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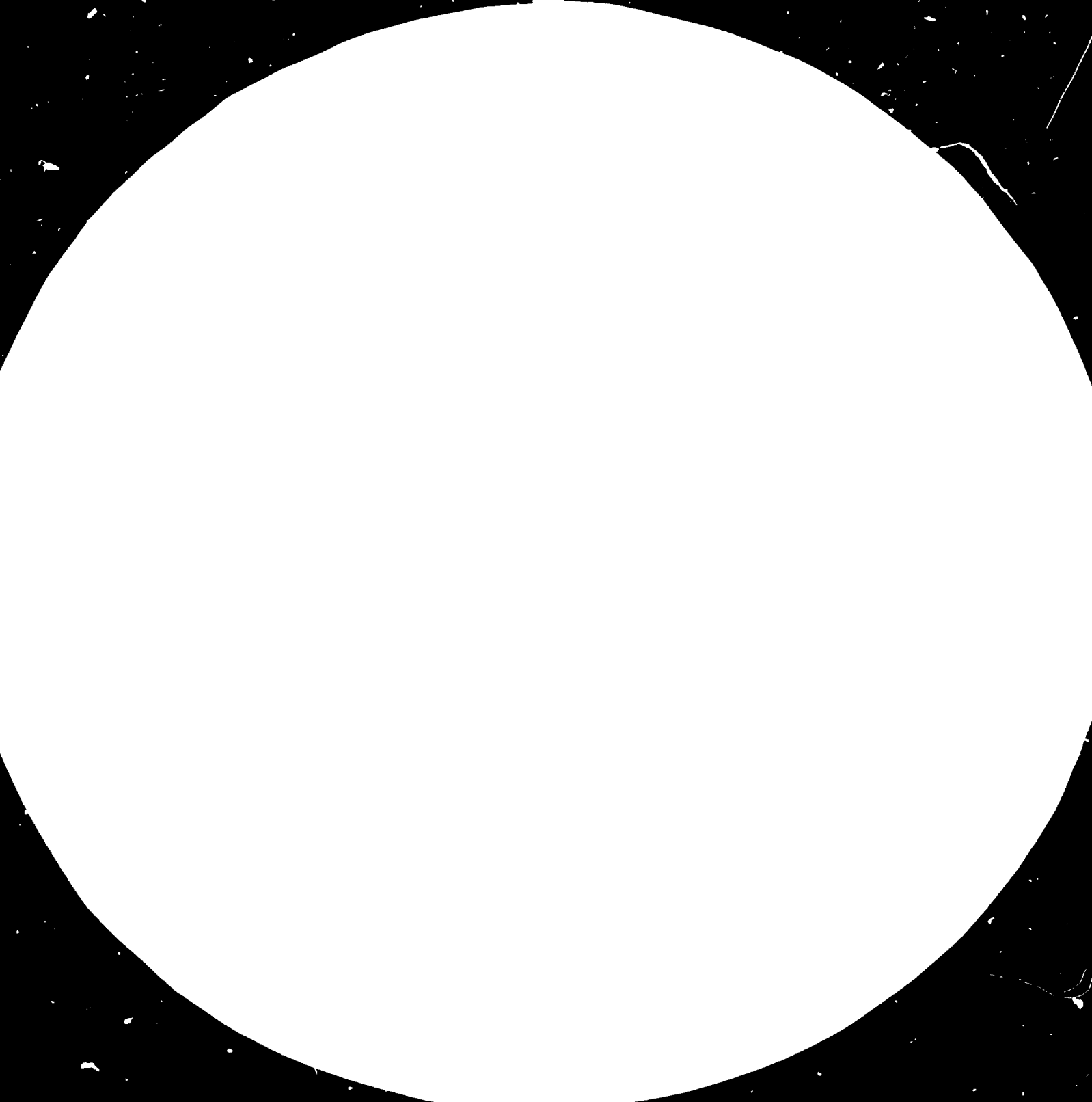

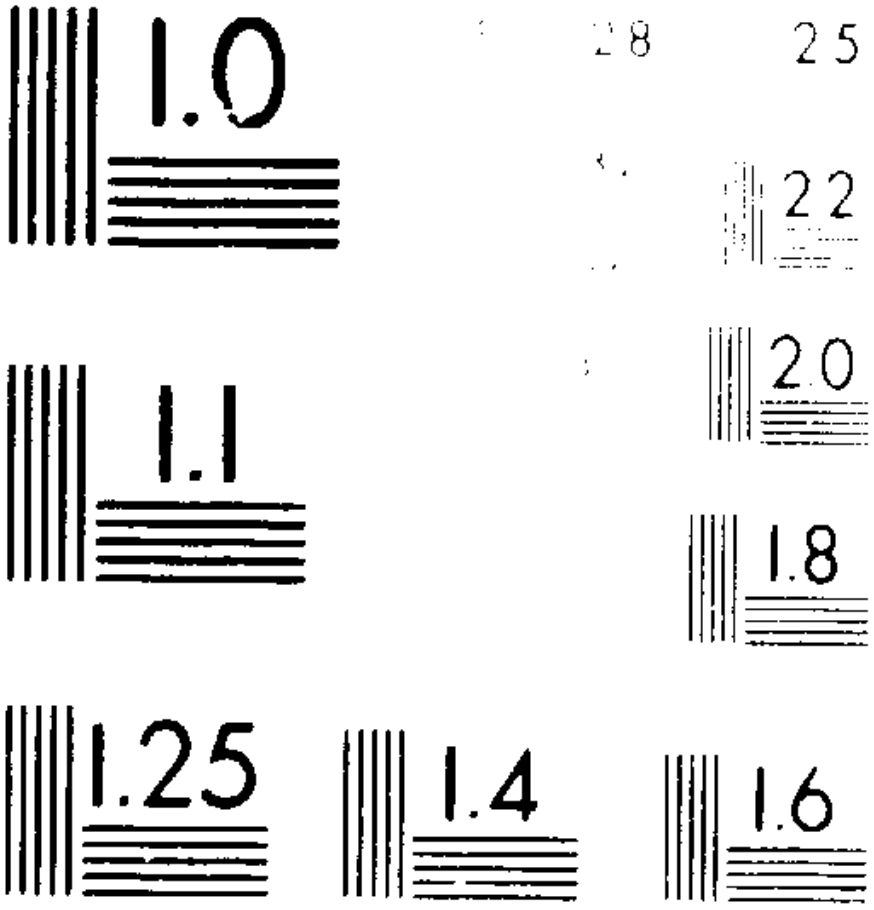
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CAPITAL GOODS INDUSTRY IN SOUTHEAST AND EAST ASIA

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CONTENT

CAPITAL GOODS INDUSTRY IN SOUTHEAST AND EAST ASIA*

1. Introduction

The major objective of this sectoral study is to provide a brief review and analysis of past developments, present situation, basic problems and future trends and prospects of the capital goods industry in Southeast and East Asia (SEEA). The capital goods industry refers to the non-electrical machinery (ISIC 382), the electrical machinery (ISIC 383) and the transport machinery and equipment (ISIC 384) industries whereas the SEEA region includes Burma, the British colony of Hong Kong, Indonesia, The Republic of Korea, Malaysia, the Philippines, Singapore and Thailand.[1]

The capital goods industry in SEEA has developed very rapidly in the last 15 years and today the countries in the region produce a variety of capital goods ranging from electronic components to light aircrafts. More important, the exports of capital goods from the SEEA region were valued at more than $13,000.6 million in current prices in 1980.[2] Furthermore, there are indications that having exhausted the

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*I am very grateful to Professor Donald Blake and Mr. Y. Suzuki for their comments and suggestions on the first draft of this paper. However, the author takes the responsibility for any error that remains.

[1]Data for Burma are generally not available so the study mainly covers the SEEA region with the exception of Burma.

[2]Unless otherwise stated the $ sign refers to the U.S. dollar.

limits of import substitution in consumer goods, many of the countries in SEEA are trying to develop their capital goods industry. Thus the present decade may very well see further intensive developments in the capital goods industry in SEEA.

Given limited resources and time this study had to rely largely on the data base supplied by UNIDO. Unfortunately the UNIDO data were not only inadequate but also inconsistent for countries in the region under study. Most seriously, only data for selected years were available but even then, the selected years were not the same for all the countries in the study. In addition, for certain countries such as Indonesia and the British colony of Hong Kong the selected years were too close to analyse significant changes in the capital goods industry within the countries concerned. This deficiency made a comparative analysis very difficult.

Another serious shortcoming in the UNIDO data as pointed out by Professor Blake, is the apparently significant discrepancies between some of the UNIDO and national data. Other deficiencies include a failure in the trade data to identify re-exports for Singapore and the British colony of Hong Kong and the lack of conversion factors for exchange rates and price series.

Attempts were made to overcome the inadequacies in the UNIDO data by using supplementary data where available, from some national and international sources such as the Report on the Census of Industrial Production, Singapore, Handbook of Statistics, Korea, Yearbook of Industrial Statistics and Yearbook of International Trade Statistics. Unfortunately the attempts were not always successful so the readers should bear in mind the limitations and imperfections of

the data base in the subsequent analysis.

Briefly this study is divided into 8 parts. Following the introduction, Part 2 reviews past developments in the capital goods industry in SEEA followed by Part 3 which discusses the major characteristics of the industry. Part 4 provides a profile of selected capital goods industries while Part 5 looks at the trade in capital goods in SEEA. Part 6 discusses basic problems and issues while Part 7 considers the prospects and potentialities for development of the capital goods industry in SEEA. Finally Part 8 concludes with the main findings and recommendations.

2. Review of Past Developments and Present Situation

Many of the economies in the SEEA region have undergone a slow but perceptible structural transformation in the last 20 years. These economies emerged from World War II with a largely predominant agricultural sector but in the last two decades the manufacturing sector has become just as important, if not, even more important than the agricultural sector. Table 2.1 shows that this structural transformation is most perceptible in the case of Korea, Malaysia and the Philippines. In the case of Korea for example, agriculture, which accounted for 44.1 per cent of the country's GDP in 1961 accounted for only 15.4 per cent in 1980. On the other hand, the share of manufacturing has increased from 12.0 per cent in 1961 to 33.2 per cent in 1980 (Table 2.1).

The structural transformation process in SEEA is indicated more clearly in Table 2.2 which shows the manufacturing value added (MVA) and MVA per capita in SEEA between 1970-80. The table shows that MV highest in Korea, Philippines and Thailand and is lowest in Burma,

Singapore) and Malaysia in 1980 (in constant 1975 prices). Korea's MVA has increased more than four-fold between 1970-80 while Burma's MVA has increased less than 1.5 times. In terms of MVA per capita, the leading countries are Singapore, the British colony of Hong Kong and Korea, the three newly industrialized countries in the region. The countries with the lowest MVA per capita are Burma, Indonesia and Thailand. Table 2.2 also shows that for all countries in SEEA, manufacturing value added in current prices totals $53,296 million and this has increased nearly three times in constant prices between 1970-80. MVA per capita for all countries in the region is $450 and this has nearly doubled in constant prices during the same period.

The increasing importance of the manufacturing sector in many of the SEEA countries may be attributed to the relatively rapid rates of growth in this sector over the last 20 years. Table 2.3 shows that for SEEA as a whole, the maufacturing was the fastest growing sector during the period 1960-79. Its rate of growth exceeded the growth of the region's GDP by nearly 3 per cent. Table 2.3 also shows that in many of the SEEA countries, the manufacturing sector had grown twice or even thrice as fast as the agricultural sector in the last decade or so. Not surprisingly, the most impressive growth rates were recorded by the three countries with the highest MVA per capita in the region, namely Korea, the British colony of Hong Kong and Singapore.

Within the manufacturing sector, one perceives a change in the relative importance of the consumer and capital goods industries. At the beginning of their industrialization programmes, many countries in SEEA concentrated their efforts on the establishment of simple import substituting industries such as food, textiles and clothing. Following

the gradual saturation of these labour-intensive industries, some of the countries in the region turned their attention to the development of the capital goods industries. The most successful of these countries appear to be Singapore, Korea and Malaysia. This may be seen in Tables 2.4 and 2.5.

Table 2.4 shows the structure of manufacturing value added in constant (1975) prices in the capital goods industries in SEEA for selected years in percentages. The table shows that the percentage of manufacturing value added from the capital goods industries in constant (1975) prices is highest in Singapore in all three sub-sectors of the industries in 1980. Singapore's dominant position remains the same even if manufacturing value added were valued in current prices. In constant prices, manufacturing value added from non-electrical machinery in Singapore accounted for 23.6 per cent of total manufacturing value added in 1980; from transport equipment 16.2 per cent and from electrical machinery 8.7 per cent. Altogether, the three sub-sectors of the capital goods industry in Singapore accounted for 53.2 per cent of total manufacturing value added in 1980.

Table 2.4 also shows that the percentages of manufacturing value added in all three sub-sectors of the capital goods industries in Singapore are more than twice those of the second leading country. Thus even though the year used for comparison in the countries may be different it is unlikely that the position will be dissimilar if the same year had been used.

Korea comes next with its capital goods industry contributing 20.4 per cent to total value added in 1979, followed by Malaysia with 17.6 per cent in 1978. The capital goods industry is least important

in Indonesia where it contributes less than 5 per cent to total manufacturing value added in 1979. For the SEEA region as a whole (except Burma for which data are not available), the weighted average contribution of the capital goods industry to total manufacturing value added is 18.6 per cent.

Among the three sub-sectors of the capital goods industry, electrical machinery (ISIC 383) is the most important (Table 2.4). On the average, for all countries in the SEEA region, this sub-sector contributed nearly 15 per cent to total manufacturing value added in the most recent year. This figure is nearly twice as large as the average contribution from the next largest sub-sector - transport equipment. The domination of the electrical machinery industry is probably due to the off-shore expansion of the electronics industry to SEEA.

Table 2.5 shows the structure of employment in the capital goods industry in SEEA for selected years. The table shows that the percentage of employment from the capital goods industry is highest in Singapore in all three sub-sectors of the industry. As in Table 2.4, Singapore's position in Table 2.5 is so strong that even if the reference year were the same for all the countries concerned it is unlikely that Singapore's leading position would be changed. The contribution of the capital goods industry to employment in Singapore is highest in the electrical machinery industry which contributed 30.7 per cent to total manufacturing employment in 1980.

