.9	140.8	137.7	
	Mar.	158.5	165.5	146.1	145.1	135.3	
	April	166.3	173.5	153.3	150.0	141.4	
	May	170.9	179.8	155.6	150.8	144.3	
	Jun.	170.4	180.1	153.9	154.0	139.9	
	Jul.	173.7	183.1	157.6	156.4	140.0	
	Aug.	183.5	198.9	158.7	160.0	137.0	
	Sept.	182.1	198.5	155.9	160.4	133.8	
	Oct.	180.8	198.9	152.4	158.9	128.1	
	Nov.	180.6	198.7	155.2	160.0	126.0	
	Dec.	181.8	200.4	152.6	159.9	126.9	
		68.4%	86.4%	72.0%	93.0%	72.2%	Recovery Rate

Note: At the synthetic index of December 1983, the peak is not recovered yet, in particular, the prices of primary products and nonferrous metals are delayed in recovery.

Source: Each Number of Economist

1978, in which the price of crude oil was rapidly raised to double or triple and which in its turn brought the rapid increase of the import amount of the oil, and became the worst of the causes of the deterioration of the trade balance of Thaliands the non-oil producing country. By the way, the total amount of the import of the first 3 items of 1981 shown in the Table 4.2.2-2 "Amount of Export by Main Goods" is Bt. 53,700 millions, which is equivalent to the Bt. 56,000 millions, total amount of the import of the oil and petroleum products of the same year.

The above-mentioned trade pattern reflects, in its original from, the existing pattern of industrialization, and so the industrialization of Thailand depends on the import of the steel, chemicals, textiles and other intermediate goods and raw materials.

The fifth 5 year development plan projected under such situation put up the policies of restructuring of the national economy and industrial structure, reduction of degree of dependence on the import and promotion of the export, and other policies. In the initial stage of industrialization, the first 6 year development plan (1961 - 1966) and the second 5 year development plan (1967 - 1971), the import replacement industries, such as textile industry, paper and pulp industry, food processing industry, etc., whose industrialization is simple were up-brought, and the industrialization of higher industries, such as cement, ceramic, bicycle, assembly of automobiles and its parts, electrical and electronical apparatus, was aimed at gradually, and at the present, the emphasis is transferred to the upbringing of the export-oriented industries.

2) The restructuring of Industry and Promotion of Export of the Fifth 5 Year Development Plan

The fifth 5 year development plan (Oct., 1981 - Sept., 1986), in its pending problems of industrial structure, points out, in the first place, the intensive import dependent character of the industrial structure of Thailand, and the past expansion of the industrial sector is partly due to benefits from the governments investment promotion policy which has provided high protection to the new industries established successively by now are getting inefficient, and also are losing the international competitive ability. As the many of the industrial

structures have come highly depending on the imported material, capital goods as machinery, etc., and energy, they are increasing continuously the deficits in the trade balance. Since the manufacturing industry is the main sector which is spending the most part of foreign exchange earnings that the agricultural sector generates, and comments that it is most important to restructure the productin process of the manufacturing industry to be less import dependent by using the indiginous material and other production elements. Secondaly, it points out that the export industry is not developing efficiently, saying that since the third 5 year development plan (1972 -1976), the government has come promoting the export industry, but the structure of the governmental promotion of industry is imparting the special benefits of promotion partially toward the protection of the import-replacing industries for the domestic market. Also it points out that the provision of the basic facilities as export processing zone and Bonded warehouses, etc., for the export trade are still inadequate, and that the benefits for the promotion of export as tax system, which is inclined toward the import-replacing industry, are in sufficient.

The fifth 5 year development plan considers that for the restructuring and the development of manufacturing industry it is necessary to put special emphasis on the export for the reduction of deficit of the trade balance and the acquisition of much foreign exchange, and put up the following targets for the restructuring of the production process and the export of the industrial products:

1 The growth of the manufacturing industry per year will be minimum 7.6% (revised to 5.5% in May 1984), and the growth of the export industry per year will be minimum 15%, and the growth of the industry for domestic consumption per year will be 5-6%.

2 Restructuring of specific industry for the elevation of the economical efficiency will be realized for ten (10) categories of industries, effectuating by two (2) industries per year, and the purpose of the restructuring is to increase efficiency of the existing and new industries so as to improve the quality, to reduce the cost of production and to realize fair price, enabling them to be competitive in the international market as well as in the domestic markets, and as the measures for that, it has planed the revision of the import tariff for the imported goods, equalizing of the business tax and the excise tax on imported goods with those of the locally

As is seen in the above-mentioned fifth 5 year development plan, it is clearly shown that, forwarding one step more the import replacing policy by protection of the national industry, the direction of the policy was changed toward the upbringing of national industry, promoting the export by the creation of various incentives, that is from the import replacing to the promotion of the export oriented industry.

3) Recent Situation of Export-Import

In the export of 1981, a relatively smooth increase in the exported quantity of main agricultural products was observed, but due to the fall of prices and depression in the international market, the increase in the amount was inactive. Owing to the diminution of export of several products of manufacturing industry, as IC, precious stone, etc., by the influence of the international simultaneous depression, the amount of export is greatly reduced, in 14.9% with respect to the preceding year and Bt. 153,000 millions in the value. On the other hand, the small increase in the import, 14.6% with respect to the preceding year, and Bt. 216,200 millions was due to the slugging of the price of crude oil, effect of the devaluation of baht, calm down of the demand for the consumption goods. However, due to the recovery of industrial production and the exploitation of the natural gas in the Gulf of Siam, as is seen in the Table 4.2.2-4 "Amount of Import by Main Goods", high increase percentages are presented by capital goods, and raw materials and intermediate goods as usual, such as machinery 26.4%, steel 15.4%, automobile and its parts 36.5%, etc., and thus the trade balance shows the highest deficit in the past of Bt. 63,200 millions.

In 1982, the export showed the stagnation for the first time since 1975, increased in 4.4% with respect to the preceding year and the total sum was Bt. 159,700 millions. On the other hand, the import fell for the first time in the last ten yeras, the increase -9.3% with respect to the preceding year and the total amount Bt. 196,600 millions, the trade balance showing the deficit of Bt. 36,900 millions. As 1982 was at the bottom of the simultaneous world depression, the trade of Thailand also suffered its influence, but due to the reduction in the import, the trade balance was improved.

The export of 1983 fell in 8.3% with respect to the preceding year, the total amount was Bt. 146,400 millions. This fall was mainly due to the decrease in the

Table 4.2.2-4 Amount of Import by Main Goods

(Baht million)

Commodity \ Year	1979	1980	1981		
			Amount	Share (%)	Growth Rate (%)
Mineral Fuel	32,858	59,744	65,239	29.7	9.2
Boilers and Machinery	16,762	18,074	22,023	10.0	21.8
Iron and Steel	14,745	14,338	18,476	8.4	28.9
Parts of Automobile	9,862	10,026	13,713	6.2	36.8
Electrical Equipment	9,377	13,239	13,593	6.2	2.7
Chemicals	5,541	6,162	7,036	3.2	14.2
Cotton and Cotton Textiles	3,014	2,907	3,626	1.7	24.7
Fertilizer	2,814	2,837	3,614	1.6	27.4
Total Import	146,161	193,618	218,123	100.0	12.7

Table 4.2.2-5 Estimate of Demand of Natural Gas

(Unit: Million cubic feet/day)

Year	Production	Demand for Fuel	Demand for Material	Total
1982	120	145		145
1983	130	368		368
1984	180	452		452
1985	300	477	50	527
1986	413	484	76	560
1990	700	521	243	764

Source : PTT, 1983

capacity of export of agricultural products due to the irregular weather, depression in the countries of trade partner, with Japan at the top, and the reduction of competitive power in the export, which caused the diminution of export of the agricultural products, mineral products such as tin, and the industrial products as sugar, textile products, IC, etc. On the other hand, the import showed the great increase due to the rapid increase in the domestic demand from the beginning of the year of 1983, the increase in 10.6% with respect to the preceding year and its total amount Bt. 217,400 millions, being estimated the deficit of trade balance of Bt. 71,000 millions, higher than the highest in the past of Bt. 63,200 millions of 1981. (According to the publication in May, 1984, it was US$3,400 or Bt. 78,200 millions).

According to the intermediate revision of the fifth 5 year plan in May, 1984, the percentage of growth of Gross Domestic Product (GDP) is stepped down from 6.6% to 5.5%, and the current account deficit of international balance from the initial maximum of Bt. 53,000 millions, per year to Bt. 48,700 millions. In accordacne with this, the grow of manufacturing industry from 7.6% per year to 5.5%, the amount of export from 22% per year to 7.8%, the amount of import from 18% per year to 7.1%, were stepped down respectively. In this year, in view of the full scale business extension in USA, Japan and Asian countries, the growth of economy is expected to exceed the estimated 5.8% to 6.0% of the increase in the GDP of last year, and it is also expected that the trade decficit of US$3,400 millions (Bt. 78,200 millions), deficit of current account balance of US$2,800 millions (Bt. 64,400 millions) will be somewhat improved, and the growth of GDP is also expected to exceed the 5.8% of the last year up to about 6.5%.

Thailand has come adopting the pattern of compensating the constant trade balance deficit by the invisible trade balance and capital balance in black. In the capital balance, since 1980, ther foreign loan by the government is increasing, and in March, 1984 the balance of foreign loan is Bt. 158,000 millions (US$6,870 millions). Of this balance, Bt. 10,800 millions (about US$470 millions) is foreseen for the budget of 1985 (Oct., 1983 - Sept., 1984). Adding to this the deficit of investment balance in the invisible trade balance (interest for the foreign loan), debt service ratio is estimated to retrocede to the line of 10%, but it is still maintained in the more healthy level than 15.5% of 1981. Accordingly,

the foreign loan by the government of Thailand will continue to play an important role in the capital balance.

In the fifth 5 year development plan, various industrialization projects in the eastern seaboard area utilizing the natural gas of the Gulf of Siam are planned, and it will be necessary to take into account this industrial project in the future prospect of trade balance and international balance of Thailand. As of April, 1984, the production is about 16,000,000 f^3 flow/day (indicated in Table 4.2.2-5 "Estimate of Demand of Natural Gas", which is below the revised production for 1984 of 18,000,000 f^3 of the Petroleum Authority of Thailand, but it is said that with the production of 200,000,000 f^3/day (converted in crude oil 33,000 barrels) it will have the effect to save the import of crude oil for US$350 millions/year. In 1990, the supply of 700,000,000 f^3flow/day (converted in crude oil 11,400 barrels) is expected, which is equivalent, at the present price of oil, to some US$900 millions, and is said to be the supply equivalent to 34% of the demand of oil. According the increase of production in future, the effect of saving foreign exchange is condsidered to go growing. In the fifth 5 year development plan, the energy conservation policy is one of the principal policies, and the control of the consumption of oil, occupied the 31% of the total import, and the exploration of national substitute energy as natural gas, etc., will be important theme for the economy of Thailand and for its future industrialization.

The promotion of the projects related with the natural gas will produce also the effect of saving of foreign exchange by the import replacement, after the completion of various plants as gas separation plant, petrochemical plant, fertilizer plant, etc., but prior to this, the foreign loan for these plants is oppressing the international balance of Thailand at the present, therefore during the fifth 5 year development plant, in spite of the efforts of export promotion of Thailand, the pattern of compensation of large trade balance deficit by the capital balance, such as governmental loan, etc., will be continued.

(4) Conditions of the import per economic goods

As is shown in the Table 4.2.2-6 "Import by Economic Goods", the percentage that each economic goods occupies in the total import of each year during 1977 to 1982 is 24 - 29% of capital goods, 24 to 30% of raw material and intermediate goods, and the total of these, except the year 1980 and 1982, occupies more than 50%. On the other hand, the consumption goods, that had once a large weight as

Table 4.2.2-6 Import by Economic Goods

(Unit: Baht million)

Classification	Year 1960	1970	1975	1977	1978	1979	1980	1981	1982
I Consumption Goods	3,365 (35.0)	5,229 (19.4)	8,455 (12.7)	11,144 (11.8)	12,942 (11.9)	15,933 (10.9)	19,286 (10.2)	22,985 (10.6)	22,783 (11.6)
1. Nondurable goods	2,258	3,486	5,148	6,346	7,544	9,343	12,257	13,616	12,991
2. Durable goods	807	1,743	3,307	4,768	5,398	6,590	7,029	9,369	9,792
II Raw Materials and Intermediate Products	1,746 (18.1)	6,725 (24.9)	16,105 (24.1)	26,921 (28.6)	29,598 (27.2)	43,500 (29.8)	45,312 (24.0)	53,575 (24.7)	48,596 (24.7)
1. For consummer goods	1,030	4,139	10,318	16,060	16,937	26,108	28,182	33,716	30,427
Textile fibres	60	602	1,902	3,134	2,236	3,189	3,175	3,915	3,247
2. For capital goods	716	2,586	5,787	10,861	12,661	17,392	17,130	19,859	18,169
Iron and steel	568	1,647	3,236	6,352	7,765	10,035	10,335	12,039	11,323
III Capital Goods	2,367 (24.6)	9,371 (34.7)	22,239 (33.3)	24,393 (25.9)	31,317 (28.8)	39,902 (27.3)	46,075 (24.4)	56,772 (26.2)	47,778 (24.3)
Nonelectrical machinery	1,021	4,723	11,973	12,592	15,894	18,648	20,402	25,842	21,172
Electrical machinery	334	1,419	2,730	3,555	5,836	7,355	11,206	10,867	11,008
IV Other Imports	2,144 (22.3)	5,684 (21.0)	20,036 (30.0)	31,749 (33.7)	35,042 (32.2)	46,826 (32.0)	78,013 (41.3)	83,414 (38.5)	77,459 (39.4)
Vehicle and parts	-	2,204	4,542	7,958	7,550	7,126	6,912	9,568	7,687
Fuels and lubricants	-	2,329	14,233	20,889	22,851	32,647	58,733	65,100	60,765
Total	9,622 (100.0)	27,009 (100.0)	66,835 (100.0)	94,177 (100.0)	108,899 (100.0)	146,161 (100.0)	188,686 (100.0)	216,746 (100.0)	196,616 (100.0)

Note : 1. The figure of import of aircraft included in the month of actual import is excluded.
2. Figure in parenthesis represents share %.