If we take the capital goods industry as a whole, then the industry contributed nearly half the total manufacturing employment in Singapore in 1980. Since the capital goods industry also accounted for more than half of the total manufacturing value added in Singapore in

1980 (as noted earlier in Table 2.4), it would appear that both in terms of value added and employment, the capital goods industry occupies a very important position in Singapore's manufacturing sector.

Table 2.5 also shows that the capital goods industry makes a relatively high contribution to manufacturing employment in Malaysia, the British colony of Hong Kong and Korea. As in the case of Singapore, this is largely due to the electrical machinery industry, or more specifically, to the labour-intensive electronics industry which performs mainly assembly operations in SEEA (see Section 4(b) below).

To sum up, we have already noted that the capital goods industry makes an important contribution to manufacturing value added in Singapore, Korea and Malaysia. In addition, this industry is also important in terms of manufacturing employment in the above three countries. On the other hand, the capital goods industry has made the least contribution to manufacturing value added and employment in Indonesia. Consequently, we may conclude that the capital goods industry is most important in Singapore, Korea and Malaysia and least important in Indonesia. In the remaining SEEA countries, the capital goods industry is more or less stagnant or appears to be declining in relative importance to the other manufacturing industries. Thus as Table 2.4 shows, apart from the Philippines where the manufacturing value added from the capital goods industry has increased marginally during the intervening period, there has been a slight decline in Indonesia, Thailand and the British colony of Hong Kong. This is seen more clearly in Figure 1. The figure also shows that most of the growth in the capital goods industry in Singapore, Korea and Malaysia took place in the last ten years or so. Nevertheless, it may be useful to trace the

development of the capital goods industry in each of the above three countries to provide some indications of the path of development taken by this sector in SEEA.

2(a). Development of the Capital Goods Industry in Singapore

Singapore's dominant position in the capital goods industries in SEEA may be explained by various factors, such as the huge expansion in external demand for semi-conductors and off-shore oil prospecting equipment and the successful industrial policy which the island republic pursued following its independence. Before independence, the island's economy was based mainly on entrepot trade. Following its independence in 1959, Singapore decided to industrialize in an effort to solve its unemployment problem (Goh Keng Swee, 1972). Initially the republic pursued a labour-intensive export-led industrialization strategy which was remarkably successful. The provision of fiscal incentives and development of infrastructure attracted numerous multi-national corporations to establish offshore production sites in Singapore. Between 1967 and 1973, Singapore's real GDP grew at an annual rate of 13 per cent. Unemployment disappeared and by 1973, Singapore even had to import workers (Pang & Tan, 1980b).

The world recession of 1974-75 arrested Singapore's remarkable growth. When the economy recovered in 1976, the labour market became so tight that the government decided to shift to the promotion of higher value added industries. Thus in 1979 the government adopted three sets of measures heralding what has been termed a "Second Industrial Revolution" (Pang, 1982). Firstly, a wage correction policy was introduced in an effort to restore wages to market levels; it was felt

that since 1972 National Wages Council (NWC) guidelines on wage increases were relatively modest, effectively suppressing wage rates and encouraging excessive use of labour services which in turn led to labour shortages and slow productivity growth. Large wage increases averaging 20 per cent annually over the three-year period from 1979 to 1981 were recommended by the Council, designed to force firms to improve efficiency of labour use.

A second set of new industrial policy measure entailed changes in investment incentives and the reorientation of incentives towards the promotion of a more limited number of priority industries; these favoured industries are highly skill- and capital-intensive, producing technologically sophisticated products. The final component of Singapore's industrial restructuring strategy had to do with the expansion of training and educational facilities for both prospective and already employed industrial workers, providing complementary support for the upgrading of skills and technology in industry (R. Bautista, 1984).

The above measures marked the beginning of Singapore's capital goods industry. Today the island republic produces various types of high technology capital goods such as radio and TV sets, tape recorders, calculators, typewriters, refrigerator compressors, air-conditioning units, precision tools and dies, ball bearings, projectors, liquefied-petroleum-gas cylinders, automobile gears, electrical machinery, elevators, escalators, hydrofoils, aircraft parts, ships, tankers and oil-drilling equipment and platforms.

Table 2.6 shows the structure of manufacturing value added in constant (1975) and current prices and of manufacturing employment for selected years in Singapore in percentages. The table shows that

in 1967 petroleum refineries made the largest contribution to manufacturing value added (at constant prices) with 28.6 per cent, followed by food products (8.3 per cent) and transport equipment (7.4 per cent). By 1980, the leading position had been taken over by electrical machinery (28.3 per cent) followed by transport equipment (16.2 per cent) and petroleum refineries (14.1 per cent). The position is not much different if manufacturing value added at current prices is used.

An analysis of the capital goods industry using data from the Report on the Census of Industrial Production (Singapore, 1982) shows there were a total of 909 establishments in the capital goods industry in Singapore (Table 2.7). These establishments employ a total of nearly 130,000 workers and registered total sales valued at $5,045 million of which $3,721 million or 74 per cent were directly exported.

Table 2.7 also shows that in terms of employment, output, value added, total sales and exports, the electrical machinery (including electronics) is the most important capital goods industry in Singapore. This industry exports more than 82 per cent of its total sales and its output and employment are higher than those of the other two capital goods industries combined.

Singapore's major capital goods products in terms of output, value added and direct exports are oil and gas field machinery and equipment, semi-conductors, TV sets, radios, audio and video sets and ships, tankers and other ocean-going vessels (Table 2.7). A comparison of the output and value added figures for these products show that the ratio of value added to output is highest in ships, tankers and other ocean-going vessels (0.47) and lowest in semi-conductors (0.20).

The shipbuilding industry is a logical outgrowth of Singapore's

role as an international seaport. Despite the declining importance of entrepot trade, however, prospects for the industry have not dimmed. On the other hand, the oil exploration rush in SEEA towards the end of the 1980's helped to accelerate activities in Singapore's 50 or more shipyards. Today, these shipyards turn out oil-drilling rigs, drilling platforms, and various other types of watercraft, including supply boats, barges, patrol boats and sophisticated pleasure vessels. Some yards are starting to build specialized vessels like fireboats, log and equipment carriers, and container "roll-on-roll-off" vessels or manufacture ship machinery, marine hardware, and shipping and air-cargo containers.

2(b). Development of the Capital Goods Industry in Malaysia

Like Singapore, the development of the capital goods industries in Malaysia is also of relatively recent origin. As Table 2.8 shows, in 1968, the three largest contributors to Malaysian manufacturing value added were food products (22.0 per cent), wood products (15.2 per cent) and rubber products (12.5 per cent). In 1978, the first two leading positions remained unchanged but the third place had been taken over by electrical machinery contributing 12.0 per cent to total manufacturing value added. The doubling of manufacturing value added by the electrical machinery industry in Malaysia since 1968 may be explained by the tremendous growth of the electronics industry in Malaysia in the early 1970's.

Faced with the rapid exhaustion of import substitution possibilities and the high level of unemployment in the late 1960's, the Malaysian government decided to attract electronics industries to Malaysia. Fiscal incentives were offered and industrial estates developed to encourage the multinational electronics companies to locate

their assembly subsidiaries in Malaysia. (For further details, see Chee, 1980). The strategy was a success and the Matsushita Electric Company became the first to set up an electronics factory in the country. The early electronics firms were mainly T.V. sets assemblers. Later on firms were set up to produce transistor radios. Initially, production was somewhat meagre in quantity, variety and value and was aimed at import substitution. For example, in 1966 only 500 T.V. sets were produced in Malaysia. By 1970 however, the number had risen to 43,700 sets (MIDA, 1971, p. 3).

Although production had increased significantly, the output was largely sold in the domestic market. In fact as late as 1972, Malaysia did not even have a single export-oriented electronics company. In view of the above, the Malaysian government decided to intensify its campaign and declared electronics a priority industry. Free trade zones were developed and shortly thereafter, export-oriented electronics companies started operations in Malaysia. By 1975, there were more than 50 export-oriented companies in Malaysia. They produced a wide range of consumer products such as colour and monochrome television sets, transistor radios, electronic calculators and digital watches, telecommunication equipment and so forth. In addition, they also produced various electronic components such as transistors, diodes, integrated circuits, capacitors, transformers, silicon wafers, quartz crystals, etc. (Chee, 1982). In 1980, Malaysia exported semi-conductors worth more than $435 million making the country the world's second largest exporter of semi-conductors to the U.S.A. (The world's largest exporter of semi-conductors is Japan - MIDA, 1981).

Another product which helped to boost the substantial

contribution to manufacturing value added in the electrical machinery industry in Malaysia was air-conditioners. Malaysia started manufacturing air-conditioners for export in 1974 and is now the third largest exporter of air-conditioners in the world (MIDA, 1981). In 1980, the country exported more than 100,000 units of air-conditioners valued at more than $26 million. All the parts and components for the air-conditioners are manufactured by local firms with the exception of the front wooden grille. (The exporter was unable to find a local manufacturer for the grille and subsequently invited a Japanese company to manufacture it in Malaysia).[1]

Table 2.9 shows that the capital goods industry in Malaysia supported a total of 2,256 firms, generated a total revenue of nearly $3,000 million, employed a total of nearly 125,000 workers and have fixed assets of nearly $700 million in 1981. The table also shows that among the three sub-sectors of the capital goods industry, the electrical machinery industry is the largest in terms of revenue, employment and value of fixed assets employed. This industry accounts for 66.6 per cent of total revenue, 64.9 per cent of total employment and 56.7 per cent of the total value of fixed assets employed in the capital goods industry. The dominant position of this industry is largely due to the contribution from the electronic components industry which accounts for almost three-quarters of the total revenue and employment in the electrical machinery sub-sector. However the sub-sector with the most numerous number of firms is non-electrical machinery. Most of the firms in this sub-sector are engaged in the manufacture of refrigerating, exhaust, ventilating and air-conditioning machinery (Table 2.9).

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[1] Information supplied by Matsushita Industrial Corporation, Malaysia.

2(c). Development of the Capital Goods Industry in Korea

The contribution of the capital goods industries to total manufacturing value added in Korea does not appear to be very significant except for the electrical machinery industry. As Table 2.10 shows, textiles contributed the highest percentage of manufacturing value added with 14.5 per cent followed by electrical machinery with 12.6 per cent in 1979. As in the case of Singapore and Malaysia the development of the electrical machinery industry in Korea is also of relatively recent origin. In 1963 the industry contributed only 2.4 per cent to total manufacturing value added (Table 2.10). This was not surprising since Korea only began to develop its capital goods industry in the early 1970's.

At that time, Korea's planners felt that after a decade of successful promotion of labour-intensive manufactures for export, Korea's comparative advantage had shifted to skill- and technology-intensive products such as machinery, shipbuilding and sophisticated electronics. It was believed that a high growth objective could not be achieved with an industrial development strategy which emphasized the export promotion of labour-intensive manufactures during the first two plan periods (1962-71). Moreover, since Korea was bound to lose its comparative advantage in labour-intensive exports due largely to the rapid increase in Korean real wages and strong competition from other LDCs emulating export-led industrial growth, major shifts in production and exports in favour of the expansion of heavy and chemical industries were called for (Y. Park, 1983. See also P. Hasan and D.C. Rao, 1979 and W. Hong and A.O. Krueger, 1975).

The new industrial development strategy was made public in

1973 and was pursued vigorously for the next seven years. During this time, investments in heavy and chemical industries grew at a rate unprecedented in Korea, thereby raising the share of these industries both in total investments and in manufacturing value added (Table 2.11). As a proportion of manufacturing investments, heavy and chemical industries rose from 50 per cent of the total in the latter part of the 1960's to 77.7 per cent of the total between 1977-79. The capital goods industry however achieved a much lower growth rate and accounted for only 15 per cent of total manufacturing investments during the same period. Nevertheless, the share of the machinery industry in Korea's GNP more than doubled from 3.7 per cent in 1970 to 8.4 per cent in 1978 (Table 2.12).

Although Tables 2.11 and 2.12 indicate a rather dramatic transformation in the structure of Korea's manufacturing industry and may even suggest a successful shift in industrial policy, a closer examination of other indicators shows that the new industrial policy was far from successful (Y. Park, 1983). From the beginning, all sectors experienced a host of financing, production, and marketing problems. Foremost among them was the lack in demand, domestic as well as foreign, and a resultant underutilised capacities in many industries. Data from Park's (1983) study shows that between 1975-80, the capacity utilization rate was less than 43 per cent in machinery and less than 36 per cent in transport equipment. Moreover, although the heavy and capital goods industries accounted for a significant increase in Korea's GNP, they had not contributed significantly to export growth in recent years. In fact, beginning in the first year of the Fourth Five Year Plan period, export growth fell sharply for 3 consecutive years, registering an absolute

decline in 1979. According to Y. Park (1983), the main causes of Korea's restructuring problem was the establishment of inefficient and high cost industries which resulted in marketing problems. Nevertheless, there are a few success stories in Korea's capital goods industries notably automobiles and shipbuilding.

Table 2.13 shows that electrical machinery is the largest sub-sector in the capital goods industry in Korea in terms of value of production in 1979. Production in this sub-sector accounted for nearly 40 per cent of the total value of production in the capital goods industry. Within this sub-sector, the most important products are electronic components and consumer electronic products. These two products accounted for nearly 90 per cent of total production value in 1980 (Table 2.14).[1] The second largest sub-sector in the Korean capital goods industry is transportation equipment (Table 2.13). Shipbuilding is the largest industry in this sub-sector. This industry was developed in the 1960's when the government identified it as one of the key industries. Today, Korea produces about 4 per cent of the world's total tonnage and is the seventh largest shipbuilding nation. Korea expects to become the world's second largest shipbuilder by the end of this century (Korea Exchange Bank, 1981, p. 217). Another important industry in this sub-sector is automobiles, of which 360,000 units were produced in 1980. In the machinery sub-sector, Korea produces mainly construction, mining, industrial chemical and textile machinery (Table 2.15).

The major centre for the manufacture of machinery in Korea is the Changwon Machinery Industrial Complex where there are more than 125

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[1] For details of the electronics industry in Korea, see S.C. Suh, 1975. For a more recent study see Korea Trade & Business, January 1984, pp. 4-6.

firms. In June 1982, the Korea Heavy Industries and Construction Co. dedicated one of the world's largest and most modern single machinery plants in Changwon.

3. Characteristics

Table 3.1 shows the value added of the capital goods industry in Southeast and East Asia[1] for selected years. The table shows that for the most recent year for which data were available, the three countries with the highest value added in the capital goods industry were

a) Korea ($3,686.4 million)

b) Singapore ($1,790.2 million)

c) the British colony of Hong Kong ($917.7 million)

The total value added in the capital goods industry in the above three countries amounted to $6,394.3 million or 84.2 per cent of the total value added in the SEEA region. The country with the lowest value added was the Philippines with only $187.9 million.

Table 3.1 also shows that with the exception of the Philippines and Indonesia, the electrical machinery industry accounts for the largest percentage of value added among the three sub-sectors in the capital goods industry. In the British colony of Hong Kong, the electrical machinery industry accounts for 79.6 per cent of total value added in the capital goods industry while in Malaysia the proportion is 64.5 per cent. The importance of the capital goods sector in SEEA is largely due to the dominance of the electronics industry in this region, which is one of the world's leading producers of electronic components. In the Philippines and Indonesia,

[1] Except Burma for which data are not available.

the transport equipment industry accounts for the largest percentage of value added. In the Philippines, the importance of the transport equipment industry may be attributed to the relatively high proportion of local content in the automobile assembly industry under the Progressive Car and Truck Manufacturing Programmes.[1] In Indonesia the electrical machinery industry is relatively underdeveloped.

Table 3.2 shows the number of employees in the capital goods industry in SEEA for selected years. The table shows that the three countries with the largest number of employees in the capital goods industry in the most recent year for which data were available are:

a) Korea (464,600)

b) the British colony of Hong Kong (145,400)

c) Singapore (135,000)

The total number of employees in the capital goods industry in the above three countries total 745,000 or 72.4 per cent of the total number of workers employed in this industry in the SEEA region. The difference in the percentages in value added (84.2 per cent) and employment (72.4 per cent) indicates the relatively high productivity of labour, possibly due to the relatively high capital intensity of the industry in the three leading countries. This may be seen when we compare the value added per employee in the industry for all countries in SEEA.

Table 3.3 shows the value added per employee in the capital goods industry in SEEA for selected years. On the weighted average, the value added per employee in the capital goods industry as a whole, is highest in Singapore ($13,261), followed by Korea ($7,934) and Thailand

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[1]For further details, see Section 4(c).

($6,656). Thus the labour productivity in Singapore is nearly twice that in Korea and certainly more than twice as high as that in the rest of SEEA. Labour productivity in Singapore in each of the three sub-sectors of the capital goods industry is also highest compared to other countries in the region. The relatively high labour productivity of the capital goods industry in Singapore is an indication of the relatively high level of technology and capital intensity in the industry. A closer look shows that labour productivity is highest in the transport equipment industry in Singapore with a value added of $18,157 per employee.

The country with the lowest value added per employee in SEEA is the Philippines with only $2,506 or 19 per cent of Singapore's level. It is however interesting to note that in 1967, Singapore's labour productivity in the capital goods industry was almost similar to that in the Philippines in 1977. But with rapid modernisation and the introduction of high technology industries, the labour productivity in Singapore has now risen far above the Philippines' level.

Among the three sub-sectors of the capital goods industry in SEEA, the electrical machinery appears to record the lowest value added per employee in most of the countries in the region (Table 3.3). This indicates that the industry is mainly concerned with assembly operations rather than manufacturing. This impression is supported by our earlier finding that the ratio of value added to output for semi-conductors in Singapore for example, is relatively low compared to the same ratio for other capital goods (see Section 2(a) above).

Table 3.4 shows the mean size of establishment in the capital goods industry in SEEA for selected years. The table shows that the

mean size of establishment is largest in the electrical machinery, although as we have already noted, this sub-sector has the lowest gross labour productivity. The large number of workers employed in the electrical machinery industry is another indication of the assembly nature of the industry. For all countries in the region, (except Burma for which data are not available), on the average, the mean size of establishment in the electrical machinery industry is 233 employees. The mean size is largest in Malaysia with 358 employees and smallest in the British colony of Hong Kong with 63 employees. All the same, it is clear that firms in the electrical machinery industry in SEEA are generally large firms.

On the other hand, firms in the non-electrical machinery industry are relatively small firms. The majority generally produce for a small domestic market and manufacture simple machinery or parts. For example, about half the agricultural machinery industry in Thailand employ less than 10 workers each and produce a maximum of 300 units of machinery a year (see Section 4(a) below). For all countries in SEEA, on the average, the mean size of establishment in this industry is only 42 employees. The mean size is smallest in the British colony of Hong Kong with 9 employees and largest in Indonesia with 87 employees.[1]

Table 3.5 shows the average annual earnings for the capital goods industry in SEEA for selected years. The table shows that on average, for the capital goods industry as a whole, the annual earnings is highest in Singapore ($4,993) followed by the British colony of

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[1] A table showing value added per establishment as Professor D. Blake suggested would doubtless provide useful comparisons among industry sub-groups but unfortunately, such data are not available.

Hong Kong ($3,856) and Korea ($3,350). The relative high earnings in Singapore is partly a reflection of the relatively high labour productivity of the capital goods industry in Singapore, which we have already noted, and partly a result of the government's deliberate policy of increasing the wage rate in the republic.

Table 3.5 also shows that Singapore's earnings is also higher than any of the other countries in SEEA in each of the three sub-sectors of the capital goods industry. The earnings is highest in the transport equipment industry where labour productivity is also highest. The country with the lowest earnings is Indonesia where the earnings is less than a fifth of that in Singapore. Singapore's average annual earnings in the capital goods industry rose nearly four times between 1967 and 1980. An even more remarkable increase may be seen in Korea where the earnings rose by a factor of 9.2 between 1963 and 1979.

Finally, with the exception of Korea, it would appear that the capital goods industry in SEEA is largely dominated by foreign investors. The UNIDO data base has no information on ownership but several studies indicate a strong foreign presence in the capital goods industry in many SEEA countries. For example, a study by the Institute of Developing Economies (1982) shows that with the exception of Korea and Taiwan (China), all the selected countries in its study have a significant proportion of foreign equity in their respective electronics industry (Table 3.6).

National data for Singapore show that foreign ownership accounted for 83, 77 and 75 per cent of the total capital invested in the electronics, electrical machinery and transport equipment industries, respectively (Singapore, 1982). In Malaysia, the electrical and electronic products, machinery and transport equipment industries had

61.4, 39.8 and 34.5 per cent of foreign capital in 1980, respectively (Chee, 1984b). Ownership data for other countries will no doubt show a pattern similar to that for Malaysia and will also show, as in the case of Singapore and Malaysia, that the major foreign investors come from Japan, the United States, and the EEC. For example, the IDE study cited earlier shows that Japanese enterprises are most numerous in the Asian electronics industry. In practically every one of the selected Asian country, Japanese enterprises accounted for at least one-third of the total number of foreign enterprises (Institute of Developing Economies, 1982, p. 178).

Among the SEEA countries, Korea appears to be the exception since it has relatively little foreign investments not only in the capital goods industry but also in the manufacturing industry as a whole (F. Hasan and D.C. Rao, 1979, p. 444). Other SEEA countries generally have to depend on foreign investments in their capital goods industry because of their lack of capital, technology and marketing outlets.

4. Profile of Selected Industries

Having given an overall picture of the capital goods industry in SEEA, we feel that an indepth profile of selected sub-sectors in the industry will provide the background for an analysis of the basic problems and issues of the capital goods industry in the subsequent section. For this purpose we have selected the agricultural machinery industry (ISIC 3822), the electronic components industry (part of ISIC 3832), and the motor vehicle industry (ISIC 3843). Each of these industries is chosen to represent one of the sub-sectors in the capital goods industry.

The agricultural machinery industry is chosen to represent

the non-electrical machinery sector because many of the economies in SEEA are based on agriculture. The modernisation of the agricultural sector in SEEA will require the extensive input of agricultural machinery some of which are already produced in the region. In addition, the development of the agricultural machinery industry will help to promote stronger linkages between industry and agriculture in the SEEA region, one of the major objectives of industrial policies in this region (ESCAP, 1970). In the electrical machinery sector, the electronic components industry is selected because SEEA is one of the world's largest exporter of electronic components. In addition, the industry is one of the largest employers in the manufacturing sector in a number of SEEA countries and has significant backward and forward linkages potential. Finally, the motor vehicle industry is chosen to represent the transport equipment sector because most of the countries in SEEA have a motor vehicle assembly industry and some of them even aspire to manufacture their own vehicles.

4(a). Agricultural Machinery

The UNIDO data do not have any statistics on the production of agricultural machinery in SEEA except for some odd figures for the production of ploughs and threshing machines in Korea and the production of tractors in Burma. The data are incomplete since many other countries in the region also produce agricultural machinery. This may be seen in Table 4.1 which shows the export of agricultural machinery (SITC 712). The table shows that SEEA exported $19.4 million worth of agricultural machinery in 1980 (representing 0.1 per cent of the total value of capital goods exports). The table also shows that Singapore accounted for 50.4 per cent of the exports while Korea accounted for 24.3 per cent.

A closer look reveals that Singapore's exports consist mainly of tractors (52.9 per cent) and agricultural machinery for harvesting, etc. (34.1 per cent). However, Singapore's figures are actually re-exports because there is no manufacturer of agricultural machinery in the republic.

Korea's exports are mainly agricultural machinery for soil preparation (76.2 per cent) and tractors (22.0 per cent). Table 4.1 also shows that the export of tractors is common to all the countries in the SEEA region which export agricultural machinery (with the exception of the British colony of Hong Kong). The total value of tractors exported by SEEA amounted to $8.7 million or nearly 45 per cent of all exports of agricultural machinery from SEEA. The second largest item was agricultural machinery for soil preparation which amounted to nearly $5 million.

Information from various SEEA countries indicate that the agricultural machinery industry has grown very rapidly in the last 15 years and is an important activity in the capital goods industry in SEEA. Even Burma produced 700 units of tractors in 1978 /UNIDO (1983, p. 50/. Unfortunately production data for the rest of SEEA are not available. However, industry sources indicate that most of the tractors produced in SEEA are small tractors, of which there are two major types. One is the two wheeler power tiller and the other is the four wheeler small tractor. These two types of agricultural machinery are popular in SEEA because they help to replace the buffalo and the wooden plough and are most suitable for tilling small plots of land. The two wheeler power tiller has an engine usually of 5 - 10 HP and weighs about 200 kg. (excluding the engine). The user has to walk behind the tiller. The four wheeler tractor has an engine with more

than 10 HP and weights around 300 kg. (excluding the engine). The user can ride on the tractor.

In Thailand, agricultural machinery was first produced in the late 1950's but there was no significant domestic production until the latter part of the 1960's (P. Taenkam, 1980). Production increased most rapidly in the first half of the 1970's and today, there are over a hundred factories all over the country producing about ฿ 780 million ($35 million) worth of agricultural machinery and employing more than 2,400 workers (Bank of Thailand, 1978). Table 4.2 shows that the total production capacity of the industry in 1978 was approximately 67,000 units with 57,000 units of two wheel power tillers, 7,000 units of four wheel power tillers and 3,000 units of tractors. Actual production of the three machinery were 39,568, 3,808 and 2,158 units, respectively. Thus production capacity was not fully utilised in the industry.

A crude estimate made by Thailand's Board of Trade (BOT) study found that the industry generated about 135.8 million baht ($6.2 million) of value added (C. Loohawenchit, 1980, p. 11). The BOT study also found that about half the firms in the agricultural machinery industry employed less than 10 workers and produced a maximum of 300 units a year. Most of these firms were small family workshops which evolved from lathe workshops or small auto repair shops. In all, the BOT estimated that the industry provided jobs for about 2,200-2,400 workers with 400 workers in tractor production and the rest in tiller production. All the firms in the industry are locally-owned with the exception of a few tractor firms which had some foreign equity.

Another study (Ungthip, Chinapant (1976), p. 53) estimated

that the demand for domestically produced small tractor in Thailand would increase at the rate of 12.5 per cent per annum as follows:

Year	Two wheel tractor	Four wheel tractor
1977	16,237 units	2,918 units
1978	18,267 "	3,282 "
1979	20,550 "	3,692 "
1980	23,118 "	4,153 "
1981	26,007 "	4,682 "
1982	29,257 "	5,268 "

Since most of the small tractors used in Thailand are locally produced, current production of small tractors in Thailand would be around 35,000 units. Ungthip's (1976) study also shows that locally produced tractors are popular with the farmers because they are better suited to the local topography. In addition they are also cheaper and because of their simple design they can be easily repaired, even by the farmers themselves.

In the Philippines, local production of power tillers and small tractors began in the mid-1960's. By 1976, 15,642 units of power tillers had been manufactured by about 44 local manufacturers (ESCAP, 1979). The local content of these tillers ranges from 50-90 per cent by value. The production of power tillers was encouraged by the introduction of high-yielding rice varieties which generated higher incomes as well as the implementation of the first CB-IBRD credit programme which financed the purchase of farm machinery (Philippines, 1975). Another important factor which assisted the development of small tractors in the Philippines was the establishment of the International Rice Research Institute (IRRI) which developed several prototypes of specially designed tractors for the rice producing countries of Asia. These prototypes are now being manufactured by several firms in the

Philippines. A study estimated that there were 45 small tractor firms in the Philippines and sales of locally produced tractors totalled 4,772 units in 1975 (J.A. Salvana and Roman, (1977), p. 10).

In Malaysia, one firm is involved in the manufacture and three firms are involved in the assembly of agricultural machinery, mainly power tillers and small tractors. The c.k.d. parts are imported from Japan. The main sources of demand for tractors in Malaysia come from the government and its associated agencies, large estates/plantations, contractors and the farmers. The government and its associated agencies such as the Agricultural Bank of Malaysia, the Farmers' Organisation Authority and the Federal Land Consolidation and Rehabilitation Authority form the main source of demand for agricultural machinery. The machinery are bought by the government and distributed to farming groups or used by the agencies. The large estates or plantations form the second largest group of customers and they are followed by the contractors. These contractors cultivate the land for the farmers for a fee. The contractors provide an attractive service because they could cultivate different plots of small land while the small farmer by himself would not be able to recoup the cost of the tractor if it were used only on his small piece of land. The smallest group of customers for agricultural machinery comes from the farmers. The reason is that many farmers are still poor and very few can afford to buy any machinery. Thus it would appear that the demand for agricultural machinery in Malaysia depends largely on the government and scarcely on the farmers. This is a strange situation and one that is the root cause of the major problem currently facing the agricultural machinery industry in Malaysia.