Source: Bank of Thailand

35% in 1960, are now stabilized occupying only 10% or so, due to the development of the industrialization, that of import replacement in main. The weight of the import of oil and its processed goods is growing rapidly since 1980, and in 1982 it occupied 31%. In 1981, due to the drop of domestic demand and slugging of price of crude oil, the import was less than the preceding year for the first time, but only slightly. In 1982, being at the bottom of the world simultaneous depression, the total import was less thatn the preceding year in 9.3%, but the import of oil increased in 8.5% and the weight was 31%, which shows the strong demand for import of energy of the non-oil production country Thailand. On the other hand, the import of the automobile and its parts, according to the progress of natinalization of production, losing its weight recently and in 1981 it occupied 4.4% of the total import.

Among the raw material and semimanufactured goods, what is important as that for the consumption goods is chemicals, material for textile (cotton and cotton textile), and in 1981 each of them occupied 3.2% and 1.8% of total import respectively. What is important for the capital goods is steel which occupies about 6% of the total import. Of the capital goods, the percentage that the machinery (except electrical machinery) is 11.9% in 1981, including the electrical machinery it was 17%. As is shown in the Table 4.2.2-4, the year 1981 is characterized by the increase of the import of machinery, parts of automobile, steel, etc., by the project of exploration of natural gas in the Gulf of Siam and the recovery of industrial production, and it is expected that this trend will continue hereafter.

(2) Export-Import of Products of Metal Fabrication Industry in Thailand

1) Structure of the Export-import of Machinery

As is shown in the Table 4.2.2-7 "Structure of Exports", the amount of import of the Sect. 7 Machinery (Transporting equipments, electrical machinery and other machinery included) by the classification of International Standard Classification (SITC), is growing from 1968 to 1980 in the highest percentage of growth of 75.4% of annual average, and the weight that it occupies in the total import is, in 1980, only 5.7%, Bt. 7,620 millions, but the weight has increased from 0.1% in 1968.

Table 4.4.2-7 Structure of Exports
(Baht millions)

SITC categories (1 digit)	1968	1973	1980	Growth rates (current baht) 1968-73	1973-80	1968-80
Food	7,016	13,661	59,338	14.3	23.3	19.5
Beverages and tobacco	204	328	1,393	10.0	22.9	17.4
Crude materials	3,636	8,411	19,095	18.3	12.4	14.8
Fuels and lubricants	15	414	86	94.2	-20.1	15.7
Animal and vegetable oils	-	34	222	-	30.7	-
Chemicals	17	162	936	57.0	28.5	39.6
Manufactured goods	1,803	5,861	29,474	26.6	25.9	26.2
Machinery	9	78	7,618	54.0	92.4	75.4
Miscellaneous manufac.	35	946	8,467	93.4	36.8	58.0
Other incl. reexports	944	2,331	6,568	19.8	15.9	17.5
Total	13,679	32,226	133,197	18.7	22.5	20.9

Growth Rates /a
(Constant 1975 prices)

	Percent per year 1968-73	1973-80	1968-80	Share (%) 1968	1973	1980
Food	4.2	11.0	8.1	51.3	42.4	44.5
Beverages and tobacco	-	10.6	6.1	1.5	1.0	1.0
Crude materials	7.8	1.2	3.9	26.6	26.1	14.3
Fuels and lubricants	71.1	29.0	2.4	0.1	1.3	0.1
Animal and vegetable oils	-	15.5	-	-	0.1	0.2
Chemicals	41.5	16.0	26.0	0.1	0.5	0.7
Manufactured goods	15.4	13.4	14.2	13.2	18.2	22.1
Machinery	31.9	74.3	55.2	0.1	0.2	5.7
Miscellaneous manufac.	75.9	23.2	42.9	0.3	2.9	6.4
Other incl. reexports	9.2	4.4	6.3	6.9	7.2	4.9
Total	8.2	10.2	9.4	100.0	100.0	100.0

Source: Bank of Thailand

Table 4.4.2-8 Structure of Imports
(Baht million)

	1968	1973	1980	Growth rates (current baht) 1968-73	1973-80	1968-80
Food	1,109	1,375	5,763	4.4	22.7	14.7
Beverage & tobacco	479	418	1,518	-2.7	20.2	10.1
Crude materials	632	3,518	10,755	41.0	17.3	26.6
Mineral fuels	1,995	4,661	38,733	18.5	43.6	32.6
Animal & vegetable oils	38	86	1,458	17.7	49.8	35.5
Chemicals	2,862	6,682	22,352	18.5	18.8	18.7
Manufactured goods	6,284	8,859	28,152	7.1	17.9	13.3
Machinery	8,821	13,891	43,102	9.5	17.5	14.1
Miscellaneous manufacturing	1,338	2,071	10,959	9.1	26.9	19.2
Miscellaneous (incl. gold)	590	622	5,894	1.1	20.6	21.1
Total	24,103	42,184	188,686	11.8	23.9	18.7

	Growth rates (constant 1975 prices) % p.a.			Share (current) %		
	68-73	73-80	68-80	1968	1973	1980
Food	-1.8	16.2	8.3	4.6	3.3	3.1
Beverage & tobacco	-8.4	13.8	4.0	2.0	1.0	1.0
Crude materials	32.6	11.1	19.6	2.6	8.3	5.7
Mineral fuels	11.4	18.9	16.5	8.3	11.0	31.1
Animal & vegetable oils	9.9	41.5	27.4	0.2	0.2	1.0
Chemicals	11.4	12.5	12.0	11.9	15.8	11.8
Manufactured goods	0.6	11.7	7.0	26.1	21.0	14.9
Machinery	2.9	11.3	7.8	36.6	32.9	22.8
Miscellaneous manufacturing	2.6	20.1	12.5	5.6	4.9	5.8
Miscellaneous (incl. gold)	-4.8	30.5	14.4	2.4	1.5	3.1
Total	5.1	17.3	12.1	100.0	100.0	100.0

Source: Bank of Thailand

On the other hand, as is shown in the Table 4.2.2-8 "Structure of Imports", the percentage of increase of import is, from 1968 to 1980, 14.1% of annual average, and occupies the 8th position next to the chemicals in the ten items, showing a lower increase percentage compared with the products of other industries. The weight of the percentage compared with the products of other industries. The weight of the percentage in the total import is 22.8%, Bt. 43,100 millions, which is 5.7 times the amount of export, but the weight is falling from the 36.6% of 1968.

2) The percentage of Export-import of Products related with Metal Metalworking Industry against their Production.

As is shown in the Table 4.2.2-9 "Share of Imports and Exports in Manufacturing Output", the percentage that the export-import of the products related with the metal fabrication industry occupies, in 1980, in the amount of the production is, 32.8% of the basic metal and metal products, 33.1% of machinery (including electrical machinery and others), 0.9% of transport equipment, and except the transport equipment, these percentages are higher than the percentage of 20.6% that the total export occupies in the amount of national production. The percentage of export of machinery occupies the 3rd position, next to the rubber and plastic industry and the food industry, but, as is above-mentioned, the amount of the export is only Bt. 7,620 millions which occupies only 5.7% of the total export. However, the percentage of the export of machinery has increased during five (5) years in 25.6%, meaning more than 5% of annual average, competing with the increase of percentage of export of the leather products industry. The percentage of export of basic metals and metal products is over 2% in annual average. And with all the manufacturing industry, the increase of percentage of export of annual average is about 1%.

On the other hand, the percentage that the export occupies in the amount of production is, in 1980, 144% of machinery, 43.6% of basic metal and metal products. 38% of transport equipment, and machinery occupies the first place, coming the chemicals and petroleum products occupying the second place with 56.5%, and basic metals and metal products occupies the third place, coming in the fourth place the transport equipment.

Table 4.2.2-9 Share of Imports and Exports in Manufacturing Output

Industry groups	Exports as % of domestic production			Imports as % of domestic production		
	1975	1978	1980	1975	1978	1980
Food processing	22.0	29.8	37.8	1.6	2.5	5.2
Beverages and tobacco	0	0	0.3	1.4	2.2	5.8
Textiles	10.0	17.6	13.6	12.7	10.2	5.0
Leather products	7.0	34.7	32.3	2.3	2.6	2.7
Wood products	13.8	12.3	10.5	1.4	6.5	5.5
Pulp, paper and paper products	1.5	1.5	15.3	24.8	26.5	15.7
Chemicals and petroleum	3.1	1.8	2.4	66.0	83.0	56.5
Rubber and plastic	79.2	60.7	85.1	13.2	6.9	7.8
Nonmetallic mineral products	10.5	3.7	3.6	9.5	10.7	15.4
Basic metals and metal products	21.9	30.2	32.8	59.9	54.5	43.6
Machinery	7.5	19.5	33.1	206.1	173.0	144.0
Transport equipment	0.2	0.4	0.9	49.4	35.2	38.0
Precision equipment and others	23.2	31.7	21.3	31.2	46.6	15.5
Total	15.0	19.7	20.6	23.4	25.6	25.2

Source: NESDB, Ministry of Commerce.
Classification based on 1975 Input-Output Table.

The share percentage of import of basic metals and metal products in the amount of production fell from 59.9% in 1975 to 43.6% in 1980, at an annual average rate of 3.3%, of machinery from 206.1% in 1975 to 144% in 1980, 62.1% falling, at an annual average rate of 12.4%, and of transportation equipment from 49.4% in 1975 to 38.0% in 1980, 11.4% down, at an annual average rate of 2.3%.

3) Demand and Supply and Export-Import of Products related with the Metalworking Industry

1 Amount of Production

The Table 4.2.2-10 "Supply and Demand Conditions in the Engineering Industries" shows the amount of value added, amount of production, amount of import, amount of export, domestic demand and percentage of nationalization of production of the basic metals as material of the metal fabrication industry (BTN 73 - BTN 76), products of basic metal (BTN 82 and BTN 83), boiler & machinery (BTN 84), electrical machinery (BTN 85), and transport equipments (BTN 86 - BTN 89). During the four year from 1975 to 1979, the total production increased from Bt. 23,500 millions to Bt. 62,200 million to 2.6 times with the percentage of increase of annual average of 27.5%. Of these, basic metal increased 2.7 times with the highest annual average growth percentage of 28.3%, metal products increased to 3.3 times with the annual average growth of 24.8%, machinery increased to 2.0 times with the annual average growth of 19.5%, transport equipments increased to 2.4 times with the annual average growth of 24.7%. Electrical machinery increased to 4.0 times with the annual average growth of 41.0%, next highest growth percentage to that of basic metals.

2 Amount of Import

Total amount of import increased 1.9 times, from Bt. 29,400 millions of 1975 to Bt. 55,300 millions of 1979, with the annual average of growth of 17.1%. What had the highest growth percentage of import was the basic metals that increased to 2.9 times with the annual average growth of 30.3%, coming next the electrical machinery that increased to 2.6 times with the annual average growth of 26.5%, metal products that increased to 2.2 times with the annual average growth of 21.7%, machinery that increased to 1.6 times with the annual average growth of 12.6%, transport

Table 4.2.2-10 Supply and Demand Conditions in the Engineering Industries 1975 - 1979
(All values in million Baht at current prices)

Year	National Income	GDP From Mfg	VALUE ADDED						OUTPUT					
			BM	MP	M	E	T	TOTAL	BM	MP	M	E	T	TOTAL
1975	246,464	53,910	967	842	785	676	3,698	6,968	3,397	2,382	2,336	2,043	13,343	23,501
1976	278,895	63,025	1,236	1,002	1,017	1,164	4,412	8,831	4,342	2,835	3,026	3,518	15,919	29,640
1977	318,690	74,676	1,580	1,299	1,099	1,516	5,776	11,270	5,551	3,675	3,270	4,582	20,840	37,918
1978	387,389	89,089	2,038	1,883	1,259	1,915	7,710	14,805	7,160	5,327	3,746	5,789	27,818	49,840
1979	443,659	109,740	2,672	2,778	1,599	2,671	8,951	18,671	9,212	7,859	4,758	8,074	32,296	62,199

Year	IMPORT					EXPORT					DEMAND (O + I - E)						Engineering Goods Price Ratio
	BM	MP	M	E	T	BM	MP	M	E	T	BM	MP	M	E	T	TOTAL	
1975	5,703	640	10,429	3,662	8,917	249	78	83	472	26	8,851	2,944	12,682	5,233	22,234	51,944	98
1976	7,157	726	8,415	4,229	8,672	369	93	203	965	71	11,130	3,468	11,238	6,782	24,520	57,138	100
1977	9,799	960	10,519	4,912	12,286	447	121	370	1,308	57	14,903	4,514	13,419	8,186	33,069	74,091	101
1978	11,798	1,181	13,737	7,382	11,659	643	144	304	2,298	101	18,315	6,364	17,179	10,873	39,376	92,107	102
1979	16,417	1,404	16,762	9,377	11,305	1,020	178	341	3,428	233	24,609	9,085	21,179	14,023	43,368	112,264	97

	SS Ratio (S / (O+I-E))					
	BM	MP	M	E	T	TOTAL
1975	.38	.81	.18	.39	.60	.45
1976	.39	.82	.27	.52	.65	.52
1977	.37	.81	.24	.56	.63	.51
1978	.39	.84	.22	.53	.71	.54
1979	.37	.87	.22	.58	.74	.55

RATES OF INCREASE P.A.	
National Income	15.83
GDP From Manufacturing	19.45
Demand for Engineering Goods	21.25
Eleasticity of Demand for Engineering Goods with Respect to:	
— National Income	1.34
— Total Manufacturing	1.09

Sources: UNDP/IBRD Technical Assistance Services, The Feasibility of A Project to Develop Engineering Industry in Thailand, originally from NESDB, Bank of Thailand, Custom Dept.

Notes : Output figures computed from value added figures in national accounts by using coefficients from the I/O table.
Price index shows ratio of average of machinery and transportation prices to general wholesale price index. BOI figures.
SS = Self-sufficiency ratio
BM = Base Metals, MP = Base Metal Products, M = Machinery, E = Electrical Machinery, T = Transportation Equipment

Table 4.2.2-11 Demand and Production, Export, Import

(Baht million)

	Demand (D = O + I - E)	Output & Self-sufficiency (O/D %)		Import & Import Ratio (I/D %)		Export Ratio (E/O %)	Export & Export Ratio (E/D %)	
1975 Total	51,944	23,501	45.2	29,351	56.5	3.9	908	1.7
BM	8,851	3,397	38.4	5,703	64.4	7.3	249	2.8
MP	2,944	2,382	80.9	640	21.7	3.3	78	2.6
M	12,682	2,336	18.4	10,429	82.2	3.6	83	0.7
E	5,233	2,043	39.0	3,662	70.0	23.1	472	9.0
T	22,234	13,343	60.0	8,917	40.1	0.2	26	0.1
1976 Total	57,138	29,640	51.9	29,199	51.1	5.7	1,701	3.0
BM	11,130	4,342	39.0	7,157	64.3	8.5	369	3.3
MP	3,468	2,835	81.7	726	20.9	3.3	93	2.6
M	11,238	3,026	26.9	8,415	74.9	6.7	203	1.8
E	6,782	3,518	51.9	4,229	62.4	27.4	965	14.3
T	24,520	15,919	64.9	8,672	35.4	0.4	71	0.3
1977 Total	74,091	37,918	51.2	38,476	51.9	6.1	2,303	3.1
BM	14,903	5,551	37.2	9,799	65.8	8.1	447	0.3
MP	4,514	3,675	81.4	960	21.3	3.3	121	2.7
M	13,419	3,270	24.4	10,519	78.4	11.3	370	2.8
E	8,186	4,582	56.0	4,912	60.0	28.5	1,308	16.0
T	33,069	20,840	63.0	12,286	37.2	0.3	57	0.2
1978 Total	92,107	49,840	54.1	45,793	49.7	7.0	3,490	3.8
BM	18,315	7,160	39.1	11,798	64.4	9.0	643	3.5
MP	6,364	5,327	83.7	1,181	18.6	2.7	144	2.3
M	17,179	3,746	21.8	13,737	80.0	8.1	304	1.8
E	10,873	5,789	53.2	7,382	67.9	39.7	2,298	21.1
T	39,376	27,818	70.6	11,659	29.6	0.4	101	0.2
1979 Total	112,264	62,199	55.4	55,265	49.2	8.4	5,200	4.6
BM	24,609	9,212	37.4	16,417	66.7	11.1	1,020	4.1
MP	9,085	7,859	86.5	1,404	15.5	2.3	178	2.0
M	21.179	4,758	22.5	16,762	79.1	7.2	341	1.6
E	14,023	8,074	57.6	9,377	66.9	42.5	3,428	24.4
T	43,368	32,296	74.5	11,305	26.1	0.7	233	0.6

Note : 1. D = Demand, O = Output, I = Import, E = Export

2. BM = Basic Metals, MP = Metal Products, M = Machinery, E = Electrical Machinery, T = Transportation Equipment

Source: Table 4.2.2-10 "Supply and Demand Conditions in the Engineering Industries 1975-9"

equipments that increased to 1.3 times with the annual average growth percentage of 6.1%.

3 Amount of Export

Total amount of export increased to 5.7 times, from Bt. 910 millions of 1975 to Bt. 5,200 millions of 1979, with the annual average growth of 54.7%. What increased most in the export was the transport equipments that increased to 9.0 times with the annual average growth of 73%, coming next the electrical machinery that increased to 7.3 times with the annual average growth of 64.2%, machinery that increased to 4.1 times with the annual average growth of 42.4%, basic metals that increased equally to 4.1 times with the annual average growth of 42.3%, the metal products that increased to 2.3 times with the annual average growth of 22.9%.

4 Domestic Demand

The total demand increased to 2.2 times, from Bt. 51, 900 millions of 1975 to Bt. 112,300 millions of 1979. What has increased most was the metal products that increased to 3.1 times with the annual average growth of 32.5%, coming next the basic metals that increased to 2.8 times with the annual average growth of 29.1%, electrical machinery that increased to 2.7 times with the annual average growth of 27.9%, transport equipment that increased to 2.0 tmes with the annual average growth of 18.2%, machinery that increased to 1.7 times with the annual average growth of 13.7%.

5 Rate of Self-sufficiency

As of 1979, the product that has the highest rate of self-sufficiency (rate of domestic demand to the production) is metal products with 87%, followed by transport equipment with 74%, electrical machinery with 58%, basic metals with 37%, and the lowest is machinery with 22%, and generally speaking, this indicates that the nationalization of production of the machinery is behind others.

6 Demand and Production, Export, Import

As is shown in the Table 4.2.2-11 "Demand and Production, Export, Import", the ratio of import to the total demand for the products of 5 industries has come decreased from the 57% of 1975 to the 49% of 1979, but as for the ratio of import against the ratio of self-sufficiency, it came for the first time below the ratio of self-sufficiency, though very slightly. On the other hand, the ratio of export increased from 1.7% of 1975 to 4.6%

of 1979, and, this is equivalent to 8.4% of the national production and is a small ratio of export yet, but the export has increased by annual average of over 1% since 1975.

Now we will see the condition of domestic demand, export and import per products of each industry (except the electrical machinery):

Basic Metal

This consists mainly of steel and aluminum. As is shown in the Table 4.2.2-12 "Balance between Supply and Demand of Iron and Steel", the steel has as of 1981, a demand of 1,800,000 t./year, at basis of crude steel, of which more than 80% depends on the import. As for the amount of production, the ratio of self-sufficiency fell one percent from 38.4% in 1975 to 37.4% in 1979, but the production both in amount and in quantity, has not increased. Though the ratio of import did not increase since 1975, the import amount increased to 2.9 times during the past 4 years, from Bt. 5,700 millions of 1975 to Bt. 16,400 millions of 1979, with annual average growth of 30.3%. The growth percentage of domestic demand is 29.1% of annual average and this is the second highest to the metal products, but the ratio of import is so high as 66.7% in 1979. This is due to that in spite of the low growth of production the demand is strong and this caused the increase of import. The export increased from Bt. 250 millions of 1975 to Bt. 1,020 millions of 1979 and the ratio of export is equivalent to 4.1% of the demand and 11.1% of the production, which means a large scale increase though the amount is not so high, and the government is controlling the export partially. The detail of the exported items is shown in the Table 4.2.2-14.

The steel products of Thailand are mainly wires, rods, shapes, cast iron by the electric furnace and mill, and the thick plates for the production of zinced iron sheet, tin plated sheets, steel pipe, light shape steel, etc. depend totally on the import. And as secondary product, mainly cast and forged iron, wires, rod, etc., are produced in the country. To protect the national steel industry with high cost at the moment, the government is imposing a high import duty. And also to assure the high quality of steel products, it is taking measures to designate them as the specified items of the industrial standard of Thailand (T I S).

Table 4.2.2-12 Balance between Supply and Demand of Iron and Steel

(Crude steel base : 1,000 ton)

Classification \ Year	1978	1979	1980	1981
Production	362	382	391	372
Import	1,573	1,738	1,743	1,480
Export	38	52	113	70
Demand	1,897	2,068	2,021	1,782

Note : Conversion rate is 1.3 for the import & the export, but 1.1 for the steel ingot.

Source: Japanese Chamber of Commerce, Bangkok, "Outline of the National Economy of Thailand 1982 - 1983" in Japanese

Metal Products

These includes the hand tools, agricultural tools, cutlery, spoon and fork made of basic metal and their parts, and other products of basic metal and their amount of production has increased to 3.3 times, from Bt. 2,380 millions of 1975 to Bt. 7,860 millions of 1979, with the annual average growth of 34.8%, and this is the second highest growth percentage next to the basic metals. The ratio of self-sufficiency to the demand is the highest of the products of five industries, which increased from 80.9% of 1975 to 86.5% of 1979. On the other hand, its growth percentage of import is lower than that of the demand and the production and is 21.7% of annual average while the percentage of import has fallen from 21.7% of 1975 to 15.5% of 1979, but the amount of import has increased from Bt. 640 million of 1975 to Bt. 1,400 millions of 1979 and its share in the total import is 0.9%. The export has increased to 2.3 times, from Bt. 78 millions of 1975 to Bt. 180 millions of 1979 with the annual average growth percentage of 22.9%, slightly higher than that of the import, but its share in the total import is only 0.16% in 1979. The ratio of export is at a stand still in 2-3% of the production. The demand increased to 3.1 times, from Bt. 2,940 millions to Bt. 9,090 millions with the annual average growth of 32.5%. The production that is overcoming the demand is covering the import demand and is increasing the export.

Machinery

The amount of production of machinery excepting electrical machinery increased to 2 times, from Bt. 2,340 millions of 1975 to Bt. 4,760 millions of 1979, with the annual average growth of 19.5%. The ratio of self-sufficiency has increased from 18.4% of 1975 to 22.5% of 1979, but among the five industries, this is the lowest ratio of self-sufficiency. As for the import, it has increased 1.6 times from Bt. 10,430 millions of 1975 to Bt. 16,760 millions of 1979, with the annual average growth of 12.6%. The ratio of import has fallen from 82.2% of 1975 to 79.1% of 1979, but among the five industries, this is the highest ratio of import and the share of import in the total import amount of 1975 is also the highest with 11.5%. The export increased to 4.1 times, from Bt. 83 millions of 1975 to Bt. 340 millions of 1979, with the annual average growth of 42.4%, but the share that occupies in the total export amount of 1979 is 0.3%.

The ratio of export is in 1975 0.7% of the demand, 3.6% of

production, in 1979 1.6% of the demand, 7.2% of production. The demand increased to 1.7 times, from Bt. 12,680 millions to Bt. 21,180 millions, with the annual average growth of 13.7%, so the production surpasses the growth of demand and the growth of import, and the annual average growth ratio of self-sufficiency is over 1%, very small, but it is increasing.

Transport Equipments

The transport equipments include automobile, aircraft, vessels, materials for railways. The amount of production increased to 2.4 times, from Bt. 13,340 millions of 1975 to Bt. 32,300 millions of 1979, with the annual average growth of 24.7%. The ratio of self-sufficiency has increased from 60% of 1975 to 74.5% of 1979, and this is the second highest to that of metals products. Measures for up-bringing of the national automobile industry were taken as to elevate the use of locally manufactured parts in 1978 for passenger cars and in 1979 for commercial cars. The import increased to 1.3 times, from Bt. 8,920 millions of 1975 to Bt. 11,310 million of 1979, with the annual average growth of 6.1%, and this is the lowest growth percentage of the five industries. The ratio of import has fallen from 40.1% of 1975 to 26.1% of 1979, and this indicates that the nationalization of production of the parts of automobile is progressing gradually, and this is the second lowest of the five industries. The export increased to 9 times, from Bt. 26 millions of 1975 to Bt. 233 millions of 1979, with the annual average growth of 73%, but the ratio of export is low, with 0.6% of demand and 0.7% of production in 1979. Demand increased to 2 times, from Bt. 22,230 millions of 1975 to Bt. 43,370 millions of 1979, with the annual average growth of 18.2%, but this is inferior to the annual average growth percentage of production, and the ratio of self-sufficiency increased at the annual average of 3.6%

4) Export-Import Conditions per Items of the Metal Fabrication Industry

1 The Table 4.2.2-13 is of "Imports of the Goods related with the Metalworking Industry"

2 The Table 4.2.2-14 is of "Exports of the Goods related with the Metalworking Industry"

Table4.2.2-13 Imports of the goods related with the Metalworking Industry

(Baht million)

BTN Chapter	Imports of Goods 1974 - 9	1974	% of Total imports	1975	% of Total imports	1976	% of Total imports	1977	% of Total imports	1978	% of Total imports	1979	% of Total imports	Annual Ratio of Increase 75 - 9 %
73	Iron & Steel	6,228.82	9.7	5,092.96	7.6	6,438.05	8.8	8,790.44	9.3	10,682.13	9.88	14,745.36	10.1	30.4
76	Aluminium	702.86	1.1	611.76	0.9	718.91	1.0	1,009.02	1.1	1,116.32	1.0	1,674.40	1.1	28.6
82	Hand Tools & Cuttery	409.03	0.6	406.41	0.6	480.30	0.7	642.30	0.7	795.12	0.7	912.39	0.6	22.4
83	Base Metal Products	221.36	0.3	234.74	0.4	246.01	0.3	317.69	0.3	386.31	0.4	491.85	0.3	20.3
84	Machinery	10,266.56	16.0	10,429.58	15.6	8,415.82	11.5	10,519.07	11.2	13,737.31	12.6	16,761.63	11.3	12.6
85	Electrical Mach.	3,342.60	5.2	3,661.97	5.5	4,229.39	5.8	4,911.64	5.2	7,381.81	6.8	9,376.68	6.4	26.5
86	Railway Goods	321.40	0.5	479.37	0.7	136.05	0.2	25.02	-	28.07	-	13.88	-	41.3
87	Vehicles	5,430.64	8.5	6,789.36	10.2	9,464.05	13.0	11,201.99	11.9	10,707.75	9.8	9,862.23	6.7	12.7
88	Aircraft	1,002.36	1.6	1,588.18	2.4	782.34	1.1	205.11	0.2	366.93	0.3	957.10	0.7	9.8
89	Ships	45.53	0.1	59.98	0.1	290.15	0.4	853.97	0.9	557.19	0.5	472.44	0.3	67.5
	Total of Above 73 - 89	27,971.16		29,354.31		31,201.07		39,118.55		45,758.93		55,267.96		17.1
	Total of 82 - 84 & 87	16,327.59		17,860.09		18,606.18		22,681.05		25,626.48		28,028.1		11.9
	Total imports	64,043.50		66,835.21		72,876.03		94,176.97		108,898.83		146,161.28	21.6	
	Total of Above as % of Total Import	43.7		43.9		42.8		41.5		42.0		37.8		
	82 - 84 & 87 as % of Total Import	25.5		26.7		25.5		24.1		23.5		19.2		
	Total Non Oil Imp.	51,472.5		52,893.2		56,181.1		73,291.4		87,118.8		113,303.7		
	All Above as % of Non-oil Imports	54.3		56.4		55.1		53.4		52.5		48.8		
	Price Index*	100		106.4		112.7		121.7		129.3		133.4		

Source : Same as the table 4.2.2-10

Table 4.2.2-14 Exports of the goods related with the Metalworking Industry

(Baht million)

BTN Chapter	Exports of Engineering Goods	1974	1975	1976	1977	1978	1979
73	Iron & Steel	337.82	116.86	234.53	236.85	433.48	694.11
74	Copper	30.90	13.97	11.31	22.02	33.54	68.04
76	Aluminium	90.27	68.21	122.74	187.90	176.58	257.87
82	Tools & Cuttery	50.07	69.54	74.75	90.32	91.83	129.48
83	Base Metal Product	15.39	8.06	18.51	30.63	52.57	48.13
84	Machinery	42.07	83.64	203.04	370.43	304.19	340.68
85	Electrical Machinery	247.87	471.72	964.91	1,307.61	2,298.32	3,427.61
86	Railway Goods	0.89	0.01	-	-	0.02	0.47
87	Vehicles	34.24	23.79	67.84	56.20	96.01	205.35
88	Aircraft	0.09	0.93	2.28	0.31	4.24	25.34
89	Ships	1.66	1.11	1.01	0.42	0.65	2.17
	Total of Above	851.27	857.84	1,700.92	2,302.69	3,491.43	5,199.25
	Total of 82 - 84 & 87	141.77	185.03	364.14	491.38	448.59	518.29
	Total Exports	50,245.66	48,437.60	60,716.56	71,198.09	83,065.03	108,178.98
	Total of Above as % of Total Export	1.7	1.8	2.8	3.2	4.2	4.8
	82 - 84 & 87 as % of Total Export	0.3	0.4	0.6	0.7	0.5	0.5

Source: UNDP/IBRD Technical Assitance Services, The Feasibility of A project to Develop Engineering Industry in Thailand originally from Customs Dept.