The problem arose when the Malaysian government decided to tighten its budget in late 1982 because of the growing budget deficit. The cutback in the government's agricultural expenditure caused a financial crisis in the agricultural machinery industry. Firms in the industry had not received any large government order since the beginning of 1983 (Business Times, July 7, 1984). The drastic drop in government orders was not compensated by any increase in orders from the other two major groups of customers. On the contrary, there was a similar decline from the other two sources. The plantations cut down on expenditure when commodity prices remained depressed in 1983. The contractors on the other hand had declined significantly in number. They were displaced by government programmes to set up and equip farming groups which could perform the necessary cultivation work for farmers at a low cost. These groups displaced many of the contractors because the latter were unable to reduce their service fees. As for the farmers, they can only afford to buy machinery if loans are available but financial institutions are reluctant to offer such loans for fear of bad debts.

The above situation has been exacerbated by the mushrooming of second-hand dealers selling reconditioned farm tractors at cut-rate prices. An average 40 hp tractor costs about $11,000; a second-hand reconditioned tractor sells for $7,000. Given the above situation the agricultural machinery industry in Malaysia faces a rather bleak future and does not anticipate improvements in the near future. Fortunately, the situation is not as bleak as it appears. Firstly, the government has committed the country to an accelerated mechanisation programme in the agricultural sector in the recently formulated

National Agricultural Policy (Malaysia, 1984). Thus we can expect government orders for agricultural machinery to increase once the economy recovers. Secondly, as agricultural income increases, more and more farmers will be able to afford to buy agricultural machinery. Thirdly, there is still substantial scope for the expansion of the agricultural machinery industry in Malaysia. As stated earlier there is only one firm manufacturing agricultural machinery in the country. The other 3 are assembly firms. A study showed that local components made up less than 30 per cent of the ex-factory cost of the locally-assembled tractor in 1975 (Chee, 1978, p. 27). When one compares the local content and the number of agricultural machinery manufacturing firms in Thailand and the Philippines, it would appear that there is a lot of scope for the development of the small tractor industry in Malaysia.

To sum up, FAO estimates that at present the manufacture of modern agricultural machinery remains massively concentrated in the industrialized countries, with the developing countries apparently accounting for only about 8 per cent of total world production (FAO, 1981a). In addition, a large proportion of SEEA's farming population are still relying on archaic agricultural techniques and equipment on the farms. In order to meet the food needs of the developing SEEA countries, agricultural production in these countries would have to increase by at least 80 per cent. This would require a five-fold increase in the use of agricultural machinery and equipment (FAO, 1981b). All these factors indicate that there is potential scope for the development of the agricultural machinery industry in SEEA - especially when such machinery are defined in a wider sense, covering not only equipment for tilling (in particular tractors and tractor-drawn machines)

and harvesting (combine harvesters) but also all the equipment needed for agricultural and animal production, the storage, transport and (primary) transformation of agricultural materials, land development (irrigation equipment) and even traditional rural activities (UNIDO, 1983, p. 4).

4(b). Electronic Components

Electronic components include active components such as semi-conductors; passive components such as resistors and other components such as printed circuit boards. The manufacture of some of these components such as semi-conductors is labour-intensive because the assembly is complex and difficult to mechanise. Moreover the industry is characterised by very rapid technological changes so expensive automated machinery may become obsolete rapidly. Thus less specialised labour-intensive equipment are used. Consequently it is more economical for electronics MNC to send raw materials or components to developing countries for labour-intensive assembly or processing (UNCTAD, 1975, p. 7). The major country whose firms have engaged in such offshore assembly is the U.S. and the major region where such assembly takes place is SEEA.

Table 4.3 shows that 70.2 per cent of SEEA's exports of electronic components originated from Singapore and Malaysia in 1980. Exports from Indonesia and the Philippines were marginal while those from Thailand were negligible.

Before the mid-sixties, there were few electronics firms in SEEA but after 1965 electronics MNCs began to move to the region, attracted largely by low wages and the fiscal incentives offered by

host country governments such as tax holidays and Free Trade Zones. Initially the British colony of Hong Kong, Korea and Singapore were selected for offshore assembly but as wages increased other SEEA countries were selected. These included Malaysia, Philippines and Indonesia. Today, Malaysia is the major location for semi-conductor firms.

The pattern of investments in the electronics industry in various SEEA countries is quite similar, starting with semi-conductor assembly and followed by the production of simple electronics consumer goods. The growth and development pattern of the electronics industry is also quite similar in the various SEEA countries. The pattern falls into three distinct phases: rapid growth from 1968 to early 1974; recession and recovery from mid-1974 to 1976; and renewed growth and slight stagnation since 1976. Before the world recession in 1975, the United States was by far the largest foreign investor but in the last decade or so, Japanese and European electronics companies have rapidly increased their share of investments in SEEA's electronics industry. In Singapore for example, in 1979, over half of the S$400 ($190) million of new investments in the electronics industry was committed by Japanese firms (Pang and Tang, 1980).

The rapid development of the electronics industry has made it one of the largest employers in the manufacturing sector in a number of SEEA countries such as Singapore, Malaysia and the British colony of Hong Kong. In Singapore, for example, the 172 electronics firms employ more than 71,000 workers in 1980, making it the largest employer in the manufacturing sector (Table 4.4). Table 4.4 also shows that the electronics industry in Singapore accounts for 16.9 per cent of

manufacturing output and 87.1 per cent direct export of total sales in 1980.

Although the electronics industry has made a significant contribution to the employment and foreign exchange situation in the SEEA countries the industry suffers from certain drawbacks. Firstly, many of the electronics firms in SEEA depend largely on the export market, especially on sales under the Generalised Scheme of Preference (GSP). The proportion of companies in Singapore selling under GSP vary from 50 per cent for the British colony of Hong Kong firms to 70 per cent for European, Japanese and American firms. The dependence of the SEEA electronics industry on the GSP does not bode well for the future prospects of the industry especially in the more developed SEEA countries such as Singapore and the British colony of Hong Kong. The problem is the emergence of protectionist sentiments in the developed countries. In the United States, pressures have been exerted by various interest groups to strip away tariff provisions which encourage offshore production. Several EEC countries have introduced "orderly marketing arrangements" to reduce their imports of electronics goods from newly-industrialising countries like the British colony of Hong Kong, Korea, Taiwan and Singapore (Pugel, et. al., 1-84).

Secondly, as stated earlier, with the exception of Korea, the electronics industry in SEEA is largely under the ownership and control of MNC. Foreign investments in the electronics industry in SEEA come mainly from the United States and Japan. The strong dominance of this industry by foreign interests in SEEA may place certain limits on the direction of growth in the industry. At the very least, growth in the industry will be dictated by foreign rather than national interests.

Thirdly, many electronics component factories in SEEA perform

mainly soldering iron operations and concentrate on assembly of integrated circuits and transistors. Virtually all the materials required for the assembly operations such as gold wire, silicon chip and wafer are imported from parent companies. At the same time, the bulk of the electronic components assembled in SEEA are exported for use in the manufacturing of video tape recorders and audio equipment such as transistors and stereo sets. Thus the electronics industry in SEEA is more or less an "enclave" industry which has minimal linkages with the rest of the region's economies (Lim, Linda, 1978).

Fourthly, since the operations involve mainly assembling and use a relatively low level of technology, the technology transfer from the electronics industry has been minimal. Moreover, the industry has relatively few backward linkages due to the inadequacy in range, in price, and in quality of the local supporting industry. Output from the industry is largely exported so forward linkages are also minimal. In fact the industry on the whole is poorly integrated with the local economy and is often regarded as an "enclave" industry.

Finally, the industry employs mainly young female workers. The job is not very attractive because of the strain, tedium and discipline of electronics factory work. Value added in the industry is generally low since the electronics firms tend to import a great deal of their inputs. For example, a study shows that American firms in Singapore use less than 10 per cent local material input (Pang and Lim, 1977).

While many of the criticisms of the electronics industry in SEEA may be valid, changes presently taking place in this industry may help to ameliorate some of these criticisms. The most significant change

is the attempt by Korea, Singapore, Malaysia and the British colony of Hong Kong to move out of low-cost, high-volume consumer electronics into the rapidly expanding world of semi-conductors, telecommunications and computers. This move is worrying their advanced competitors especially Japan and the United States which may respond with a new wave of protectionism and renewed efforts to embargo high-technology exports.

Evidence of this move is most obvious in Korea where the giant Hyundai industrial group plans to pour $700 million into seven state-of-the-art computer and advanced electronics plants. In Singapore, electronics firms are now producing various computer "peripherals" such as printer mechanisms, key boards and disc drives and these are shipped to affiliated plants all over the world (Newsweek, July 23, 1984). Changes are also taking place in the electronics industry in Malaysia. NEC, the second largest producer of integrated circuits in the world plans to equip its Malaysian subsidiary with a leading-edge LSI (large-scale integrated circuit) plant by 1986 (Business Times, July 9, 1984). In the meantime, Mostek is producing the Zero Power RAM, a superchip which can be used in portable computers, sophisticated defence systems, medical, commercial and other uses (New Straits Times, July 11, 1984).

All the above products represent a change from the traditional products such as inexpensive radios, watches, television sets and other consumer appliances which still form the bulk of SEEA's electronics exports. The shift to the higher value-added and greater technology-intensive products is prompted by two major factors. Firstly, the SEEA countries want to deepen their electronics industry and develop new products of their own rather than remain mere assemblers for overseas manufacturers. Secondly, some of the SEEA countries especially Korea,

Singapore and the British colony of Hong Kong are losing their comparative advantage in labour costs. Prosperity has driven up wages, while robots and other technological advances have lowered production costs elsewhere so dramatically that plants in Japan and the United States are now as competitive as those in SEEA. At the same time, lower-cost producers in Malaysia, Indonesia and Thailand are moving strongly into consumer electronics. China looms as potentially the most threatening competitor of all. The preferred solution to these threats has beer the same in the advanced SEEA countries; to turn out more advanced products and, eventually, compete with Japan.

4(c). Motor Vehicle

Table 4.5 shows the export of motor vehicles by SEEA countries in 1980. Exports from Singapore and the British colony of Hong Kong are entirely re-exports since these two countries do not have a motor vehicle industry. Exports by the other SEEA countries (except Korea) comprise mainly bodies, chassis and frames of motor vehicles. Only Korea exports passenger cars manufactured locally since Korea is the only country in SEEA with manufacturing capability in the motor vehicle industry. Indonesia, Malaysia, Philippines and Thailand assemble motor vehicles from imported c.k.d. packs. Singapore, the British colony of Hong Kong and Burma have no motor vehicle industry.[1]

The motor vehicle industry in Korea started in 1962 when the first motor vehicle assembly plant was established. In 1979 the country manufactured over 200,000 units of motor vehicles (Kim and Lee, 1983).

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[1]Singapore closed down its motor vehicle assembly plant a few years ago. (For further information, see UNIDO, June 1984).

Korea began to export motor vehicles in 1975; more than 30,000 units were exported in 1979. Korean cars are exported to Africa, Latin America, West Asia, Europe and Canada. The leading Korean car manufacturer is Hyundai Motor which produces Pony cars with technological help from Mitsubishi Motors (L. Kraar, 1983). A new Hyundai factory designed to make 300,000 cars a year will quadruple the Korean car maker's capacity in a few years. The company wants to reduce unit costs, improve quality and export to the U.S. In order to do this, Korea's car manufacturers are teaming up with their U.S. counterparts. For example, in July 1984, Daewoo signed an agreement with General Motors to take equal shares in a $427 million joint venture to build front-wheel-drive cars in the U.S. Similarly, Hyundai and Samsung also had joint venture plans with Ford Motor Company and Chrysler respectively. The Koreans hope that partnerships with American companies will help them in their automobile export drive. (Business Times, August 4, 1984).

Korea decided to expand the automobile industry after realizing that small-scale production made it difficult to compete with overseas manufacturers and hindered the introduction of new technology. Auto Industries Cooperative Association officials said six Korean car manufacturers had plans to triple their combined annual production capacity to nearly one million units by 1988 from the current 337,000 units. The expansion plans and export drive follow three lean years for the industry from 1980 until last year, when sales increased 36 per cent from 1982 to a record 219,144 units. Industry officials expect even better sales this year (Business Times, August 4, 1984).

According to a recent study, Korea's remarkable progress in the motor vehicle industry is largely due to the Korean government's

adherence to the automobile manufacturing policy patterned after the Japanese model (Kim & Lee, 1983, p. 286). The Korean strategy of automobile industry development differs in many respects from the strategies of most of the developing countries where completed cars are assembled by subsidiaries of foreign companies (usually multinationals) or by joint ventures with foreign firms, and where the development of ancillary firms is closely linked to multinational corporations which control the supply of major parts and components. In contrast, most automobile ancillary firms in Korea developed prior to or independent of parent firms, and this has greatly facilitated the rapid localization of parts and components within a relatively short period of time. Anothe. important element of the Korean strategy was the government's recognition of the parts and components industry as a potential export industry. Consequently, the government decided to actively promote the development of ancillary firms independent of parent firms. The government realized that the development of ancillary firms based on specialization and large-scale production was indispensable for the successful implementation of the Korean car industry. This development strategy stimulated vigorous investment in the automobile ancillary industry and was a major factor in the success of the Korean automobile industry as a whole.

After Korea, the Philippines is probably the most advanced in the motor vehicle industry in SEEA although it is still at the assembly stage. The Philippines automotive industry began with the establishment of the Progressive Car Manufacturing Program (PCMP) and the Progressive Car and Truck Manufacturing Program (PTMP) established in 1973 and 1977 respectively. The main features of these programmes were:

a) A requirement on participating automotive companies to increase the local or domestic content ratio of their products from 10 per cent in the first semester of 1973 to 62.5 per cent by the end of 1978. Furthermore, net foreign exchange earnings from exports of locally manufactured components would be considered in computing domestic content attainment.

b) Restructuring of the existing sales tax and tariff scheme to encourage local manufacture of components.

c) Limits on the exchange cost and peso cost of locally manufactured components.

d) Preference for horizontal integration rather than vertical integration of operations.

e) Limitation of programme coverage to cars and light commercial vehicles with engines of four cylinders or less and displacements of 2000 cc or less (ESCAP, 1979, p. 125).

Under PCMP and PTMP the local automobile assembly industry achieved nearly 70 per cent local content in 1979 (Tolentino and Ybanez, 1983).[1] The utilisation of domestically manufactured parts encouraged the establishment of more than 250 component manufacturers producing mainly metal parts and fabrications, rubber products and car accessories.

However, in spite of their achievements, the PCMP and PTMP have their share of criticisms. The main criticism relates to the

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[1] The local content is much lower in the other SEEA countries which are still assembling automobiles. For example, local content is less than 15 per cent in Malaysia (Chee, 1983a) and around 40 per cent in Thailand (N. Siriboon, 1983).

benefits of the PCMP and PTMP relative to their costs. Critics charge that the Philippines market is not large enough to support the PCMP and PTMP. Consequently, they point out that the prices of locally assembled automobiles have risen by 100 per cent or more between 1973 and 1978 (ESCAP, 1979).

Apparently, the criticisms levied at the Philippines automobile industry have not discouraged other SEEA countries from trying to set up their own automobile manufacturing industries. For example, in late 1982, Malaysia announced its intention to manufacture cars by 1985. In May 1984, the Malaysian government and Mitsubishi signed a $245 million contract to set up a joint venture to produce the Malaysian car. The transition from motor vehicle assembly to manufacturing will be a painful one for the industry which currently supports a dozen assemblers assembling more than 20 makes and models of cars (Chee, 1984b).

In the wake of the Malaysian announcement, a Bangkok firm also stated that it wanted to build an "all-Thai car" (New Straits Times, August 10, 1983). The firm (Yontrakit Group) applied for promotional privileges to invest about $91 million to set up a plant to manufacture both sedans and commercial vehicles using only locally produced components. Subsequently the Automobile Industry Development Committee in the Industry Ministry in Thailand said that it was studying the possibility of setting up a car manufacturing plant in Thailand. The Committee believed that it would be better for Thailand to have its own car manufacturing plant as it could mean substantial foreign exchange earnings and savings (Business Times, May 23, 1984).[1]

[1]At present Thailand has a dozen car assembly plants which use about 40 per cent local contents in value. (For further details, see N. Siriboon, 1983).

Indonesia which has one of the largest markets for commercial vehicles, does not have a local content programme for passenger cars but it has a deletion schedule for commercial vehicles that aims for 100 per cent local content by 1985 (W. Witoelar, 1983). Thus if Philippines, Malaysia, Thailand and Indonesia achieve their objectives, each of these countries will have their own integrated car manufacturing industry by 1985, each catering to their own small domestic market. Much of the drive towards a local motor vehicle industry appears to be stimulated by the prestige and glamour of this industry rather than sensible economics.

In view of the above developments, it would appear that the motor vehicle industry in SEEA may not be heading towards a bright future. The SEEA market is too small to support a multiplicity of national car industries while the export market is too competitive even for well established car manufacturers such as those in the United States and Europe (UNIDO, June 1984, p. 50). For this reason it is rather unfortunate that the countries in the region are unable to coordinate their motor vehicle manufacturing industries and work towards the manufacture of a regional car industry.

One of the most promising schemes along this line is the ASEAN Automotive Complementation Scheme (AACS). The AACS refers to the production of a particular automobile component part in an ASEAN country both for use in that country and for export to other countries, particularly those in the ASEAN region (Chee, 1983c). The general concept is that expensive capital facilities and equipment for the manufacture of a high volume component part will be introduced in one country and from there supply the needs of all the participating countries. The manufacture of the various vehicle parts will thus be

shared between the member countries in such a way as to provide equal benefit to all member countries at the same time, enabling the industry to make the most of the available market and the economies of scale resulting from higher production volumes. In this way the ASEAN countries will be able to overcome the presently small domestic markets in their respective countries which have acted as a serious constraint in the development of their respective local automobile industries. The scheme will also serve to achieve the most efficient use of resources possible by locating component plants on a regional basis. This will provide for the most economic production of each major component. Under the scheme each ASEAN country will manufacture specified component parts. These parts will then be traded within and outside the ASEAN region.

There are several factors in favour of the AACs. Firstly, the scheme will enable manufacturers to benefit from the economies of scale for the combined markets of the participating countries. At present the market for motor vehicles in the individual ASEAN country is not large enough to support the manufacture of high volume component parts. The manufacture of such components however will be feasible if we take the ASEAN market as a whole. More important perhaps is the growing potential of the ASEAN vehicle market. With a population of over 250 million people the vehicle density in the ASEAN region is relatively low (199 persons to 1 passenger car) compared to the vehicle density in the developed countries such as Japan (15 persons to a car) (Australia, 1972). The current market for vehicles in the ASEAN countries is about 150,000 units per annum, with forecasts ranging from 500,000 to 800,000 for the area by 1980. Thus there is no doubt that

ASEAN has the market and the potential to provide the basis for the establishment of high volume component manufacturing industries.

Secondly, the ASEAN countries have made a strong commitment to regional industrial cooperation. The motor vehicle industry offers a fruitful area for such cooperation. The ASEAN Governments realize this and so have private enterprises in the respective countries. Both sides have made strenous efforts to make the scheme a success so that it can provide the lead for other similar industrial cooperation schemes.

The AACS scheme received a boost in 1977 when ASEAN motor assemblers and component manufacturers came together to form the ASEAN Automotive Federation (AAF) (New Straits Times, February 5, 1977). The AAF is made up of five automotive associations in ASEAN. At the first AAF Council meeting in December 1976, it appointed a Technical Committee to study and identify automotive components/parts/products for regional complementation. Subsequentiy, the Technical Committee recommended 32 out of 121 items identified as products for possible industrial complementation as follows:

A. Suspension system

1. Shock absorber complemented by models
2. Coil spring

B. Power train

1. Transmission assembly complete
2. Driving axle including differential carrier assembly, complete
3. Propeller shaft including "U" joints
4. Constant velocity joints

C. Electrical system

1. Horns

2. Wiper motors

3. Starter motors

4. Alternators

5. Regulators

6. Gauges

7. Head light bulbs

D. Engine and parts

1. Engine assembly by make

2. Engine parts

(a) Oil screen
(b) Oil pressure gauges
(c) Oil temperature gauge
(d) Thermostat
(e) Water temperature gauge
(f) Timing chain cover
(g) Cylinder block
(h) Cylinder head
(i) Crankshaft
(j) Valves
(k) Carburetor
(l) Timing chain

E. Make system and wheels

1. Make hoses, clutch hoses

F. Body parts (to be complemented by models)

1. Floor side panel assembly

2. Side structure

3. Roof panel

4. Frame side rail

5. Cross members

Of the 32 products, it was found out that there was:

- No existing facility in all the five ASEAN countries for three components.
- No existing facility in four ASEAN countries for seven components.
- No existing facility in three ASEAN countries for six components.
- No existing facility in two ASEAN countries for seven components (UNIDO, 1983, p 45).

After the AAF Third Council Meeting held in Singapore in November 1978, the initial package for regional complementation was agreed upon by AAF members. This package consisted of the following:

Indonesia - Deutz diesel engines (30 HP - 150 HP)

Malaysia - Spokes, nipples and drive chain for cars

Philippines- Body panels for Ford Cortina

Singapore - Universal joints

Thailand - Body panels for commercial vehicles of one ton and above

Carburetor and headlight projects were also agreed upon by AAF.

The proposed initial package as well as the carburetor and headlight projects were approved at the WGIC Standing Committee Meeting held in February 1979 for recommendation to COIME. After a few rounds of meetings and consultation with the expert group on the automotive industry, COIME eventually adopted the first two AIC packages for final approval by the ASEAN Economic Ministers in Bali in September 1980:

<u>First Package</u>:

Indonesia - Diesel engines (80-135 HP)

Malaysia - Spokes, nipples and drive chains for

motorcycles and timing chains for motor vehicles.

Philippines - Ford body panels for passenger cars

Singapore - Universal joints

Thailand - Body panels for motor vehicles of 1 ton and above.

Second Package:

Indonesia - Steering systems

Malaysia - Headlights for motor vehicles

Philippines - Heavy duty rear axle for commercial vehicles

Singapore - Fuel injection pumps

Thailand - Carburetors (UNIDO, 1983, p. 46).

To facilitiate the implementation of the first package, AAF agreed that the companies involved in manufacturing should take the initiative to work multilateral or bilateral complementation. Request had to be made to the government bodies for appropriate tariff concessions. At the Fourth ASEAN-CCI meeting held in Jakarta in December 1980, AAF was authorized to communicate and negotiate with COIME and the expert group on the automotive industry on all matters relating to complementation in the automotive industry. Meanwhile, negotiations on trade preferences on products covered under the two automotive complementation packages started at the Eighth Meeting of the Trade Preferences Negotiating Group of the COTT held in January 1981. The requests for tariff concessions from each other involved further rounds of negotiation. This was because all the ASEAN countries (with perhaps the exception of Singapore) had numerous automotive parts industries operating behind tariff walls (UNIDO, 1983, p. 46). This was

one of the reasons why the ASEAN governments were unable to overcome several obstacles relating to the AACS. There were of course other reasons.

Firstly, there were five different countries involved,[1] each with different reasons for wanting an automobile industry and to a lesser extent with different national needs. For example, the Philippines Government wanted an automobile industry mainly to induce light engineering skills. Singapore was mainly interested in component manufacturing industries which used high level skills and could live mainly on exports. Indonesia had no specific plans for component manufacture and was basically concerned with the growth of labour-intensive industries. Malaysia was concerned with minimizing the cost of motor vehicle production.

Secondly, the level of development in the motor vehicle industry in the ASEAN region was rather uneven. Philippines was well ahead of its neighbours while Indonesia was far behind. The multi-national motor corporations such as Ford, General Motors, Chrysler and Toyota had set up component manufacturing facilities in a few ASEAN countries but not in others. The uneven distribution in the existing number and type of component industries gave rise to problems relating to the allocation of components and distribution of benefits. For example, it was difficult to envisage the Philippines giving up some of its sophisticated component manufacturing facilities following an agreement to allocate such facilities to some other ASEAN countries.

Finally, automobile ancillary firms had developed in somewhat

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[1] At that time Brunei was not a member of ASEAN.

similar ways in each of the ASEAN countries. As a result there was duplication in production facilities. For example, tyres, batteries and exhaust systems were made in all the ASEAN countries. In short, regional production of high frequency replacement automotive parts were generally overdeveloped. As a result the scheme confronted member countries with the problem of disposing excess plant facilities. This was not an easy matter to solve. Several ASEAN Governments indicated that they would protect existing or prospective industries, even against other countries of the ASEAN Group, and to this extent, the scheme was inhibited (Chee, 1977).

The delay in implementing the AACS exhausted the patience of some ASEAN countries which finally decided to take their own road in developing the automobile industry. Unfortunately this decision will have an adverse impact on the automobile industry in the ASEAN region as a whole, because the region cannot afford to support more than one automobile manufacturing plant.

5. Trade

Table 5.1 shows the value imports of capital goods at current prices by SEEA countries between 1970 and 1980. The table shows that SEEA countries imported capital goods valued at $3,262.8 million in 1970.[1] By 1975 imports had increased to $10,526.9 million (or an increase of 3.2 fold) and by 1980 capital goods valued at $29,137.8 million were imported by SEEA. Thus in the last decade, SEEA's import

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[1]The trade figures for SEEA have to be discounted because part of the imports of Singapore and the British colony of Hong Kong are destined for re-export. Similarly part of the exports of these countries are re-exports.

of capital goods had increased by nearly nine times at current prices.

The three countries in SEEA which showed the greatest increase in their imports of capital goods between 1970 and 1980 were Singapore, Indonesia and Malaysia. On the other hand, Burma's increase in the value of its capital imports during the same period was the lowest.

Within the capital goods industry, Table 5.1 shows that the share of non-electrical machinery (in total capital goods) was the largest in 1980 (40.3 per cent) followed by electrical machinery (35.5 per cent) and transport equipment (24.2 per cent). The proportions are not much different in 1970 except that transport equipment was slightly ahead of electrical machinery. Table 5.1 also shows that the imports of non-electrical machinery and transport equipment had steadily declined over the last decade while the reverse was true of electrical machinery.

Table 5.1 also shows that in 1970, Korea was the largest importer of capital goods in SEEA with total imports valued at $589.5 million or 18.1 per cent of SEEA's total imports of capital goods. Singapore was not far behind Korea with imports totalling $561.3 million. By 1980, Singapore had replaced Korea as the largest importer of capital goods in SEEA, with imports valued at $7,053.0 million or 24.2 per cent of SEEA's total imports of capital goods.[1] Korea which was next had imports valued at $4,974.7 million or 70.5 per cent of Singapore's imports. If we assume that most of the capital imported by Singapore and Korea were used for the production of other capital

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[1] Singapore's leading position may be disputed because some of her imports are meant for re-exports. Unfortunately, retained import figures are not available.

goods,[1] then it would appear that the import figures reflect the rapid development of the capital goods industry in the above two countries. They also appear to indicate that by 1980 Korea had gone further than Singapore in its capital goods import substitution programme. At the other end of the scale, Burma's imports of capital goods valued at $49.0 million in 1970 and $119.8 million in 1980 indicates the slow rate of development in the country's capital goods industry in particular and in industrial development in general. In the last decade Burma's imports of capital goods merely doubled, while those of Singapore increased by a factor of 12.6.

Table 5.2 shows the value of exports of capital goods at current prices from SEEA between 1970 and 1980. The table shows that SEEA exported capital goods valued at $13,020.6 million in 1980. These exports include re-exports which are quite substantial for Singapore and the British colony of Hong Kong. For example, Singapore's re-exports of capital goods were valued at $1,822.2 million in 1980 and accounted for 35.7 per cent of its total exports of capital goods (Singapore ICC, 1982/83). The republic's largest re-export market is Southeast Asia which accounted for 39 per cent of total re-exports in 1982. In recent years, there has been a noticeable shift in the composition of re-export trade away from primary commodities towards capital goods such as machinery, industrial components and transport equipment. This is largely due to industrial development in neighbouring countries and

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[1]This is not an unrealistic assumption since the 1970's was a decade of intensive industrialisation in Singapore and Korea. However, the import figures for Singapore should be discounted because some of the capital goods imported by Singapore are re-exported to other countries.

the increasingly important role of Singapore as a regional distribution and service centre. For example, re-export of machinery and equipment accounted for only 11 per cent of total re-exports in 1970. Their share of total re-exports rose to 30 per cent in 1982. Major re-export items included the re-exports of power generating machinery, industrial machinery, general industrial machinery, telecommunication equipment, electrical machinery, and transport equipment. Malaysia was the largest market for the re-exports of machinery and transport equipment (Singapore ICC, 1982/83).