(Million Baht)

BTN Chapter	Exports: Individual Items	1974	1975	1976	1977	1978	1979
73	Compressed Gas Cylinder	6.91	11.04	22.12	42.00	61.51	66.89
73	Chain	7.22	9.33	24.10	37.78	41.44	56.86
73	Other tubes & pipe of iron & steel	59.45	34.81	69.28	68.02	211.82	373.46
74	Other domestic article of copper	15.59	11.88	10.28	17.57	29.23	54.34
76	Structures, plates, rods, angles, shapes, etc. of aluminium	44.74	30.82	75.56	100.84	83.81	121.01
82	Bronze tableware	37.10	42.51	49.45	59.15	77.87	92.95
84	Calculators	-	6.78	67.72	120.75	110.80	47.82
85	Electric accumulator	0.55	1.07	5.05	9.90	25.04	47.95
85	Integrated circuits	-	39.00	-	1,144.93	2,157.88	2,903.03
85	Radio & TV	35.31	5.43	17.38	3.87	8.57	58.72
85	Electric capacitors	1.76	0.96	13.28	13.76	16.95	25.09
87	Other parts & accessories of motor vehicles	0.85	4.12	1.69	40.87	78.39	148.84
87	Parts & accessory of motorcycles	8.72	27.13	2.78	7.23	10.85	10.72
	Total	243.03	250.31	468.12	1,777.53	3,041.10	4,157.46

Source: Customs Department

5) Import-Export of Target Products for the Promotion of the Metalworking Industry of Thailand

The Table 4.2.2-15 is "Import-Export of Targets Products" elaborated according to the analysis effectuated by now.

Table 4.2.2-15 Imports-Exports of Target Products

(Baht thousand)

Commodity Code	Description	Im./Ex.	1979		1980		1981	
			Value	Share (%)	Value	Share (%)	Value	Share (%)
82.	Tools, Implements, Cuttery, Spoons and Forks, of Base metal; Parts thereof	Im.	912,389	(0.62)	891,774	(0.46)	1,114,035	(0.51)
		Ex.	129,479	(0.12)	250,307	(0.19)	200,644	(0.13)
		Re-Ex.	6,003	(0.00)	22,630	(0.01)	4,644	(0.00)
84.	Boilers, Machinery and Mechanical Appliances; Parts thereof	Im.	16,761,634	(11.47)	18,089,200	(9.34)	22,672,630	(10.35)
		Ex.	340,676	(0.32)	554,146	(0.42)	582,044	(0.39)
		Re-Ex.	79,274	(0.05)	28,760	(0.01)	74,134	(0.03)
87.	Vehicles, Other than Railway or Tramway Rolling-Stock, and Parts thereof	Im.	9,862,227	(6.75)	10,034,061	(5.18)	13,779,186	(6.29)
		Ex.	205,351	(0.19)	272,011	(0.20)	224,495	(0.15)
		Re-Ex.	-	-	69,455	(0.05)	66,948	(0.04)
	Chapter 82, 84 and 87 in Total	Im.	27,536,250	(18.84)	29,015,035	(14.98)	37,565,851	(17.15)
		Ex.	675,506	(0.63)	1,076,464	(0.81)	1,007,183	(0.67)
		Re-Ex.	-	-	120,845	(0.04)	145,726	(0.07)
	Total Import		146,161,283	(100)	193,618,283	(100)	219,025,765	(100)
	Total Export		108,178,975	(100)	133,197,170	(100)	148,962,213	(100)

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979		1980		1981		Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
				Q'ty	Value	Q'ty	Value	Q'ty	Value		
8201	Hand Tools-(A) *1		Im.						10,586	100.00	
			Ex.						43,987	100.00	
			Re-Ex.						17	100.00	
820111	Spades Shovels	(Kg)	Im.	121,480	2,418	171,506	5,104	143,443	5,022	47.44	JPN(68.7) KOR.S(24.1) CHN(3.1)
			Ex.	196,385	3,845	399,806	8,251	444,786	9,074	20.63	UAE(36.0) SNG(19.3) INDNE(16.2)
			Re-Ex.	20,240	651	-	-	-	-	-	AUSTRAL(9.5)-1979
820112	Changols & Hoes	"	Im.	396,386	8,660	273,719	10,234	984,000	2,204	20.82	CHN(65.5) WG(34.5)
			Ex.	659,788	21,390	1,167,474	40,873	754,947	33,311	75.73	INDNE(66.6) MALAY(18.2) LAOS(8.4)
			Re-Ex.	-	-	-	-	-	-	-	-
820113	Picks Forks & Rakes	"	Im.	220,919	3,863	31,795	578	900	153	1.45	HUNGA(56.0) CHN(27.2) DMK(9.6)
			Ex.	150	4	33,137	264	9,921	333	0.76	SNG(99.1) IRAQ(0.9) LAOS(0.0)
			Re-Ex.	2,600	57	-	-	-	-	-	AUSTRAL(100)-1979
820114	Bill Hooks Hewing Tools	"	Im.	1,680	123	4,397	382	400	50	0.47	WG(58.4) CHN(23.4) JPN(18.2)
			Ex.	-	-	-	-	-	-	-	-
			Re-Ex.	-	-	-	-	-	-	-	-
820115	Scythes Sickles Hay Knives	"	Im.	3,200	101	7,200	229	1,045	102	0.96	JPN(74.5) WG(25.5)
			Ex.	-	-	-	-	21,015	782	1.78	SNG(100)
			Re-Ex.	-	-	-	-	-	-	-	-
820120	Axes of Any Kinds	"	Im.	27,364	868	70,828	2,485	68,801	2,731	25.80	CHN(57.2) SWD(36.6) WG(6.2)
			Ex.	1,913	32	24,652	808	14,744	447	1.01	SNG(96.4) LAOS(3.6)
			Re-Ex.	-	-	2,812	132	-	-	-	LAOS(100)-1980
820130	Other Hand Tools Nes Used in Agri-horticle or Horestry	"	Im.	83,844	4,313	104,545	4,816	5,383	324	3.06	JPN(70.5) TWN(12.1) WG(6.0)
			Ex.	380	13	35,878	2,168	512	40	0.09	KAMPUCHEA(90) SNG(10)
			Re-Ex.	-	-	-	-	1	17	100.00	AUSTRAL(100)

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979 Q'ty	1979 Value	1980 Q'ty	1980 Value	1981 Q'ty	1981 Value	Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
8202	Saws and Blades *2		Im.						103,868	100.00	
			Ex.						8,524	100.00	
			Re-Ex.						148	100.00	
820211	Hack Saws	(Unit)	Im.	548,437	2,280	8,502	540	24,781	1,211	1.17	CHN(33.2/13,701) ITLY(20.0/1,961) WG(17.8/1,752)
			Ex.	492	17	-	-	9,000	180	2.11	SNG(100/9,000)
			Re-Ex.	-	-	-	-	100	138	93.24	
820215	Other Hand Saws	"	Im.	338,521	6,418	157,450	8,376	509,800	9,697	9.34	WG(42.0/420,247) JPN(16.6/33,338) SWD(16.5/15,268)
			Ex.	5,200	639	7,960	1,114	24,274	1,244	14.59	AUSTRAL(67.0/12,888) SNG(30.5/11,000) LAOS(2.6/386)
			Re-Ex.	-	-	2	5	-	-	-	LAOS(100/100)-1980
820216	Hack Saw Blades	"	Im.	1,533,834	10,592	1,711,863	11,600	1,361,250	8,957	8.62	UK(47.2/8,277) CHN(19.7/16,842) JPN(11.1/33,338)
			Ex.	1,628,182	1,702	3,036,472	7,734	1,888,962	4,938	57.93	SNG(27.5/241,600) AUSTRAL(27.3/274,800) IRAN(16.6/720,000)
			Re-Ex.	750	6	-	-	120	3	2.03	LAOS(100/120)
820217	Toothless Handsaw Blades	"	Im.	39,820	1,619	51,900	2,340	70,292	3,772	3.63	WG(95.5/66,692) ITLY(0.5/3,600)
			Ex.	-	-	-	-	-	-	-	-
			Re-Ex.	-	-	-	-	-	-	-	-
820219	Other Handsaw Blades	"	Im.	13,869,198	25,660	17,771,968	23,082	16,634,702	27,114	26.10	JPN(27.1/608,933) WG(23.1/14,958,294) SWD(17.9/186,131)
			Ex.	140,649	398	496,989	1,152	175,159	851	9.98	AUSTRAL(43.2/6,144) USA(40.0/25,000) JPN(16.7/144,000)
			Re-Ex.	97	35	-	-	-	-	-	UK(100/97)

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979 Q'ty	1979 Value	1980 Q'ty	1980 Value	1981 Q'ty	1981 Value	Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
820230	Parts of Hand Saws	(Kg)	Im.	149,217	12,300	38,170	2,310	80,626	4,235	4.08	WG(39.3) CHN(32.0) CND(14.2)
			Ex.	2,543	446	4,176	574	200	21	0.25	SNG(100)
			Re-Ex.	-	-	-	-	-	-	-	-
8203	Hand Tools-(B)*3		Im.						241,428	100.00	
			Ex.						3,910	100.00	
			Re-Ex.						156	100.00	
820301	Pliers, Pincers	(Kg)	Im.	307,787	30,350	272,755	29,560	415,577	48,218	19.97	USA(35.9) CHN(17.6) WG(16.2)
			Ex.	170	12	326	57	18,577	581	14.86	SNG(99.3) SRI LANKA(0.4) LAOS(0.3)
			Re-Ex.	-	-	15	4	-	-	-	LAOS(100)-1980
820303	Spanners & Wrenches	"	Im.	872,857	67,958	889,023	66,005	1,102,077	89,823	37.20	JPN(26.7) CHN(23.8) IND(18.3)
			Ex.	232	46	556	28	6	2	0.05	USA(100)
			Re-Ex.	25	5	9	1	-	-	-	LAOS(100)-1980
820304	Files & Rasps	"	Im.	375,411	72,181	254,629	63,973	287,927	74,967	31.05	CND(64.9) PHLP(7.5) CHN(6.7)
			Ex.	45	8	252	55	4,000	817	20.90	SNG(100)
			Re-Ex.	-	-	1,143	114	468	156	100.00	CND(100)
8204	Hand Tools-(C) *4		Im.						155,827	100.00	
			Ex.						5,767	100.00	
			Re-Ex.						978	100.00	
820411	Hammers	(Kg)	Im.	825,383	27,359	589,672	22,919	675,228	27,696	17.77	CHN(54.5) WG(14.0) MXC(9.2)
			Ex.	2,669	59	7,940	391	16,900	825	14.31	SNG(84.4) AUSTRAL(15.5) LAOS(0.1)
			Re-Ex.	1,233	27	-	-	-	-	-	AUSTRAL(100)-1979

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979		1980		1981		Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
				Q'ty	Value	Q'ty	Value	Q'ty	Value		
820416	Drilling, Threading & Tapping Tools	(Kg)	Im.	40,548	3,024	78,768	4,065	118,430	6,430	4.13	CHN(42.2) PLD(19.9) TWN(15.2)
			Ex.	42	37	31	11	-	-	-	IRAQ(51.8) SAUDI(40.4) LAOS(8.2)-1980
			Re-Ex.	2,512	164	252	121	-	-	-	SNG(100)-1980
820421	Vices & Clamps	"	Im.	454,266	11,534	263,984	7,671	528,175	12,521	8.04	CHN(48.7) JPN(17.3) IND(15.9)
			Ex.	220	7	1,580	134	-	-	-	MALAY(54.5) SNG(43.3) LAOS(2.2)-1980
			Re-Ex.	-	-	287	9	-	-	-	BAHRAIN(100)-1980
820430	Parts of Hand Tools	"	Im.	83,418	3,241	58,676	3,766	66,695	4,889	3.14	CHN(35.6) JPN(18.8) WG(15.8)
			Ex.	161	55	6,790	109	5,000	236	4.09	SNG(100)
			Re-Ex.	47	32	-	-	-	-	-	HKG(100)-1979
8205	Interchangeable Tools *5		Im.						343,232	100.00	
			Ex.						2,619	100.00	
			Re-Ex.						3,330	100.00	
820510	Interchangeable Tools for Hand Tools	(Kg)	Im.	79,103	27,728	74,987	20,767	90,934	38,929	11.34	JPN(61.2) UK(13.8) USA(10.0)
			Ex.	4	35	574	23	-	-	-	HKG(100)-1980
			Re-Ex.	-	-	-	-	-	-	-	-
820521	Punches & Dies for Pressing, Stamping Sheet Metal, Perforating & Cutting Dies and Punches for Machine Tools	"	Im.	17,418	8,159	10,392	7,214	45,665	24,321	7.09	JPN(87.0) USA(2.4) TWN(2.0)
			Ex.	100	2	3,235	141	-	-	-	INDNE(47.5) HKG(22.7) SNG(17.7)-1980
			Re-Ex.	-	-	-	-	-	-	-	-