Hong Kong's re-exports of capital goods were valued at $933.0 million in 1980 and accounted for 39.3 per cent of its total exports of capital goods (Hong Kong, undated). The colony's largest re-export markets are China, U.S.A., Indonesia and Singapore and the major capital goods re-exports are electrical machinery and telecommunications equipment.

As indicated earlier in Table 5.2, SEEA exported capital goods valued at $13,020.6 million in 1980. Since the region imported capital goods valued at $29,137.8 million in the same year, SEEA's imports were 2.2 times higher than its exports, resulting in a deficit of $16,117.2 million in the balance of trade in SEEA's capital goods. However, SEEA's exports have been growing much faster than its imports of capital goods. Thus in 1970, SEEA only export $500 million worth of capital goods. By 1980, this had increased by nearly 26 times to $13,020.6 million at current prices. On the other hand, as indicated earlier, SEEA's imports of capital goods had increased only 9 times during the same period. Thus according to past trends, the deficit in the balance of trade in SEEA's capital goods should be narrower by the

end of this decade.

The three countries in SEEA which showed the greatest increase in their exports of capital goods between 1970 and 1980 were Thailand, the Philippines and Korea (Table 5.2). The rapid increase in Thailand and the Philippines may be explained by the small amount of exports in these two countries in 1970. Both countries exported less than $800,000 worth of capital goods each in 1970. Korea had a relatively bigger export base in 1970 but even then its exports of capital goods increased by nearly 60-fold between 1970-80. Data from a World Bank study by P. Hasan and D.C. Rao (1979) show that amoung the three sub-sectors in Korea, electrical machinery experienced the highest annual growth rate (87.1 per cent) between 1965-70 while transport equipment led during the period 1970-75, with an annual growth rate of 82.0 per cent. Electrical machinery however, accounted for the largest share (8.7 per cent) of total merchandise exports in 1975. The increase in Korea's exports of capital goods took place at a time when other merchandise exports were also growing at a phenomenal rate (estimated at an annual compound growth rate of 40 per cent - Y. Lim, 1981, p. 81).

Altogether, it would appear that all countries in the region, with the exception of Burma (for which data are not available) made rapid strides in exporting capital goods over the last 10 years.

Table 5.2 also shows that Singapore was the largest exporter of capital goods in SEEA in 1980 with exports valued at $5,105.5 million. Singapore's export figures however include re-exports so if we only take its domestic exports of capital goods, valued at $3,283.3 million (Singapore, 1982/83, p. 145), Korea would be the leading exporter of capital goods in SEEA. The third position would be taken by the British

colony of Hong Kong, even when re-exports valued at $562 million (Hong Kong, undated) are deducted from Hong Kong's overall exports figures. These three countries accounted for nearly 85 per cent of SEEA's total exports of capital goods in 1980. Korea's and Singapore's leading positions were largely due to their exports of electrical machinery (especially semi-conductors and television receivers) which increased by up to 50-fold between 1970 and 1980.

Table 5.3 shows the exports of SEEA's capital goods by destination. The table shows that the major destinations of SEEA's capital goods are North America (39.6 per cent), ESCAP's developing countries (28.0 per cent) and EEC (16.6 per cent). Generally, exports from the more developed SEEA's countries go to North America while exports from the less developed SEEA's countries go to ESCAP's developing countries. Thus nearly 40 per cent of Korea's capital goods exports went to North America in 1980[1] while more than 96 per cent of Indonesia's capital goods exports went to ESCAP's developing countries. As the SEEA countries develop, a larger proportion of their capital goods exports go to North America or the EEC. For example, Singapore's exports of capital goods to ESCAP's developing countries have declined during the period 1970-80 while exports to North America have increased. The same trend may be observed in Malaysia where the exports of transport equipment to ESCAP's developing countries have declined while such exports of North America have increased between 1970-80 (Table 5.3).

SEEA's exports in terms of value to both North America and the ESCAP developing countries comprise mainly electrical machinery.

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[1]The U.S. is one of Korea's traditional market, the other being Japan. Both these markets accounted for over 60 per cent of Korea's exports up to 1975 (Y. Lim, 1981, p. 81).

6. Basic Problems

The development of the capital goods industry in SEEA appears to be a logical development of the industrialization process in many countries in the region. Having exhausted the obvious import substitution possibilities in the manufacture of consumer goods in the 1960's, the more advanced SEEA countries began to venture into the capital goods industry at the beginning of the last decade. The move was a great success especially for Singapore, Korea and Malaysia. This prompted the other SEEA countries to follow the same strategy. However, certain problems will have to be overcome before the capital goods industry can develop to its full potential in SEEA. These problems are manifold but fortunately, as a World Bank study has observed, they are remedial, not inherent (World Bank, March, 1980). The problems include product selection, lack of linkages, subcontracting, quality control, R & D, managerial and technical capability, shortage of skilled workers and lack of design adaptation.

Firstly, the major problems appears to be a wrong choice of the type of capital goods industry to develop. In all the SEEA countries, the individual market is too small to provide an adequate demand for most types of capital goods. Thus the type of industries selected for development should have some export potential. Otherwise the countries will fail to achieve sustained economic growth through industrialization (see H. Chenery, 1965; H. Chenery and H. Hughes, 1972; R. Vernon, 1966 and H. Johnson, 1968). In a free enterprise system, market forces might be relied on to encourage the proper selection of capital goods industries for development. Unfortunately, in a number of SEEA countries the government has intervened in the

development of the capital goods industry partly for misguided or ambitious reasons.[1] A good example is the motor vehicle industry. In the early 1960's motor vehicle assembly was believed to be a suitable industry to spearhead industrial development in the LDC. The industry was labour-intensive and the increase in local content would eventually enable the assembly industry to develop industrial-technology capacity. In addition, it was argued that the automobile industry had valuable technological spin-offs and would help to spawn a host of ancillary firms (UNIDO, June 1984).

However, rapid technological developments have changed the capital-labour dimensions in the automobile industry. Robots now do a better job at the assembly stage than human workers. More important, the minimum efficient scale of a motor vehicle plant has risen to a level far exceeding the limited domestic markets of the individual SEEA countries. According to a recent UNIDO (August 1983) study, the demand for vehicles in each ASEAN country, and even in the entire ASEAN region, is too small to support the integrated manufacture of vehicles on internationally competitive scale. The automotive market in each ASEAN country is further affected by the proliferation of different makes and different models. The total sales of private passenger cars in ASEAN in 1979 amounted to only 190,000 units. Even if these sales were all of one make or one model, the region's aggregate demand would not support a fully integrated automobile industry competitive with those in the

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[1] Government intervention is of course not always undesirable if it is based on sound planning and advice. Unfortunately in some SEEA countries such intervention are often based on the whims and fancies of politicians and dictated by political or social rather than economic considerations. In any case, for a discussion of pros and cons on this issue and a list of relevent works, see G. Meier, 1976, ch. XII.

United States, Japan or other larger European countries. With fast technological progress towards fuel efficiency and less pollutive engine designs, an integrated manufacture of passenger cars by countries with a weak industrial base could well be a high risk undertaking.

As for the technological and ancillary spin-off arguments, the automobile industry is not the only capital goods industry which provide these spin-offs. Other industries can provide similar spin-offs but at a much lower cost.

In spite of the obvious disadvantages however, many governments in SEEA are still attracted to the motor vehicle industry and more than half of them have plans to manufacture their own cars by 1990. Such plans however, are not based on feasibility studies or economic realities but on the desire of government leaders or politicians to develop a prestigious industry. Unfortunately the pursuit of these grandiose plans would stifle the development of the capital goods industry as a whole because none of the SEEA countries (with the possible exception of Korea) has any comparative advantage in automobile production. This is seen in the relatively high cost of domestic production and equally high level of protection required to sustain loca production. For example, cars assembled in the Philippines are one of the most expensive in the world. Even the Korean automobile industry has to depend on high tariffs and import ban and in the case of exports, on subsidies (UNIDO, June 1984).

Prospective car manufacturers in SEEA should heed the recent UNIDO (June 1984) study which predicts that only very large volume Asian car manufacturers will be able to compete in the world market in the 1990's. Otherwise they may repeat the mistake of policy-makers in Australia and Taiwan Province. Concerned more with creating jobs than

industrial efficiency, the Australian government erected a wall of stringent tariffs and quotas to ensure that 80 per cent of Australia's passenger car market goes to local manufacturers. Duties on imported vehicles are fixed up to a maximum of 60 per cent. As a result, Australia has 5 car manufacturers catering to the tiny Australian market of 600,000 vehicles a year. Not surprisingly, Australian car industry is now in trouble and it will be a matter of time before one or more of the 5 manufacturers go out of business (Newsweek, September 26, 1983).

In Taiwan Province, a joint venture with a state enterprise and General Motors (GM) established to assemble heavy trucks now has an empty plant and a pile of debts. Initially the foreign venture partner GM agreed to buy 45 per cent of the company's equity when the venture started nearly two years ago provided that the company's new truck received long-term protection from imports. But even with a 45 per cent import tariff, the trucks could not compete with imports, so Taiwan Province refunded GM's investments. Only about 1,000 vehicles were produced and the government bought most of them.

Another example of an inappropriate capital goods industry in SEEA is aircraft. The aircraft manufacturing industry may be regarded as an advanced capital goods industry which a country develops only after it has achieved an advanced level of industrialization and technical competence. In the early stages of economic development when wages are low and expertise is scarce it appears sensible to concentrate on the development of the more labour and less skill-intensive type of capital goods industries. Indonesian policy-makers however, are not impressed with this typology and are trying to take a great leap forward by establishing an aircraft industry (in addition to a number of other

advanced capital goods industries, such as the manufacture of helicopter and oil tanker). The development of these advanced industries is largely propelled by Indonesia's powerful Minister for Research and Technology, B.J. Habibie (Far Eastern Economic Review, July 12, 1984).

The above examples serve to indicate the folly of government intervention in the capital goods industry. There is of course, a significant and legitimate role for governments in the development of the capital goods industry in developing countries as seen in the case of Japan and Korea. However, the nature and quality of state intervention in Japan and Korea was quite different. In Japan for example, the government's intervention was generally based on sound advice offered by highly qualified professional economists in the planning agency. Moreover, the Ministry of International Trade and Industry (MITI) in Japan tried its best to consult the private sector and to harmonise its views with those of the government. Rooted in Japan's values of groupism and consensus and harmonious cooperation among enterprise, government, and the public, MITI's efforts were centered on a huge network of hundreds of committees, councils, associations, institutes, and so on, involving thousands of leaders in various fields including academia, labour unions, farm groups, consumer and other organizations in countless meetings whose results were funnelled into the Industrial Structure Council at the top. The decisions arrived at (on new technologies and core industries to promote in the next decade or so, on the shifts in industrial structure, on the ways to promote competition in various industries, assistance to small and medium industries, and so on) were implemented by MITI, the Ministry of Finance and other ministries and agencies largely through extensive discussions with relevant business

and other affected groups. For example, MITI took an active role in procedures for identifying, importing, adapting, innovating, and diffusing industrial technologies, through consultation, coordination and persuasion, apart from using subsidies and regulations (H. Oshima, 1984, p. 70. For further details of the Japanese approach, see C. Johnson, 1982; Y. Tsurumi, 1976; T. Ozawa, 1974 and K. Bieda, 1970).

The underlying assumptions in this time-consuming, costly, and difficult approach to decision-making were that less mistakes were made with "more wise heads", to whom in any case, the relevant information must be spread; that decisions on basic industries and technologies affected all groups in the economy, (workers if the technology was labour saving, consumers if the technology was polluting,); that the lost time and cost incurred could be recouped through swift and effective implementation when disparate views and objections were properly taken into account and reconciled; and finally to preserve the good feeling and harmony of contending groups so necessary in a society where groupism and cooperation were so essential.

In contrast to the above, the impression one gets in the way decisions are made on industry and technology policies in most SEEA countries, is that at best, they are hastily made by a small group in the government with sporadic, ad hoc consultations involving small groups of businessmen and engineers and perhaps a few academics knowledgeable above science and technology, At worst, decisions are based mainly on the whims and fancies of politicians. Alternatively, the criterion for selecting one capital good industry over another is often based on social or political rather than economic considerations. In such cases, feasibility studies, if any, are ignored or conveniently overlooked.

This may help to explain why the car manufacturing industry is selected in Malaysia or why the manufacture of aircraft is given top priority in Indonesia. Clearly this is not the way to plan or decide on the development on the capital goods industry because the wrong decision will not only be very costly but will also have an adverse impact on the manufacturing sector as a whole. In short, while government intervention in the development of the capital goods industry may be justified and may even be desirable, such intervention should be based on carefully thought-out studies and a set of well-formulated plan and strategy. The capital goods industry is not the place for amateur economists acting on personal inclinations or politicians who prefer to be guided by political instincts. In fact, if governments in SEEA do not have a capable economic planning agency or are unwilling to employ qualified consultants, they should leave the development of the capital goods industry entirely to the private sector.

Secondly, some of the capital goods industries in SEEA are poorly integrated and have relatively few backward or forward linkages. Electronics epitomises the shallowness of the capital goods industry in SEEA. The electronics industry in the region is largely an assembly operation and as one well-known Singaporean economist observes, requires "less skill than that required by barbers and cooks", since it involves mostly repetitive manual operations (Goh Keng Swee, 1972, p. 275). Consequently, the ratio of value added to output in Singapore's electronics industry is only 0.2 (Singapore, 1982). In addition, there has hardly been any technology transfer in the industry. More important, is the lack of backward linkages in the electronics industry and one reason for this is the inadequacy in range, the high price and the low quality of

the components produced by local ancillary firms. For example, one study showed that only one firm out of 40 surveyed in Singapore said local suppliers were adequate (Pang and Lim, 1977). Consequently manufacturers prefer to source most of their materials and components from aboard resulting in relatively low value added in the electronic components industry. A more important reason of course is the fact that the electronics firms in SEEA are part of the international subcontracting system and provide a captive market for their parent companies (see Roche, Chee and Choe, 1984). Thus these firms, especially those in Singapore and in the free trade zones would naturally prefer to import components from abroad.

A similar level of shallowness is found in the other capital goods industry. For example, in the shipbuilding industry, even Korea has yet to realize the full advantages of having a local design capability and of producing associated deck equipment, elements of the drive train, and so on (P. Hasan & Rao, 1979, p. 252). In Malaysia, the local content in locally assembled cars and tractors is less than 15 and 30 per cent respectively (Chee, 1978 and 1983c). The list is endless but it is not necessary to document comprehensively the shallowness of the capital goods industry in SEEA where it exists, but to demonstrate some of its characteristics. In some sectors it is due to technological backwardness; in others it is the result of MNC preferring to import components from abroad. But whatever the reason, the lack of linkages has isolated the capital goods industry from the rest of the manufacturing sector. This problem will have to be overcome if the capital goods industry is to form an integral part of SEEA's manufacturing sector.

Thirdly, a principle requirement for the efficient operation

of a capital goods industry is the development of an extensive sub-contracting network. There is a need for a large and varied group of small and medium industries to supply the parts and components for the assembling firms. If too large a portion of the more important parts and components of the capital goods industries have to be imported, value added is low and the costs of the assembled products may be high. Similarly, if the assemblers have to manufacture most of the parts in-house, production costs will also go up. Thus in the machinery sector of the advanced countries, subcontracting has proved to be important in reducing costs. Small firms concentrating on a few operations or components common to a large number of producers are able to utilize special-purpose equipment fully, as well as obtain the benefits of learning over time as a result of specialization in a narrow area (U.N., 1974). Subcontracting also benefits the large firms. Japan's efficient motor vehicle industry relies heavily on its legendary Kanban ("just in time") system of ordering parts just in time for assembly, saving the manufacturers millions of dollars a year in inventory. The Kanban system cannot be implemented unless there are efficient ancillary firms which can be relied to supply high quality components with minimal rejection rates according to an agreed delivery schedule. Another prerequisite for the Kanban system is the close relationship between manufacturer and supplier. Both these prerequisites are not present in many SEEA countries where there are not many efficient ancillary firms in SEEA. Most of the ancillary firms in SEEA are not only unable to meet delivery dates or quality specifications but are also generally high cost producers. Consequently, many SEEA machinery manufacturers either have to import or manufacture most of their components. This in turn affects their competitiveness. For example, it

is well-known that the low quality of subcontracting firms inhibits Taiwan Province's automotive industries and Korea's machinery industry despite the fact that small industries are extensively found in these countries and account for a large portion of manufacturing output and exports. Pack notes the high costs of coordination between assemblers and subcontractors as an obstacle to efficiency (H. Pack, 1980).

The underdevelopment ancillary firms in SEEA is largely due to government neglect and discriminatory policies. In their haste to develop large scale industries, governments generally tend to neglect the small and medium-sized firms which generally form the bulk of ancillary firms. At the same time, deliberately or otherwise, fiscal policies in SEEA generally tend to discriminate against small firms. For example, in Malaysia, tax incensives favour large firms while the sales tax in Indonesia discourages subcontracting (Chee, 1984a). In addition, to the lack of government support, ancillary firms in SEEA have also been unable to secure the support of the large assemblers. The reason is the lack of initiative by both parties to develop a close relationship.

Fourthly, the local market in each of the SEEA countries is relatively small. Indonesia with 155 million people has the largest population among the SEEA countries. The Philippines and Thailand have a population of 47 and 46 million people respectively but all these three countries have a relatively low income per capita (less than $800 p. a.). The two countries with relatively high income per capita - Singapore and the British colony of Hong Kong, have a miniscule population. Only Korea, among the SEEA countries, has a relatively large population (38.5 million) and a relatively high income per capita ($1,520).

In short, the market in individual SEEA countries is relatively small. As a result, capital goods manufacturing plants in SEEA are generally built on a minimal scale. For example, as Table 3.4 above indicates, the average employment of the firms in the non-electrical machinery industry in SEEA is only 42 workers each. (Firms in the electrical and transport machinery industries are larger but these are mainly assembling rather than manufacturing firms). The larger firms generally produce at a relatively low rate of capacity utilisation. For example, Table 4.2 above shows that the capacity utilisation of agricultural machinery firms in Thailand is only between 55 to 70 per cent.

Some of the more developed SEEA countries try to solve the market problem by seeking export outlets, in some cases by subsidising exports. Other countries try to develop a larger market through regional cooperation. Unfortunately the latter attempt as epitomised by ASEAN has not been very successful. For example, mention has already been made of the abortive ASEAN Automotive Complementation Scheme. In addition, there is also a wide ranging Preferential Trading Arrangement but in spite of this, intra-ASEAN trade still accounts for less than 15 per cent of total ASEAN trade (Chee, 1983c). In the long run, ASEAN may provide a viable market but in the short run, SEEA countries will have to depend on the export market. However, here they will face another constraint, namely the low quality of their products.

Fifthly, another problem facing the capital goods industry in SEEA is the relatively low quality of the product. Consumers have often complained about the quality of locally assembled cars. They cite several examples of locally made components that do not match the standard of imported ones. Paint work shows up an undulating surface

and rust shows even before the car is one year old. Exhaust pipes do not last as long as imported ones. In the case of machinery, complaints are made about the locally produced motors which not only have a short life but are also very noisy. As a result, machinery for exports generally incorporate a foreign made motor (Chee, 1978). The poor quality of locally produced capital goods in SEEA has often been attributed to numerous factors, the most common being a desire to reduce costs, the lack of quality control and standardisation and inadequate resources devoted to research and development (R & D). Another important factor is the lack of competition. For quality to be good, there must be competition among the producers of each type of capital goods but in many SEEA countries there is little competition because the market is not only small but also heavily protected. The limited market is not able to sustain more than one or two producers. In those rare instances where there are many producers, the sole possession of a license to use the most advanced technology may confer monopolistic power to one firm over the rest.

Sixthly, technological changes in the capital goods industry are very rapid so adequate R & D expenditures are required to enable the industry to keep abreast. Unfortunately, SEEA countries especially the less developed countries are unable to spend more than a minimal sum on R & D. For example, up to 1975, R & D expenditures in Korea and the Philippines averaged 0.2 per cent of GNP compared to 2.0 per cent in the United States, Japan, France, West Germany and the United Kingdom (United Nations, 1979, pp. 933-4). Moreover, the expenditures in the latter countries were concentrated in the high-technology sectors of machinery, chemical, basic metals, transport and aerospace which

accounted for 85 per cent of the total R & D expenditures in 1975. In developing countries, a major part must go into agriculture and social services (H. Oshima, 1984, p. 43).

But even if funds were available, the developing countries may not have the large, experienced staff of R & D manpower to keep them in the forefront technologically. A broad array of specialized scientists and engineers with long experience in fields such as electronics and metallurgy may not be available if the other industries in non-ferrous metals, chemistry, lower-stream processing and assembly industries are not well developed. The research externalities may be large in 20th century technologies which must provide for highly interconnected, integrated, synchronized manufacturing processes through the whole of a stream of industries. This is in addition to the problems of scale economies in research (H. Oshima, 1984, p. 43).

In short, technological capability is another serious constraint in the development of the capital goods industry in SEEA. Unless the countries in this region can overcome this constraint the speed of technological changes is likely to leave the capital goods industry in SEEA far behind as shown in the case of India's automobile and textile machinery industries.

Seventhly, capital goods manufacturers in SEEA are seriously affected by the shortage of highly skilled, technical, engineering and managerial and experienced shop supervisory personnel. Producing capital goods require a lot more skill than the production of consumer goods. But there is a general shortage of skilled labour in many SEEA countries, especially skilled metal tradesmen, maintenance tradesmen, mechanical engineers and experienced managers. Government-sponsored training

schemes are either ineffective or inadequate to meet the demand for skilled workers and very few plants have formal in-house training programmes. Many of the skilled workers presently working in the industry acquired their skill through informal on-the-job training but this is a long and expensive process. Partly because of the shortage of skilled workers, wages for such workers are relatively high so some of the smaller manufacturers often do without these workers. For example, a study in Thailand stated that manufacturers of small tractors do not generally employ any engineer (Thailand, 1976).

Eighthly, there are problems associated with raw materials and plants. In numerous SEEA countries such as Indonesia and the Philippines, there are across-the-board problems with availability, quality and cost of local raw materials, notably scrap, tinplate and steel sheets. The problem with plants arise from constraints in investment and financing which are reflected in crowded shops, frequently antiquated tooling, costly down time and obsolete methods of production. Consequently, capacity is often underutilized and productivity is low.

Finally, other problems affecting the capital goods industry in SEEA are those relating to task-level production and plant-wide productivity as well as design adaptation. These problems are interrelated with the other problems mentioned earlier. For example, the absence of design alteration is related to the general lack of R & D and a shortage of skilled workers.

7. Prospects and Potential

Despite the numerous problems plaguing the capital goods industry, there are excellent prospects for the further development of

the industry in SEEA. This stems from three major factors. Firstly, the capital goods industry posted a relatively high rate of growth in SEEA in the last 20 years, especially in Singapore, Korea and Malaysia (Table 7.1).[1] For all SEEA countries as a whole (with the exception of Burma), the growth rate of the capital goods industry in the region averaged 28.1 per cent per annum in the last 20 years or so. The electrical machinery industry recorded the highest growth rate among the three sub-sectors. For the capital goods industry as a whole, Singapore appeared to have recorded the highest growth rate for the period 1963-80 (40.80 per cent) but this may be partly due to its initial small base. Nevertheless, even Philippines which recorded the lowest growth rate managed to post a respectable 10.6 per cent. In fact, in a number of SEEA countries, the capital goods sector appears to be growing faster than many other sectors.

For example, in Malaysia, an analysis of the growth rates of the domestic market for consumer, intermediate and capital goods show that during the period 1968-73 the fastest growing market is for capital goods - Table 7.2. The table shows that during this period, non-electrical machinery, electrical machinery and transport equipment experienced increases in domestic demand of more than 22 per cent each year between 1968-73. This fact combined with the fact that domestic production is still less than 50 per cent of domestic market for these products suggests that future import-substitution has to take place to a larger extent in the capital goods sector (Chee, 1984c, p. 11).

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[1] The relatively high growth rate in Thailand may be due to the fact that the data for Thailand go back at least 5 years earlier than most of the other countries. See Table 3.1.

There are strong indications, given the various development plans for countries in SEEA (see below) that the remarkable growth rates in the capital goods industry will be maintained or even exceeded, at least for the remainder of this century.

Using the historical growth rates in Table 7.1, we extrapolated the growth in value added of the three sub-sectors in the capital goods industry, assuming a low, a medium and a high growth rate. The projected value added for the three sub-sectors in the capital goods industry in SEEA for the period 1985-90 and 1990-2000 are shown in Tables 7.3 and 7.4 respectively. These tables show that on the basis of historical growth rates, the capital goods industry in SEEA is expected to be valued at between $149,799 - $271,056 million by 1990 and to achieve a total value of between $1,762,767 - $10,253,049 million by the year 2000 at current prices.

More specific projections have been made for the three leading capital goods producing countries in SEEA namely Singapore, Korea and Malaysia. In order to assess the overall quantum of capital goods imports of these three countries, some order-of-magnitude projections was made of demand and anticipated imports. In making these projections we disaggregated the capital goods sector by selecting the most important capital goods industry in each of the three sub-sectors in the respective countries. An indication of the projected requirements of these disaggregated capital goods in those countries was then obtained by projecting the increase in manufactured output by using the historical growth rate of the selected capital goods industry and a ratio between manufactured output and demand for machinery and equipment in previous years. While this was undoubtedly a simplistic approach and did not

provide for a number of important variables such as the time lag in machinery installation and variations in the machinery-output relationship, it nevertheless provided a broad assessment of the level of requirements.

Table 7.5 shows the projected requirements of major specific capital goods in Singapore, Korea and Malaysia for 1990 and the year 2000. The table shows that electronic products and components which presently dominate the capital goods sector in Singapore and Malaysia will have a projected value of $2,102.5 billion by 2000.

Secondly, SEEA imported capital goods valued at nearly $30,000 million in 1980. One may expect these imports to increase substantially and the demand for capital goods to intensify at least for the rest of this decade in view of the acceleration in industrial and agricultural developments which is a major objective in the development plans in the SEEA countries. For example, if we examine the current Five Year Plan (1981-85) in Malaysia we find that the government has ambitious plans for agricultural and industrial development. Value added in agriculture and manufacturing has been projected to increase at 3.5 and 10.9 per cent per annum respectively during the period 1981-85 (Malaysia, 1981, p. 160). The growth in these two sectors will intensify the demand for capital goods especially since the Fourth Malaysia Plan anticipates that growth will be achieved through productivity increases by using more and better machinery and equipment. In agriculture for example, there are extensive plans for mechanisation to overcome the labour shortage and to maintain the competitive position of Malaysia's export crops. In the manufacturing sector, the thrust appears to be aimed at the development of consumer

durable goods in view of the exhaustion of import substitution possibilities in the production of consumer goods. The Plan also anticipates that the increase in the size of the domestic market and the increases in income and living standards of the population will result in the growth of domestic demand for consumer durables. In addition, the expansion of the industrial base will also make it profitable for an expanded development of capital and intermediate goods, the imports of which accounted for 50.3 per cent of total imports in 1980. More significantly, the Malaysian government has established the Heavy Industries Corporation of Malaysia (HICOM) to develop the capital goods industries in partnership with the private sector. Among HICOM's various projects are the Malaysian car, motor-cycle engine and a sponge iron plant. (For further details of HICOM and its projects see INTAN, 1984).

Under Korea's Fifth Five Year Plan (1982-86), the development of high-technology industries, such as electronics, is one of the country's key objectives. The public and private sectors are currently engaged in research and development in a wide spectrum of high-technology areas, including robotics, medical equipment, chemicals and pharmaceutical products, bioengineering, advanced electronic components and very large-scale integrated (VLSI) technology (Korea Trade and Business, January 1984).

In 1982 the government launched a five-year programme to boost the country's investments in research and development to 2 per cent of gross national product by 1986, only slightly lower than the average in industrial countries. This translates into $3.2 billion for research and development in 1986, compared to $600 million in 1979.

At the same time, a quarterly Technology Promotion Conference, presided over by President Chun and attended by high-level representatives of the government, research institutions, academia and business was called to plan steps to ensure the programme's success. Fifteen government-supported research institutions have been merged into nine, granted increased funding and placed under the jurisdiction of the Ministry of Science and Technology.

A research complex called Taedok Science Town has been built some 150 kilometers south of Seoul. Covering 28 square kilometers, the complex includes a university and 30 research and development institutions.

The fields of research currently assigned top government priority include semi-conductors, computers, mechanical engineering and automation, fine chemistry, telecommunications, nuclear power plant safety and pollution control.