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979		1980		1981		Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
				Q'ty	Value	Q'ty	Value	Q'ty	Value		
820528	Dies for Wire Drawing and Extrusion Dies for Metal	(Kg)	Im.	9,709	4,531	9,739	3,714	4,134	3,257	0.95	JPN(64.0) US(21.2) TWN(12.4)
			Ex.	-	-	-	-	-	-	-	-
			Re-Ex.	-	-	-	-	-	-	-	-
8410	Pumps for Liquids *6		Im.						856,605	100.00	
			Ex.						22,172	100.00	
			Re-Ex.						4,067	100.00	
841021	Reciprocating Pumps	(Unit)	Im.	105,878	232,952	138,132	250,419	121,137	208,239	24.31	JPN(63.5/88,860) USA(10.9/3,825) ITLY(9.5/17,073)
			Ex.	3,257	1,518	1,621	704	564	149	0.67	MALAY(93.3/553) AUSTRAL(4.0/10) SNG(2.0/1)
			Re-Ex.	7	4	-	-	-	-	-	MALAY(69.2/4) SNG(30.8/3)-1979
841022	Centrifugal Pumps	"	Im.	25,815	69,382	20,226	40,269	692	4,818	0.56	JPN(49.7/26,326) USA(12.6/771) ITLY(11.4/5,194)
			Ex.	454	584	628	717	77	1,777	8.01	JPN(88.6/27) SNG(3.9/25) BURMA(3.9/3)
			Re-Ex.	6	247	1	19	-	-	-	LAOS(100/1)-1980
841025	Rotary Pumps	"	Im.	1,025	1,696	782	1,569	277	3,541	0.41	NETH(79.2/12) WG(10.5/4,416) USA(8.9/15,615)
			Ex.	3,275	1,124	8,767	3,274	6,036	1,063	4.79	SAUDI(63.8/3,850) SNG(21.4/1,480) UAE(8.9/540)
			Re-Ex.	-	-	-	-	-	-	-	-
841029	Other Pumps for Liquids & Liquid Elevators of Bucket Chain, Etc.	"	Im.	145,392	208,876	132,703	195,716	215,539	302,684	35.34	JPN(40.7/151,997) WG(11.7/4,416) ITLY(7.3/15,286)
			Ex.	13,362	5,432	21,856	15,375	17,672	13,061	58.91	JPN(41.4/117) SNG(28.1/1,593) INDNE(18.9/6,009)
			Re-Ex.	7	322	16	141	33	3,776	92.84	LAOS(92.7/15) SNG(5.5/8) HKG(1.6/7)

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979 Q'ty	1979 Value	1980 Q'ty	1980 Value	1981 Q'ty	1981 Value	Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
841030	Parts of Pumps for Liquid & Liquid Elevators	(Kg)	Im.	331,945	149,134	322,931	146,848	465,808	190,808	22.27	JPN(46.5) USA(16.4) UK(10.8)
			Ex.	14,847	851	117,005	3,740	136,978	4,770	21.15	KUWAIT(47.6) AUSTRAL(19.5) IRAQ(13.2)
			Re-Ex.	547	38	157	402	33,699	282	6.93	KUWAIT(78.4) SWD(13.1) USA(7.4)
8425	Harvesting and Threshing Machinery *7		Im.						53,561	100.00	
			Ex.						3,737	100.00	
			Re-Ex.						7	100.00	
842521	Harvesting Machines	(Unit)	Im.	13	401	18	4,177	356	12,547	23.43	JPN(63.0/39) CHN(14.6/297) TWN(12.7/11)
			Ex.	-	-	-	-	2	125	3.34	SNG(87.2/1) BURMA(13.6/1)
			Re-Ex.	-	-	-	-	-	-	-	-
842522	Threshing Machines	"	Im.	2	14	2	54	401	3,127	5.84	CHN(98.8/400) NETH(1.2/1)
			Ex.	-	-	4	58	-	-	-	INDNE(93.0/3) MALAY(7.0/1)-1980
			Re-Ex.	-	-	-	-	-	-	-	-
842523	Combined Harvester Threshers	"	Im.	3	132	19	646	112	4,545	8.49	WG(81.2/4) CHN(16.3/100) JPN(2.5/8)
			Ex.	-	-	-	-	-	-	-	-
			Re-Ex.	-	-	-	-	-	-	-	-
842524	Winnowing and Similar Cleaning Machines	"	Im.	10	1,896	4	662	8	110	0.21	USA(90.9/7) DMK(9.1/1)
			Ex.	-	-	-	-	-	-	-	-
			Re-Ex.	-	-	-	-	-	-	-	-

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979 Q'ty	1979 Value	1980 Q'ty	1980 Value	1981 Q'ty	1981 Value	Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
842529	Straw Fooder Presses and Winnow & Other Cleaning Machines for Seed, Grain, Etc. and Grading Machine	(Unit)	Im.	89	17,087	153	5,471	3,515	18,411	34.37	JPN(36.2/134) AUSTRAL(10.8/131) HKG(8.1/1,000)
			Ex.	11	8,384	3	34	1,906	3,586	95.96	INDNE(100/1,906)
			Re-Ex.	-	-	-	-	-	-	-	-
842530	Parts & Accessories for the Above	(Kg)	Im.	9,965	424	13,374	993	24,442	993	1.85	JPN(67.3) CHN(14.8) DMK(10.8)
			Ex.	2,423	271	786	142	-	-	-	AUSTRAL(94.4) INDNE(4.9) MALAYA(1.4)-1980
			Re-Ex.	-	-	-	-	-	-	-	-
8445	Machine Tools *8		Im.						790,143	100.00	
			Ex.						7,509	100.00	
			Re-Ex.						130	100.00	
844501	Leathes of All Kinds for Metal Working	(Unit)	Im.	3,888	214,029	1,379	97,295	1,473	133,607	16.91	TWN(45.7/813) JPN(29.0/179) UK(4.3/50)
			Ex.	-	-	5	85	-	-	-	MALAYA(77.6/4) ITLY(22.2/1)-1980
			Re-Ex.	3	770	-	-	1	118	90.77	MALAYA(100/1)
844502	Planing, Saping & Sloting Machines for Metal Working	"	Im.	1,854	67,114	1,934	39,832	1,488	98,866	12.51	JPN(64.0/271) TWN(13.8/1,016) WG(3.1/24)
			Ex.	3	444	6	135	-	-	-	MALAY(100/6)-1980
			Re-Ex.	51	137	1	7	-	-	-	PHLP(100/1)-1980
844503	Drilling & Boring Machines for Metal Working	"	Im.	5,363	43,134	6,470	41,083	8,417	36,320	4.60	TWN(61.1/6,143) JPN(20.2/238) ITLY(4.0/4)
			Ex.	1	3	5	15	7	133	1.77	MALAYA(100/7)
			Re-Ex.	4	118	-	-	-	-	-	SNG(100/4)-1979

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979		1980		1981		Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
				Q'ty	Value	Q'ty	Value	Q'ty	Value		
844504	Milling Machines for Working Metal	(Unit)	Im.	493	45,159	379	60,606	570	45,121	5.71	TWN(24.0/423) WG(17.4/12) JPN(17.2/35)
			Ex.	-	-	1	3	-	-	-	MALAY(100/1)-1980
			Re-Ex.	-	-	-	-	-	-	-	-
844505	Sawing & Cutting Machines for Metal Working	"	Im.	2,670	28,564	3,614	45,858	4,620	62,231	7.88	JPN(51.2/1,526) BELG(16.0/7) WG(12.8/2,372)
			Ex.	6	52	1,876	2,843	4,439	5,466	72.79	SAUDI(75.9/4,401) MALAY(17.1/35) SRI RANKA(6.2/1)
			Re-Ex.	1	5	-	-	-	-	-	LAOS(100/1)-1979
844506	Grinding Machine for Metal Working	"	Im.	9,364	44,946	7,438	36,616	6,256	27,166	3.44	JPN(36.7/627) TWN(24.8/5,391) SPN(7.5/9)
			Ex.	4,901	1,634	3	57	-	-	-	AUSTRAL(66.7/2) SNG(33.3/1)-1980
			Re-Ex.	-	-	-	-	-	-	-	-
844507	Riveting Machines for Metal Working	"	Im.	24	493	17	585	61	3,779	0.48	JPN(62.8/43) TWN(17.0/14) USA(7.0/1)
			Ex.	-	-	-	-	1	1,010	13.45	BAHRAIN(100/1)
			Re-Ex.	-	-	-	-	-	-	-	-
844508	Wire Drawing Machines	"	Im.	21	13,554	42	23,984	25	22,156	2.80	IND(47.1/4) JPN(31.9/10) TWN(14.6/9)
			Ex.	-	-	-	-	-	-	-	-
			Re-Ex.	-	-	-	-	-	-	-	-
844509	Other Machine Tools for Working Metal or Metal Carbides	"	Im.	11,279	376,332	15,374	308,488	8,110	360,897	45.67	JPN(44.4/2,091) TWN(33.9/1,829) WG(8.7/1,169)
			Ex.	1	2	18	3,590	23	900	11.99	MALAY(75.4/18) SRI RANKA (19.9/1) SNG(2.1/1)
			Re-Ex.	1	362	-	-	2	12	9.23	AUSTRIA(75/1) UK(25/1)

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979		1980		1981		Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
				Q'ty	Value	Q'ty	Value	Q'ty	Value		
8460	Molding Boxes for Metal Foundry, including all moulds *9		Im.						178,641	100.00	
			Ex.						12,635	100.00	
			Re-Ex.						893	100.00	
846003	Moulding for Non-Metal	(Kg)	Im.	905,203	122,935	1,439,245	173,151	911,628	157,308	88.06	JPN(35.9) TWN(20.8) USA(8.6) MAL(7.5)
			Ex.	132,470	8,262	83,446	6,771	169,640	11,884	94.06	SNG(51.9) MALAY(20.0) TWN(15.2)
			Re-Ex.	3,779	125	12,216	679	2,683	94	10.53	USA(66.2)
8461	Taps, Cocks, Valves and Appliances *10		Im.						570,625	100.00	
									22,599	100.00	
									741	100.00	
846101	Pressure Reduction Valves for Gas Cylinders	(Kg)	Im.	84,073	10,588	80,025	16,307	107,979	16,226	2.84	JPN(29.6) TWN(21.4) UK(17.9)
			Ex.	126	23	80	19	5,660	1,093	4.84	UK(100)
			Re-Ex.	60	4	-	-	-	-	-	INDNE(100)-1979
846102	Thermostatically Controlled Valves	"	Im.	6,143	1,281	1,947	749	7,512	2,518	0.44	JPN(52.7) USA(33.0) IND(7.5)
			Ex.	-	-	-	-	-	-	-	-
			Re-Ex.	-	-	-	-	-	-	-	-
846103	Fluid-Flow Control Valves	"	Im.	33,442	3,890	23,390	3,477	40,718	6,927	1.21	JPN(55.2) USA(15.7) TWN(8.2)
			Ex.	537,142	11,447	724,919	21,109	332,352	10,573	46.79	PHLP(38.3) MALAY(24.5) VENEZ(20.2)
			Re-Ex.	-	-	3,419	152	-	-	-	SNG(92.1) HKG(7.9)-1980
846105	Other Valves	"	Im.	2,498,962	359,144	2,649,992	379,045	2,687,635	483,609	84.75	JPN(46.2) USA(19.9) WG(6.9)
			Ex.	462,225	10,134	447,130	11,456	252,671	10,104	44.71	HKG(39.5) SNG(28.4) INDNE(16.7)
			Re-Ex.	1,683	164	173	66	2,969	741	100.00	SNG(66.0) JPN(13.0) BANGLA(12.4)

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979 Q'ty	1979 Value	1980 Q'ty	1980 Value	1981 Q'ty	1981 Value	Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
840106	Taps & Cocks	(Kg)	Im.	292,120	31,417	286,754	40,738	268,493	51,064	8.95	ITLY(20.2) USA(18.4) JPN(15.6)
			Ex.	121	15	63	3	754	28	0.12	LAOS(85.7) MALAY(14.3) VIETNAM(3.2)
			Re-Ex.	-	-	-	-	-	-	-	-
846109	Taps, Cocks, Valves, Etc. for Pipes, Boiler Shells, Tank Vats & The Like	"	Im.	20,592	3,332	16,576	3,225	18,734	5,311	0.93	JPN(40.2) USA(37.8) WG(9.1)
			Ex.	48	1	2,400	111	-	-	-	SNG(100)-1980
			Re-Ex.	-	-	-	-	-	-	-	-
846110	Parts of Taps, Cock, Valves, Etc.	"	Im.	10,076	2,794	9,038	2,984	16,057	4,970	0.87	WG(34.3) USA(22.4) JPN(13.5)
			Ex.	2,413	66	1,399	62	31,640	801	3.54	SNG(96.6) TWN(1.9) USA(1.4)
			Re-Ex.	-	-	151	8	-	-	-	MALAY(100)-1980
8463	Tasnsmission Shaft, Cranks, Gears and Gearing, etc. *11		Im.						707,959	100.00	
			Ex.						2,363	100.00	
			Re-Ex.						145	100.00	
846304	Gears & Gearing	(Unit)	Im.	857,268	145,449	1,280,572	165,847	1,094,134	221,063	31.23	JPN(55.1) USA(13.5) WG(7.3)
			Ex.	330	11	7,817	63	1,854	252	10.66	JPN(49.2) PHLP(40.9) SNG(6.3)
			Re-Ex.	18	5	222	20	189	14	9.66	WG(78.6) BURMA(21.4)
8701	Tractors *12	"	Im.						26,845,312	100.00	
			Ex.						3,028	100.00	
			Re-Ex.						28,336	100.00	

(to be continued)

Table 4.2.2-15 (Cont.)

Commodity Code	Description	Unit	Im./Ex.	1979		1980		1981		Share (%)	Countries of Origin and Destination, and Share of The Total Amount in 1981 (%/Unit)
				Q'ty	Value	Q'ty	Value	Q'ty	Value		
870122	Farm Tractors	(Unit)	Im.	3,348	261,407	3,892	369,833	15,840	755,442	2.81	UK(40.7/1,736) JPN(31.4/6,905) CHN(1.9/6,414)
			Ex.	60	1,509	884	7,933	18	2,767	91.38	LAOS(98.8/15) CHN(0.9/2) MALAYA(0.3/1)
			Re-Ex.	16	2,086	26	7,641	20	11,153	39.36	MALAYA(36.2/6) LIBIYA(31.2/1) LAOS(16.7/4)

Source: Foreign Trade Statistics of Thailand, Dept. of Customs

Note: 1. Abbreviation: AUSTRAL=Australia, BELG=Belgium, CHN=China, CND=Canada, DMK=Denmark, HKG=Hong Kong, IND=India, INDNE=Indonesia, ITLY=Italy, JPN=Japan, KOR.S=South Korea, MALAY=Malaysia, MXC=Mexico, NETH=Netherland, PHLP=Philippines, SAUDI=Saudi Arabia, SNG=Singapore, SPN=Spain, SWD=Sweden, TWN=Taiwan, UAE=United Arab Emirates, UK=United Kingdom, WG=West Germany

2. Explanatory notes of the Customs Co-operation Council Nomenclature:
(1) Hand tools, the following: Spades, shovels, picks, hoes, forks and rakes; axes, bill hooks and similar hewing tools, scythes, sickles, hay knives, grass shears, timber wedges and other tools of a kind used in agriculture, horticulture or forestry
(2) Saws (non-mechanical) and blades for hand or machine saws (including toothless saw blades)
(3) Hand tools, the following: Pliers (including cutting pliers), pincers, tweezers, timen's snips, bolt croppers and the like; perforating punches; pipe cutters; spanners and wrenches (but not including tap wrenches); files and rasps
(4) Hand tools, including glaziers, diamonds, not falling within any other heading of Chapter 82. of the Customs Co-operation Council Nomenclature; blow lamps, anvils; vices and clamps, other than accessories for and parts of, machine tools; portable forges; grinding wheels with frameworks (hand or pedal operated)
(5) Interchangeable tools for hand tools, for machine tools or for power-operated hand tools, including dies for wire drawing, extrusion dies for metal, and rock drilling bits
(6) Pumps (including motor pumps and turbo pumps) for liquids, whether or not fitted with measuring devices; liquid elevators of bucket, chain, screw, band and similar kinds
(7) Harvesting and threshing machinery; straw and fooder presses; hay or grass mowers; winnowing and similar cleaning machines for seed, grain or leguminous vegetables and egg-grading and other grading machines for agricultural produce
(8) Machine tools for working metal or metal carbides, not being machines falling within heading No. 84.49 or 84.50
(9) Moulding boxes for metal foundry; moulds of a type used for metal (other than ingot moulds), for metal carbides, for glass, for mineral materials (for example, ceramic pastes, concrete or cement) or for rubber or artificial plastic materials
(10) Taps, cocks, valves and similar appliances, for pipes, boiler shells, tanks, vats and the like, including pressure reducing valves and thermostatically controlled valves
(11) Transmission shaft, cranks, bearing housings, plainshaft bearings, gears and gearing (including friction gears and gear-boxes and other variable speed gears), flywheels, pulleys and pulley blocks, clutches and shaft couplings
(12) Tractors (other than those falling within heading No. 87.07 of the Nomenclature), whether or not fitted with power take-offs, winches or pulleys

4.2.3 Linkage with Other Industries

As shown in Fig. 4.2.3-1 below, there is a great deal of complexity about the metalworking industry's relation to other types of industrial activities. This indicates a high linkage effect of metalworking operations.

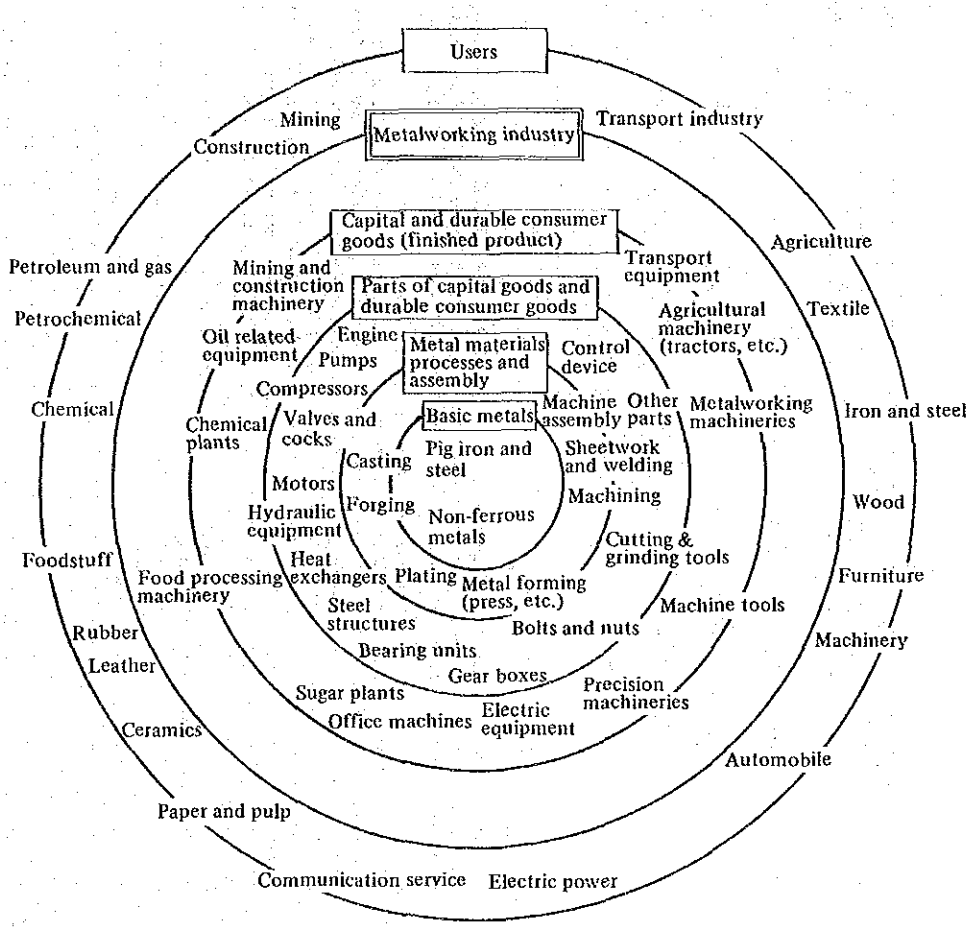


Fig. 4.2.3-1 Linkage between Metalworking Industry and Other Industries

Metalworking is not directly related to the food processing, textile, wood, furniture, rubber and mining industries which are major pillars of the Thai economy. But it is nonetheless supporting the Thai manufacturing industries through the supply of machines, devices, parts, etc. for use in their plants. Needless to say, the extent of this contribution differs from industry to industry, but it is a fact.

For instance, metalworking is closely related to the Thai society by producing jet pumps for tin mining, various types of food processing machines, rubber processing rollers, repair parts of wood working and textile machines, etc.

On the other hand, mutual dependence in the metalworking industry itself is deepening gradually as described later in this report as part of the analysis of processes and products of the industry.

Judging from trade structure of Thailand, the country still depends heavily on imports. As such, it is all the more desirable for the metalworking industry to grow by building up its own industrial physique while deepening relations with other industries of the country.

4.2.4 Thai Metalworking Industry in terms of International Division of Work

In the light of international division of work, the Thai metalworking industry might be described as having just successfully put itself on the starting line or just getting ready to put its toe on the starting line, although there are some advanced industries existing as leading sector. However, in view of the fact that interdependence among the countries within and without the ASEAN region is increasing, it is important at this time to overview the Thai metalworking industry from the aspect of international division of work in order to gain a medium and longer range perspective.

The following is an overview of the industry.

(1) Comparative advantage of industrial products

As history proves, it is only natural that in the process of economic development, the industrial structure of every country should undergo changes in its pattern of comparative advantage.

Thailand, too, during such a process, has achieved a growth more than ten times in terms of the total amount of imports and exports within a time span of 15 years from 1965 to 1980 and expanded its interdependency with other countries.

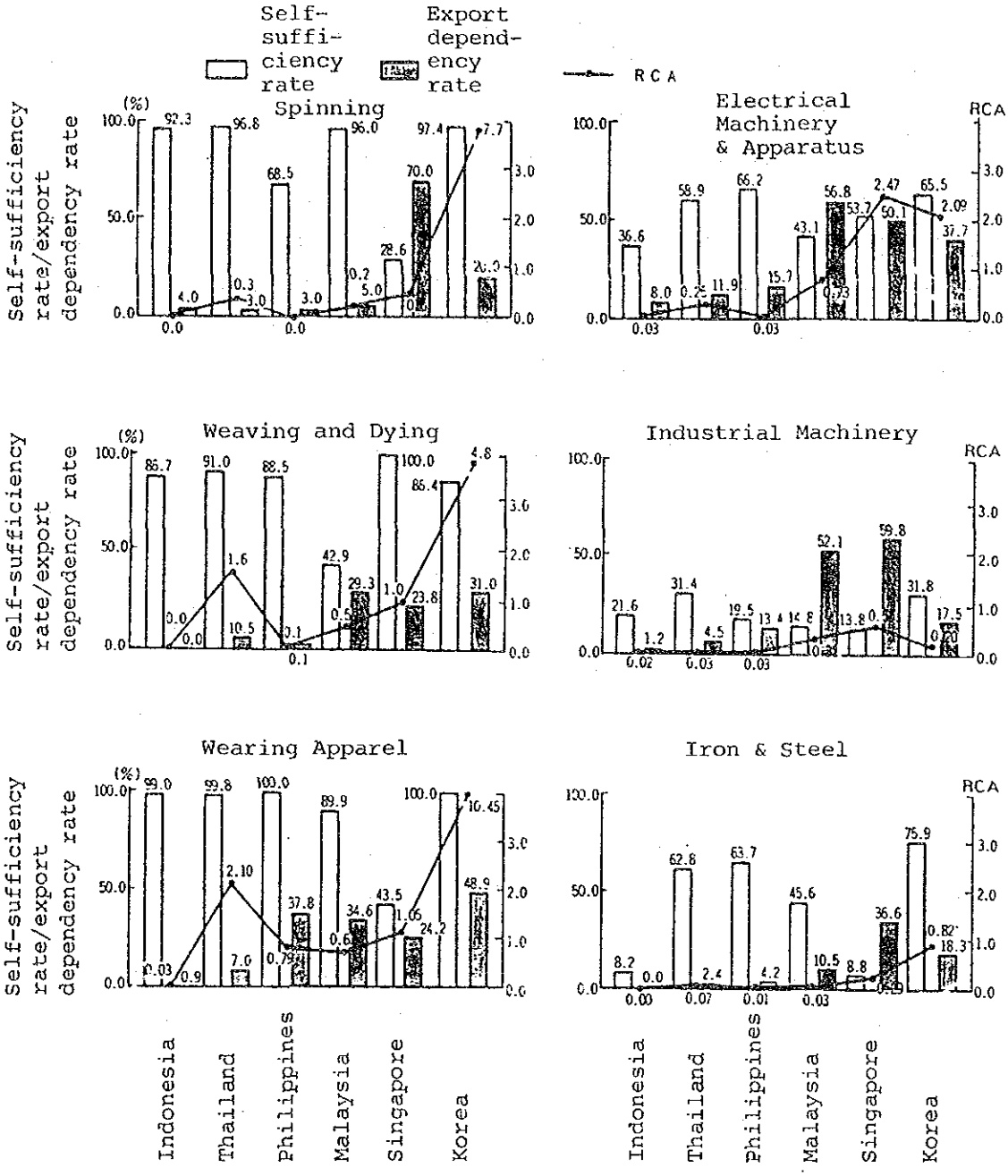
Table 4.2.4-1 Amounts and Shares of Foreign Trade

Year	Exports					Imports				
	Total (in $ billion)	% share in total				Total (in $ billion)	% share in total			
		Japan	USA	ASEAN	Others		Japan	USA	ASEAN	Others
1965	0.62	18.6	6.5	25.3	49.6	0.74	33.7	15.7	4.6	46
1970	0.71	25.5	13.4	14.9	46.2	1.3	37.4	14.8	3.2	44.6
1975	2.2	27.6	11	17.2	44.2	3.19	32.4	14.8	2.6	50.2
1980	6.4	15.5	12.4	17.2	54.9	9.4	22.2	14.5	10.2	53.1

There are differences in factors of production such as in the degree of labor skill and absorptive power of technology depending on the stage of economic development while there are differences in the degree of intensiveness of skilled labor, technology and capital in terms of the merchandise produced. Hence, the countries that are the least advanced for example, has a comparative advantage in goods that intensively utilize unskilled labor and they will domestically produce those goods for export.

Fig. 4.2.4-1 compares the status of the Southeast Asian countries in terms of typical merchandise using the self-sufficiency rate [domestic production/(domestic production + import – export)] and the export dependency rate (export/domestic production) as the indices of domestic production and export respectively, and RCA Note 1) (Revealed Comparative Advantage) as an index to represent comparative advantage. As for merchandise, the three commodities of industrial machinery, electrical machinery & apparatus and iron & steel have been selected as typical of capital intensive goods, while spinning, weaving & dying and wearing apparel of the textile industry have been selected as typical of labor intensive goods. Even among capital intensive goods, there are some differences in contents, for instance, between the process industry type iron & steel and the technology intensive industrial machinery or between the electrical machinery & apparatus which uses a comparatively large amount of labor and a lesser degree of technology intensiveness. Such differences also exist with respect to labor intensive goods with the degree of labor intensiveness in each production process rising in the order of spun yarn → fabrics → apparel (upstream → middle stream → downstream).

Note 1: RCA index = $(1/n)\sum_{i=1}^{n}[(Eh^i/Eh)/(Wi/W)]$, where Eh^i/Eh stands for the ratio of the export of i product by h country to the total exports of the country, and W^i/W for the ratio of the world total exports of the product to the world total exports.



Source: "The Development Economics" 10,11,1983 edition, Institute of Developing Economies, Tokyo, Japan (Values are for 1975)

Fig. 4.2.4-1 Trade Specialization Pattern of Korea & the ASEANS

A review of Fig. 4.2.4-1 reveals that every country has attained a self-sufficiency rate of close to 100% in labor intensive goods. As a tendency, the level is approximately linked to the level of the country's developmental stage. In terms of RCA, Thailand exhibits an exceptionally high RCA for its developmental stage and boasts a comparative advantage over other countries while the RCA indices of other countries are approximately linked to their respective level of developmental stage.

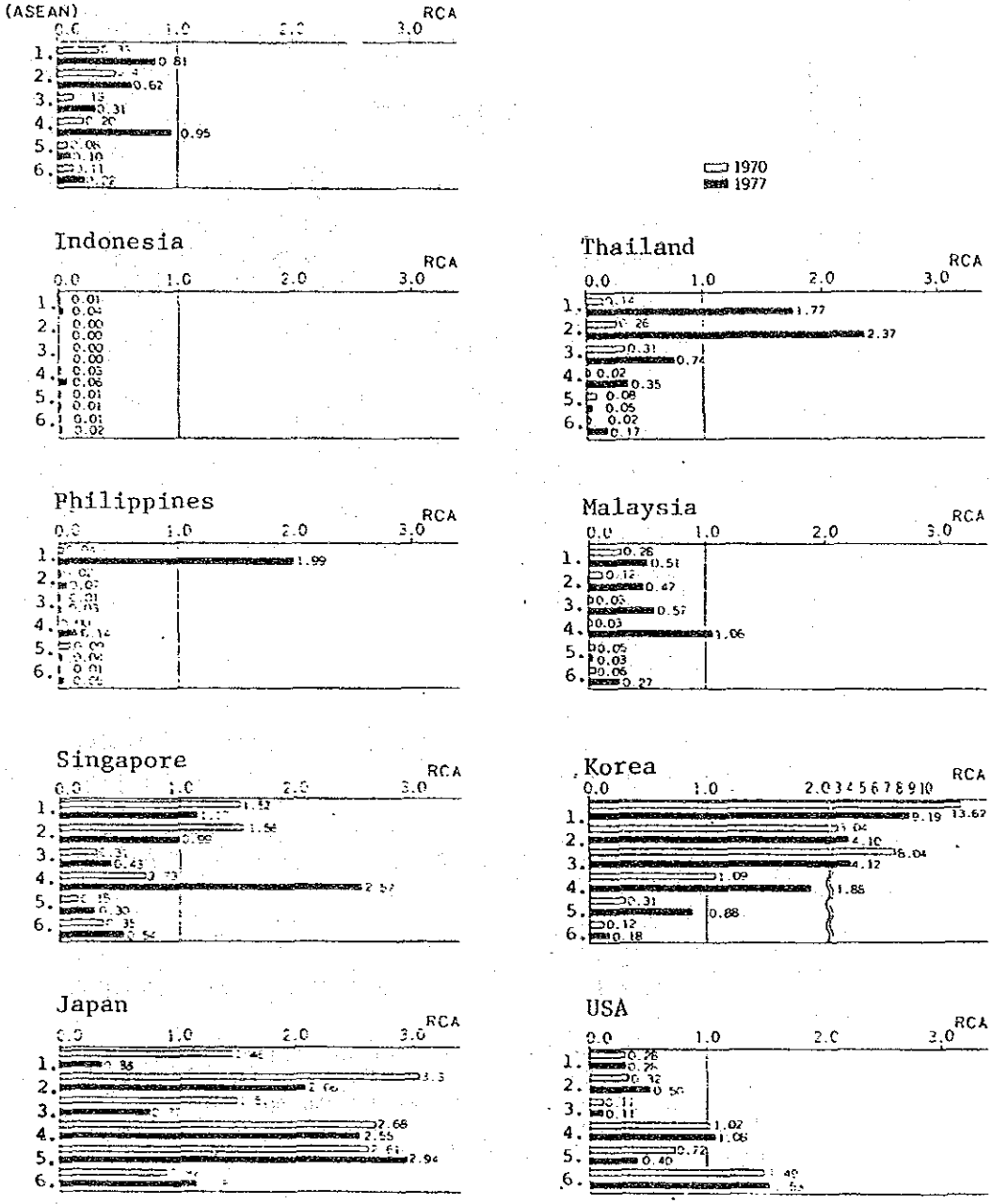
In regard to capital intensive goods, both export dependency rate and RCA of the ASEAN countries are low with the exception of some countries which have a conspicuously high self sufficiency rate in steel and Korea and Singapore which are in the category of NICs. In electrical machinery in which technology intensiveness is comparatively low, however, the figure indicates that a reasonably high level of self-sufficiency rate and export dependency rate have been reached and that a higher level of RCA than other goods has also been reached. The figures for technology intensive industrial machinery are all still low. The metalworking industry today plays the nucleus role in the technology intensive industries represented by industrial machinery and, in Thailand, it is the industry with a future.

Fig. 4.2.4-2 traces the changes in RCA by the lapse of time by commodity.

It may be claimed that the state of industrial machinery in Thailand symbolizes the actual situation of the Thai metalworking industry today.

Fig. 4.2.4-3 which shows the relationship between RCA and per capita GNP, represents the multi-stratified catching up process of export.

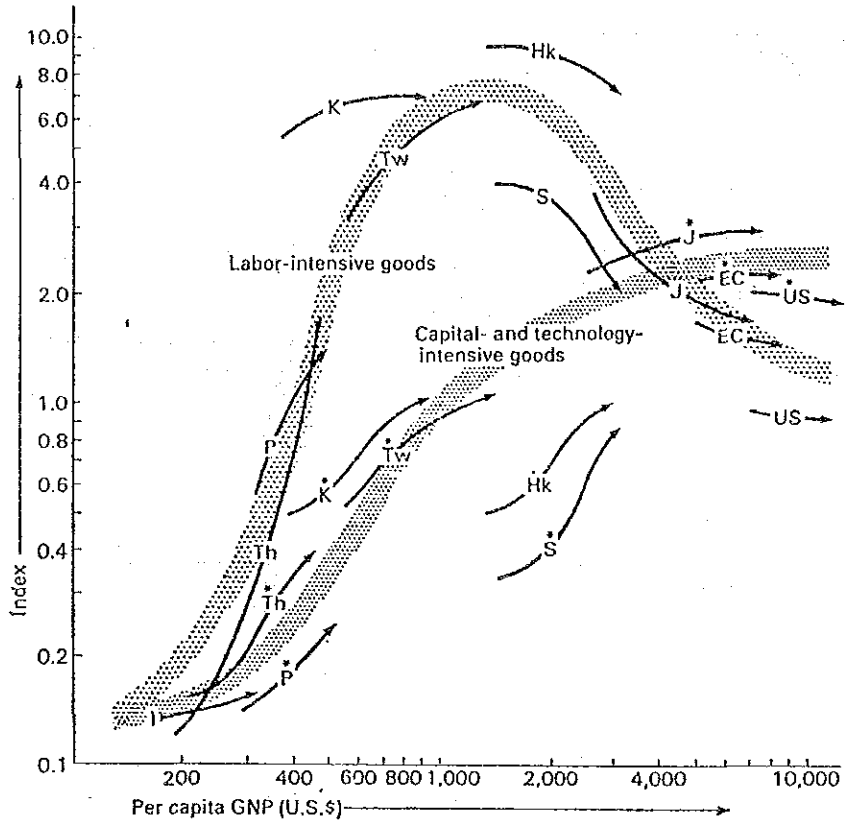
The figure clarifies the position of the forerunner countries relative to the late starting countries in exports of manufactured goods. To begin with, in labor intensive products, the U.S.A., Europe and Japan are losing their competitive strength respectively in the order mentioned, while the NICs in Asia (Korea, Taiwan, Hong Kong and Singapore) either have already reached their peak or are on their way to losing their competitiveness. The figure proves that in place of these countries, the ASEAN countries, including Thailand, are strengthening their competitive position.



Note: 1. Weaving 2. Wearing & dying 3. Spinning
4. Electrical machinery & apparatus 5. Iron & steel
6. Industrial machinery

Source: Same as Fig. 4.2.4-1

Fig. 4.2.4-2 Change in RCA



Labor-intensive goods consist of: SITC 611, 612, 613, 631, 632, 633, 651, 652, 653, 654, 655, 656, 657, 662, 663, 664, 665, 666, 667, 691, 692, 693, 694, 695, 696, 697, 698, 812, 821, 831, 841, 842, 851, 891, 893, 894, 895, 896, 899.

Capital- and technology-intensive goods consist of: SITC 512, 513, 514, 515, 521, 531, 532, 533, 541, 551, 553, 554, 561, 571, 581, 599, 621, 629, 641, 642, 661, 671, 672, 673, 674, 675, 676, 677, 678, 679, 681, 682, 683, 684, 685, 686, 687, 688, 689, 711, 712, 714, 715, 717, 718, 719, 722, 723, 724, 725, 726, 729, 731, 732, 733, 734, 735, 861, 862, 863, 864, 892.

I stands for Indonesia, Th for Thailand, P for Philippines, K for the Republic of Korea, Tw for Taiwan, H for Hong Kong, S for Singapore, J for Japan, EC for European Economic Community countries, and US for the United States. The symbols with asterisks are for capital- and technology-intensive goods and without asterisks for labor-intensive goods.

Source: "Asian Market Structure and Japan's Response" by Toshio Watanabe cited from "The Developing Economies", the October – November 1983 combined edition, Tokyo, Japan.

Fig. 4.2.4-3 Multiple Structure of Comparative Advantages in Industrial Products

In capital and technology intensive commodities, however, the United States and Europe are still strong in competitiveness with Japan running close behind. The NICs are currently in the phase of rapidly strengthening their competitive powers. The fact that the NICs are losing their competitive edge in labor intensive goods while they are strengthening their competitiveness in capital and technology intensive goods suggests the possibility for the ASEAN countries including Thailand that they might be able to export their metalworking products which are relatively amenable to an industrial form similar to labor intensive products.

As above, the Southeast Asian region including Thailand is enhancing its competitive strength – while expanding its division of work relationship with the United States, Europe and Japan, – not only in labor intensive commodities but in capital and technology intensive commodities as well which in turn is resulting in a further expansion of that division of work relationship. The region thus may be deemed as having an immensely dynamic potential for growth and brisk foreign trade.

The Thai Government's fifth five year plan (for 1982–1986) which positions the metalworking industry as one of the industrial pillars to be promoted and which has launched concrete promotional policy measures may be evaluated as being very appropriate and timely. Why? Because the metalworking industry is a typical example of the technology intensive industries and one of the industries that requires a long gestation period before it can be developed – an industry in which the consequences of any specific policy measure launched now will only begin to show up as a change in the nation's industrial structure in a time span of ten years or maybe twenty years. What is needed to develop such an industry is the unstinted efforts to implement development measures on a continuous basis.

(2) International division of work and direct investment between Thailand and Japan

Tables 4.2.4-2 and 4.2.4-3 show the recent trends in manufactured goods imports of Japan from the Southeast Asian countries. A review of these indicates a fairly substantial rise in the share of Southeast Asia in Japan's imports. This rise is particularly remarkable on textiles which are labor intensive merchandise. However, Japan's import pattern by commodity is characterized by the large shares of fuels, raw materials and foodstuff and by the relatively smaller shares of manufactured goods. Japan's total amount of imports expanded by about 7.5 times between 1970 and 1980, but partly due to the soaring price of crude oil, the share of manufactured goods imports declined from almost 30% in

the early 1970s to a range of 20 to 25%. What is noteworthy is that amidst this decline, the Southeast Asian countries increased their shares of manufactured goods in Japan's imports. While the amount of Japan's manufactured goods imports rose by about 5.4 times, the amount of manufactured goods imports from Southeast Asia grew 13.9 times during the decade between 1970 – 1980.

Table 4.2.4-2 Japan's Manufactured Goods Imports[1)]

(Unit: $ million and %)

Year	Total imports (1)	Total manufactured goods imports		Manufactured goods imports from East & Southeast Asia 2)	
		Amount (2)	Share (3) = (2) ÷ (1)	Amount (4)	Share (5) = (4) ÷ (2)
1970	18,881	5,633	29.8	376	6.7
1971	19,712	5,501	27.9	420	7.6
1972	23,471	6,777	28.9	615	9.1
1973	38,314	11,494	30.0	1,845	16.1
1974	62,110	14,506	23.4	2,281	15.7
1975	57,863	11,520	19.9	1,736	15.1
1976	64,799	13,389	20.7	2,625	19.6
1977	70,809	14,648	20.7	2,753	18.8
1978	79,343	20,000	25.2	3,850	19.2
1979	110,672	27,148	24.5	5,433	20.0
1980	140,528	30,587	21.8	5,219	17.1

Notes 1) Manufactured goods are the total of SITC classification categories 5 through 8.

2) East Asia: Korea, Taiwan, Hong Kong,
Southeast Asia: Indonesia, Malaysia, the Philippines, Singapore, Thailand

Source: "Japan's Import of Manufactured Goods from East and Southeast Asia" by Hirohisa Kohama, "The developing Economies", October – November issue, 1983, Tokyo.

Table 4.2.4-3 Shares of Southeast Asian Countries in Japan's Imports of Manufactured Goods

(Unit: %)

Year	Hong Kong	Korea	Taiwan	Indonesia	Malaysia	Philippines	Singapore	Thailand
1970	1.1 (16.3)	1.6 (24.7)	1.5 (22.8)	0.1 (2.0)	1.8 (27.4)	0.1 (2.0)	0.0 (0.7)	0.3 (4.0)
1971	1.2 (15.9)	2.2 (29.1)	1.6 (21.5)	0.3 (3.5)	1.8 (23.0)	0.1 (1.2)	0.2 (2.2)	0.3 (3.8)
1972	1.1 (12.5)	3.0 (32.8)	2.2 (24.2)	0.3 (3.1)	1.5 (17.0)	0.1 (1.2)	0.3 (2.9)	0.6 (6.1)
1973	1.9 (12.1)	6.9 (42.9)	4.1 (25.6)	0.3 (1.9)	1.3 (8.0)	0.3 (1.9)	0.4 (2.6)	0.8 (5.2)
1974	1.4 (9.2)	7.2 (45.9)	3.6 (22.8)	0.4 (2.6)	1.4 (8.9)	0.3 (1.7)	0.5 (3.0)	0.9 (6.0)
1975	1.6 (10.7)	6.9 (45.6)	3.1 (20.3)	0.4 (2.9)	1.2 (7.7)	0.2 (1.5)	0.7 (4.8)	1.0 (6.4)
1976	1.8 (9.3)	9.3 (47.3)	3.9 (20.0)	0.5 (2.6)	1.6 (8.4)	0.4 (2.2)	1.1 (5.8)	0.9 (4.4)
1977	1.6 (8.7)	8.8 (46.8)	3.7 (19.9)	0.7 (3.6)	1.7 (8.9)	0.4 (2.3)	0.9 (4.6)	1.0 (5.2)
1978	1.8 (9.4)	8.8 (45.8)	4.3 (22.2)	0.6 (3.2)	1.5 (7.8)	0.4 (2.0)	0.9 (4.4)	1.0 (5.1)
1979	1.8 (9.2)	8.8 (43.8)	5.2 (25.9)	0.6 (3.0)	1.4 (7.0)	0.5 (2.6)	0.7 (3.5)	1.0 (4.9)
1980	1.4 (8.1)	7.1 (41.8)	4.1 (24.1)	0.7 (2.8)	1.5 (8.7)	0.6 (3.7)	0.8 (4.5)	0.9 (5.2)

Note: The share of the amount of each country's manufactured goods in the total amount of Japanese imports of manufactured goods (total of SITC categories 5 through 8). Figures in ( ) are the % share of each country's manufactured goods in the total amount of Japanese imports of manufactured goods from eight countries in East and Southeast Asian countries.

Source: Same as Table 4.2.4-2

When the share of each Southeast Asian country in Japan's imports of manufactured goods is reviewed, the expansion of shares by NICs, particularly that of Korea, is noted as being spectacular. This may be construed as implying that if industrialization in the ASEAN countries including Thailand is further advanced, there might still be room for further expansion of Japanese imports of manufactured goods from the ASEAN countries and that, at the same time, Japan might be compelled to exert greater efforts to expand its imports of manufactured goods. Direct investment from Japan has played quite an important role in expanding Japanese imports of manufactured goods from Southeast Asia. Of course the role played by the local industries of the South-east Asian countries in industrialization and in exports of manufactured goods is by no means slight, but it is also a fact that direct investment by the advanced countries including Japan to the manufacturing industries of the Southeast Asian countries was one of the key factors that led to the expansion of Japanese imports. Therefore, if a stronger relationship of interdependency between Thailand and Japan is to be established in metalworking products, one conceivable means would be to induce direct investment from Japan and strengthen the local industries that support the metalworking industries so that these together might form a strong chain to strengthen the industrial base of the Thai metalworking industries. However, as the historical record of direct investment from Japan to Thailand (refer to Table 4.2.4-5) speaks for itself, Thailand, among the ASEAN countries, has been the smallest recipient of direct investment from Japan. As this very fact suggests, there are many latent problems to promoting a relationship of horizontal division of work between Thailand and Japan. Nevertheless, the time does seem ripe to consider this problem from a longer range perspective on a reciprocal and equal footing with a full understanding that the future may yet present many more problems.

Table 4.2.4-4 Cumulative Authorized Direct Investment from Japan to ASEAN and Northeast Asian Countries (FY1951-80)

(Unit: $ million)

	1951-1965	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
ASEAN	150	490	642	856	1,481	2,046	2,902	3,946	4,581	5,499	6,094	7,021
Indonesia	51	242	354	473	814	1,190	1,775	2,703	3,128	3,739	3,888	4,424
Malaysia	19	50	62	76	202	250	302	356	425	473	506	650
Philippines	24	74	78	88	131	190	339	354	381	434	537	615
Singapore	17	33	48	90	171	222	278	305	370	544	800	936
Thailand	39	91	100	129	163	194	208	228	277	309	363	396
Northeast Asia	20	147	228	415	783	944	1,164	1,365	1,585	2,006	2,364	2,602
Korea	-	33	61	207	418	495	587	690	785	1,007	1,102	1,137
Taiwan	10	85	97	108	142	175	198	227	244	284	323	370
Hong Kong	10	29	70	100	223	274	379	448	556	715	939	1,095
Other Asia	18	116	118	120	124	129	153	153	162	163	185	207
North America	241	912	1,142	1,548	2,462	3,012	3,917	4,666	5,401	6,765	8,202	9,798
Latin America	281	567	707	989	1,811	2,510	2,881	3,301	3,757	4,373	5,580	6,168
Oceania	7	281	391	432	640	748	930	1,092	1,257	1,496	2,078	2,525
Middle East	196	334	370	606	716	780	976	1,254	1,479	1,971	2,101	2,259
Africa	11	92	114	147	253	308	501	773	913	1,138	1,306	1,445
Europe	25	639	724	1,659	1,996	2,185	2,518	2,854	3,075	3,398	3,893	4,471
World Total	949	3,577	4,435	6,773	10,267	12,662	15,943	19,405	22,211	26,809	31,804	36,497

Source: Sueo Sekiguchi, "Japan's Direct Investment and the East Asian Economy" in "The Developing Economies", October-November edition, 1983, Tokyo, Japan

Table 4.2.4-5 Japan's Direct Investment to ASEAN Countries; Comulative Authorization by Industry (FY1951-80)

(Unit: $ million)

	Indonesia		Malaysia		Philippines		Singapore		Thailand		Total	
	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount	No.	Amount
Total, manufacturing industries	566	1,527.0	331	455.9	223	235.7	527	687.6	393	291.7	2,040	3,198
Foodstuff	44	29.3	23	17.5	25	14.1	21	10.4	79	46.4	192	118
Textile	120	344.5	38	104.9	29	21.3	29	11.4	72	126.3	288	608
Timber and pulp	60	57.4	62	44.9	18	7.6	11	11.3	19	4.1	170	125
Chemical	93	73.4	41	167.5	34	65.2	61	82.3	65	28.9	294	417
Metal	96	753.1	31	29.7	25	73.8	67	36.7	33	19.6	252	913
General machinery	23	14.8	10	8.9	13	4.5	90	123.3	34	11.5	170	163
Electrical machinery	29	39.0	55	51.8	20	6.7	130	138.5	24	6.8	258	243
Transportation equipment	31	61.2	9	7.6	17	27.0	20	113.9	24	29.7	101	239
Other manufacturing	70	154.3	62	23.1	42	15.5	98	159.9	43	18.4	315	371
Others												
Agriculture & forestry	99	108.6	37	16.6	83	32.7	3	0.5	17	6.7	239	165
Fishery	69	60.2	7	1.0	14	1.2	-	-	4	1.1	94	63
Mining	35	2,522.2	32	119.6	40	276.7	-	-	26	4.7	133	2,923
Construction	37	16.2	25	4.4	24	10.9	50	17.2	30	11.3	166	60
Commerce	32	10.7	69	11.8	69	4.3	219	56.4	130	43.5	519	127
Finance & insurance	19	65.7	15	6.9	11	17.2	18	12.1	17	8.8	80	111
Others	74	104.7	53	28.4	42	29.8	134	124.5	80	25.0	383	312
Real estate	41	8.1	14	3.0	7	0.8	27	5.5	5	0.7	94	18
Branch offices	4	0.5	19	2.9	23	5.6	77	32.3	33	3.0	156	44
Grand Total	976	4,423.8	602	650.4	536	614.9	1,055	936.2	735	396.4	3,904	7,022
Share (%) $\frac{\text{Total manufacturing}}{\text{Grand total}}$	34.5		70.1		38.3		73.4		73.6		45.5	

Note: Share of manufacturing: Korea (68.6), Hong Kong (16.9)

Source: Same as Table 4.2.4-4

Table 4.2.4-6 Degree of Japan's Horizontal Division of Work by Trading Partner, by Sector (1965, 1970, 1978)

	ANICs			ASEAN-4			America		
	1965	1970	1978	1965	1970	1978	1965	1970	1978
Foodstuff	16.7	15.9	24.9	16.6	18.0	16.3	23.6	35.9	21.3
Beverage	-	-	-	0	0	0.3	12.6	19.0	45.1
Fiber	11.5	39.6	41.9	2.1	0.6	32.8	0.7	1.3	45.7
Textile goods	24.1	31.6	25.8	4.8	19.0	30.7	9.6	14.4	34.6
Wooden products	18.2	27.8	21.6	4.5	21.4	21.7	23.0	6.1	22.5
Pulp and paper*	6.4	17.5	9.2	1.4	11.2	9.5	33.8	34.4	28.7
Printing and publication	13.7	14.3	90.2	7.5	1.8	93.5	16.9	23.6	30.7
Rubber products*	20.7	37.7	37.8	0.3	0.1	17.6	21.1	12.6	29.9
Chemical products*	7.9	14.9	19.1	4.9	4.5	9.4	31.4	35.6	44.6
Petroleum products*	10.4	36.7	19.8	27.1	31.5	8.6	6.9	3.9	2.7
Coal products*	0	47.8	99.5	0	0	0	0	0	28.4
Ceramics and earthen goods*	3.7	11.1	19.0	0	0.1	0.8	29.0	35.3	52.8
Iron and steel*	21.5	23.5	28.0	0	0	6.0	40.7	16.9	51.5
Primary iron and steel products*	0	7.3	13.0	0	0.3	4.6	11.4	2.8	1.5
Primary non-ferrous metal products*	12.7	15.0	20.9	1.0	1.5	3.6	34.9	36.6	22.0
Metal products*	0.3	12.2	21.3	0.1	0.2	0.9	28.0	15.7	24.4
General machinery*	1.6	1.3	6.0	0.3	0.2	1.6	37.4	43.9	47.0
Electric and electronic apparatus*	3.8	20.4	22.4	0	0	6.4	52.4	50.6	55.9
Transportation equipment*	0.5	6.8	10.6	0	0	0.4	23.9	17.2	13.7
Precision instruments*	2.5	3.3	16.5	0	0	21.5	42.3	44.2	44.0
Other manufacturing	25.5	44.0	51.0	18.0	30.0	38.4	29.3	30.6	53.0
Total manufacturing industries	8.7	16.3	27.4	3.9	5.9	15.2	33.4	31.0	35.7

Note: * indicate producers' goods sector.
Index of the degree of horizontal division of work here is expressed as:

$$\frac{1}{n} \sum_{i=1}^{n} \left(\frac{E_{ij} + M_{ij} - |E_{ij} - M_{ij}|}{M_{ij} + M_{ij}} \right) \times 100$$

Source: Toshio Watanabe, "Asian Market Structure and Japan's Response", in "The Developing Economies", October-November edition, 1983.

Table 4.2.4-7 Investment in ASEAN Countries by Asian NICs (excluding Singapore)

Investing country \ Invested country		Indonesia ($ million)		Malaysia (M$ million)		Thailand (million)		Philippines ($ million)	
		1980	1981	1980	1981	1980	1981	1980	1981
Hong Kong		23	210	3.8	35.1	45	111	26	39
Singapore		32	26	56.8	42.6	84	367	n.a.	n.a.
Taiwan		2	-	n.a.	n.a.	151	43	n.a.	n.a.
Korea		4	26	-	3.5	46	-	n.a.	n.a.
Sub-total	A	61	262	60.6	81.2	326	521	26	39
Japan		29	76	32.6	69.1	89	965	68	29
Grand-total	B	489	577	248.2	495.3	2,858	5,662	303	358
A / B (%)		12.5	45.4	24.4	16.4	11.4	9.2	8.6	10.9

Sources: Indonesia: Data of the Investment Coordination Board
(On the basis of approved new investment)
Malaysia: MIDA (On the basis of approval)
Thailand: Board of Investment (On the basis of approval)
The Philippines: Central Bank of Philippines (On the basis of approval)
"White Paper on Overseas Market, Volume on Investment", p.8, 1983 ed.

4.2.5 Demand Structure

As it is difficult to analyze demand structure in details, it is considered in broad terms based on trends in sales by processes and markets (destinations) disclosed by the joint study with Technonet/JICA/ISI in 1978.

(1) Sales by processes (Q66)

1) Sheetwork and welding	25.9%
2) Presswork	21.1%
3) Casting	18.9%
4) Machine assembly	16.2%
5) Machining	8.7%
6) Forging	8.1%
7) Plating	1.1%

As seen above, processes that are relatively easy to deal with, that is, sheetwork and welding and presswork, take up larger shares in demand structure. In other words, the processes which are in a position to benefit more easily from the other processes' output that is relatively low in added value but high in technical stability, take the lead in structuring demand for the metalworking industry.

In order to build up the industrial physique of the Thai metalworking industry and improve the added value of its products hereafter, it is necessary to increase its capabilities in the field of metal materials and processes, that is, castings and forgings, and relatively promote demand of machining and machine assembly.

(2) Markets (destinations) (Q23)

The provinces take up an overwhelming 89% or so, followed by the regions 57% and other districts 45% The main market is domestic. But the fact that, of Thai metalworking firms under survey, 5% and 7% are engaged in export sales to developing and developed countries demonstrates a possibility of the export development of the Thai metalworking industry hereafter.

4.2.6 Industry Structure

The industry's current structure is analyzed in many ways and details in the joint study with Technonet/JICA/ISI in 1978

The following description also touches more or less on probable trends hereafter, taking into account findings in the above report.

(1) Specialization rate (Note 1)

The process of sophstication of an industry structure includes a trend among participating enterprises toward greater specialization. The specialization step of one process → one product → one part means simplification in production, engineering, administration and management, which naturally results in superior productivity and quality of products. This rule is proven in industrialized countries and directs specialization in the Thai metal-working industry.

Specialization breakdown by processes and products in Thailand is as follows.

Casting	0.55	
Forging	1.0	
Sheetwork/welding	0.53	
Plating	0.96	0.49 (average)
Machine assembly	0.28	
Machining	0.50	
Presswork	0.58	

Note 1: The specialization rate by processes and products is calculated by the following formulas.

$$\text{Specialization rate by main process (S1)} = \frac{\text{Total number of main processes}}{\text{Total of main and sideline processes}}$$

$$\text{Specialization rate by main products (S2)} = \frac{\text{Total number of main processes}}{\text{Total of main and sideline products}}$$

When S1 and S2 is 1, specialization by processes and products is thought to have attained a high level. When the value is almost zero (0) specialization is very low.