Clearly the capital goods industry especially electronics has been given high priority in the current Five Year Plan. This is in line with the Plan's objective to increase the export of capital goods by 1986.

Export of light manufacturing commodities such as textiles, wearing apparel and shoes, all of which were the major items in the past, is expected to become a less important factor in the future. On the other hand, the export share of the skill-intensive and relatively capital-intensive industries such as industrial machinery, electronics, shipbuilding and steel products and finished metal products will grow substantially. In fact, machinery exports should increase at an average annual rate of 31.5 per cent, enlarging the industry's share in total

export from 20.9 per cent in 1981 to 32.6 per cent in 1986 (Table 7.6).

Singapore plans to reorientate its fiscal incentives towards the promotion of a more limited number of priority industries; these favoured industries are highly skill- and capital-intensive, producing technologically sophisticated products. Some of these products are computers and peripheral equipment, instrumentation and industrial controls, precision machine tools and accessories, photographic and optical equipment, oil field equipment, aircraft components, and specialty industrial chemicals. The new investment incentives are designed to foster rapid technology transfer, allowing for the accelerated depreciation of machinery and equipment for research and development (R & D), double deduction for R & D expenditures and writing-off of lump sum payments for manufacturing licences. On the other hand, tariff protection has been removed for some industries catering mainly to the domestic market, for example, automotive assembly and other consumer durables producing industries (air-conditioners, televisions, refrigerators); this is aimed at promoting their efficiency or, in the case of internationally uncompetitive industries like automotive assembly and related industries, at phasing out such activities (R. Bautista, 1984).

In the Philippines industrial restructuring aims primarily to improve the country's manufacturing capability in providing a broader and more competitive export base, and to promote "the development of an efficient domestic intermediate goods industry". Towards this end, the government has recently adopted major policy changes relating to: (1) tariffs and import licensing; (2) export promotion; (3) investment incentives and administration; (4) industrial revitalization; and

(5) implementation of "major industrial projects".

Eleven major industrial projects have been identified for implementation up to 1987 that would "produce vital commodities and intermediate inputs at internationally competitive prices, induce the establishment of downstream labour-intensive industries and enhance the country's technological capabilities". These projects are highly capital-intensive and include the following: copper smelter, phosphate fertilizer plant, diesel engine manufacturing, cement industry rationalization, coco-chemical plant, aluminum smelter, integrated pulp and paper, petrochemical complex, heavy engineering industries, integrated steel project, and alcogas distillery (R. Bautista, 1984).

Other SEEA countries like Indonesia and Thailand have less ambitious plans to develop their capital goods industry but nevertheless their determination to support agricultural development provides good prospects for the production of agricultural machinery. Indonesia's Third Five Year Plan (1979-1984) for example continues to accord agriculture the prime role in development. However, the Plan also pointed out that in order to develop agriculture, attention will also be given to the production of hand-tractors, mini-tractors, rice hullers and rice threshers (Indonesia, 1980, p. 172). In fact, production of these machinery have already accelerated in the last few years. For example, the production of hand-tractors in 1979 totalled 550, while in 1978 only 280 tractors had been produced, which means that the production of hand-tractors rose by 96.4 per cent. Similarly, the production of rice threshers rose by 83.3 per cent, from 600 units in 1978 to 1,100 in 1979. The increase in the production of mini-tractors was even more spectacular. Production rose five-fold, from 25 units in 1978 to 150

units in 1979 (Indonesia, 1980, p. 173).

From the above, it is clear that most SEEA countries have definite plans to step up their production of capital goods not only as part of their import substitution but also as part of their export promotion drive. Either objective should enhance the development of the capital goods sector in the region. For example, a World Bank study estimated that a modest 30 per rate of import substitution in the Philippines would translate to a capital goods market of more than $100 million (World Bank, May 1980).

Thirdly, countries in SEEA appear to have a comparative advantage in the production of certain types of capital goods. The structural adjustment and industrial restructuring processes presently underway in the economies of the developed countries together with changes in comparative advantage should enhance the position of SEEA in the relatively labour-intensive type of capital goods. At present, these are mainly electrical machinery which presently accounts for more than 65 per cent of SEEA's exports of capital goods. Among the electrical machinery, the factor endowments of SEEA are ideally suited for the production of electronic components, radios, television sets, batteries and electrical switch gears. Each of these products figure prominently in the export composition of SEEA's capital goods. SEEA's comparative advantage in the production of these products has been confirmed by a recent study which stated that Korea, Malaysia, Thailand and Indonesia have a comparative advantage in the production of electrical and electronics parts and components (Institute of Developing Economies, 1982, p. 30). The study added that the ASEAN countries had substantially improved their pattern of comparative advantage. The study also observed

that the production of small-size radio sets and black and white television sets is shifting from Japan to the Asian NICs and subsequently to the ASEAN countries.

Another type of capital goods which some SEEA countries have a comparative advantage is electrical equipment. In Malaysia for example, the electrical engineering industry has reached a level of development where it can compete with Japanese, South Korean and European electrical suppliers in the regional market. For example, one engineering company which set up local operations in 1973, ASEA Sdn. Bhd., has won turnkey electrical contracts in Thailand, Indonesia and Sri Lanka. The company recently won a $4 million contract in Sri Lanka to upgrade some of the existing sub-stations in the country, overcoming competition from French, British and Swiss companies.

According to its managing director, Mr. Bernt Olausson, the contracts have an important Malaysian content. This is because a major part of the engineering input and components for these contracts are from Malaysia. The engineering design and hardware items like switch-gear equipment and control relay panels for overseas jobs is based on the company's experience here. In Malaysia, the company has been involved in Prai Power Station Final Phase, the Pasir Gudang Power Station Extension and the Proton Plant Sub-station. (Malay Mail, August 21, 1984).

Electrical machinery products generally have a high income elasticity of demand so rising income in the ESCAP developing countries should stimulate the demand for these products, a large proportion of which is sold in the above market.

However the best prospects for the electrical machinery

industry in SEEA will lie in the extension of backward and forward linkages particularly in the electronic components industry. As stated earlier, the industry is poorly integrated and there are few linkages with local industries. Most of the materials for the components are imported and the assembled components are subsequently exported. There are encouraging signs that multinational corporations are considering the possibility of increasing linkages in the industry. In Singapore, for example, Texas Instruments is planning a $50 million wafer-fabrication plant which is technologically a step or two higher than microchip-assembly operations (Asian Wall Street Journal, December 10, 1981). Similarly, in Malaysia, SEH a Japanese company started production of silicon wafers in 1980 and is planning to be involved in the "growing" of the silicon ingot itself, a raw material that is now being imported from Japan (Business Times, October 13, 1980). At the other end, manufacturing plants are being planned to produce electronic products ranging from colour television sets to personal computers which will use some of the electronic components products in the SEEA region. For example, 12 of the world's largest disk-drive manufacturers have set up shops in Singapore and more are coming in every month. Taiwan Province, has in some ways done even better, In 1984, technology-intensive machinery such as computers earned more foreign exchange than labour-intensive exports such as textiles. Sales of small computers doubled and computer accessories rose six-fold (Newsweek, March 12, 1984).

In fact, small computers appear to have the brightest potential for growth in SEEA. Even Indonesia has started to assemble computers using components from the U.S., Japan and Taiwan. The

Bakrie Group uses its own machines to put together microcomputers of its own design and uses its own manpower and software. Sales have already reached $10 million on a $1 million investment (Business Times, August 17, 1984). In Malaysia, an industry source estimates that $42 million a year is being spent on computer hardware, including microcomputers, minis and main frames. Currently computers are being used in some government departments and large firms. The majority of small firms have yet to go on-line. The prospects of catering to a largely untapped market has attracted a few firms to set up assembly operations.

Singapore has just launched a ten-year plan to go into computer manufacturing in a big way as part of its efforts to upgrade its industries and join the world of high technology. The plan calls for an extensive programme to produce thousands of engineers and technicians skilled in computer-aided design and manufacturing. More than $15 million has been earmarked for the programme which, if successful, will help many factories to be run almost entirely by robots and machines within six years (New Straits Times, September 21, 1984).

All these developments should boost the value added in the electrical machinery industry in SEEA by the end of this decade. Critics who are pessimistic about the prospects for developing the electronics industry in SEEA should remember that the industry is still a relative new-comer to this region so development may be a bit slow. But there is no doubt that given enough time, SEEA will emerge as an important region for the electronics industry.

Another capital goods industry which has good prospects for further development in SEEA is non-electrical machinery. In 1970, this industry contributed 20.3 per cent to the total value of capital goods

exports from SEEA (Table 5.2 above) but in 1980 the proportion had dropped to 16.8 per cent. In terms of absolute value however exports of this product increased 22-fold during the last decade. There is potential for further development especially pumps, heating and cooling machinery, calculating machinery and agricultural machinery. More than half the countries in SEEA have a large agricultural sector where mechanisation is still at a relatively low level. The need to step up the pack of mechanisation and modernise the agricultural sector should stimulate the demand for agricultural machinery. Malaysia for example, faces a shortage of labour in its rubber and oil palm estates. The obvious solution is increased mechanisation. Even without labour shortage, the increased use of agricultural machinery is required to increase productivity in the agricultural sector.

For the above purpose, locally produced machinery are more suitable for SEEA countries because their design is simpler and more appropriate to the needs of local farmers. Moreover they are also cheaper. A good example of such a machinery is the small tractor which we have already discussed in Section 4(a). Another example is the locally made brick machine in Malaysia. The machine makes both solid and hollow blocks and costs only M$68,000 ($30,000). Brick making machines from abroad cost as much as $750,000 ($330,000). Locally made brick machines have another advantage over their imported counterparts. They can be serviced by the manufacturers and parts are readily available. A third example is a simple rice sowing machine developed in Malaysia. The machine was invented by a rice transporting agent who now manufactures it for sale at M$1,500 ($650) each. The machine eliminates the transplanting process in rice cultivation and reduces the time required for

sowing (Sunday Star, August 16, 1981). There are numerous other examples of local ingenuity which have been applied to the development of simple and yet effective machinery for local use. It is this kind of ingenuity which justifies optimism for the development of the machinery industry in SEEA.

Apart from ingenuity there has also been a significant transfer of technology in the machinery industry. Most of the technology was acquired either by workers working in machinery manufacturing plants or repairmen repairing or servicing various types of machinery. A good example of the latter type of technology transfer is the manufacture of the nut-cracker machine for processing palm oil. The traditional manufacturers of palm oil machinery are Stork of Amsterdam, and the German firm of Usein Dewerker. Malaysians learned the technology when Stork joined venture with United Engineers in Malaysia to produce palm oil machinery. Others obtained the technology by repairing oil palm mills. Subsequently the workers and repairmen turned entrepreneurs and set up firms such as Apex Engineering, Hip Heng and Wang Yue. These firms added modifications to the whole range of machinery-leading ramps, sterilisers, depericarpers, nut-crackers, pressing machines, digestors, including complete palm oil mills. Today one of these firms, CHD Engineering has an annual turnover exceeding M$6 million ($2.6 million) and exports machinery to Papua New Guinea and Nigeria. The firm thinks that the overseas market has tremendous potential and is optimistic of marketing its machinery in growing oil palm producing countries such as Thailand, Indonesia, Burma, West Africa and South America. Considering that a palm oil mill may cost anything from M$1 million ($0.4 million) to M$18 million ($7.8 million), the potential of foreign earnings from

palm oil machinery alone is tremendous (New Straits Times, May 28, 1983).

Various other types of agricultural processing machinery also have good prospects for development. Some of the countries in SEEA such as Malaysia and Indonesia are the world's leading producers of various primary commodities such as natural rubber and palm oil. Malaysia is already the world's largest exporter of rubber and palm oil processing machinery. The expertise in the manufacture of these machinery can be readily extended into other crops such as rice and cocoa. As the production of these crops increases, the demand for processing machinery will develop.

Apart from agricultural machinery there are also good prospects for various types of simple construction machinery in view of the rapid growth of the construction industry in SEEA in the last 20 years. These machinery include concrete mixers and stone crushers.

For example, in the Philippines, a World Bank (May 1980) study has identified the following areas of immediate opportunities: (a) mining, construction and material handling equipment where the country has some considerable experience in parts production. Investments here will largely be expansion and modernization of selected existing capacities towards the production of some standard lines of machinery. Foundries, fabrication shops and machine shops will all require some new tooling and improved plant layout; and (b) plant equipment which links with growing activities by local firms in plant construction, domestic and overseas. There is no appropriate existing capacity in this area. One large or two complementary smaller projects might be considered, possibly as joint ventures with established foreign makers, designed for efficient heavy fabrication, machining and assembly of selected

lines for plant equipment.

Finally we come to the transport equipment industry which some SEEA countries think seem to offer the best prospects for development. Looking at the example of Japan these countries are trying to use the automobile industry to spearhead their industrial development. Unfortunately they seem to overlook the vital differences between Japan and SEEA. Japan had a broad industrial base, an extensive ancillary firm network, a huge reservoir of skilled manpower and a high level of home grown technology. Many of these attributes are lacking in the SEEA countries. Moreover Japan sent their cars out during a long period of robust global demand and relatively open Western market. These conditions no longer exist. In view of this, the automobile industry offers the least prospects for development in SEEA but unfortunately many of the countries in the region think otherwise.[1]

Instead of motor vehicles, the SEEA countries would do better to focus on automobile components some of which they are already exporting. Other possibilities include ships and boats, trucks, motorised rickshaws and bicycles. Shipbuilding has already gained a foothold in Korea and Singapore and there is no reason to think that it cannot be established in some of the other SEEA countries such as Indonesia and Malaysia. At the very least, these countries offer good prospects for manufacturing small ships and boats for their own coastal shipping. In addition, SEEA has a large and expanding fishing industry. Thus, the region should provide an adequate market for small ships and boats. There are also good prospects for small ships and boats made of

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[1] For details of the gloomy prospects for the automobile manufacturing industry in SEEA, see UNIDO, June 1984.

fibre-glass. At present the market for pleasure fibre-glass boats is monopolised by Taiwan Province but many SEEA countries also have the technology and capability to enter the market. Moreover, fibre-glass technology applied to boat-making is a labour-intensive sort of shipbuilding.

The manufacture of trucks also offers good prospects because truck manufacturing is less susceptible to scale economies since it does not require an expensive metal stamping plant for the body. The trucks can also be modified to carry different types of goods such as containers or logs.

A third possibility is the manufacture of motorised rickshaw. This is urgently needed to improve transportation in the rural areas where the only alternative to the taxi is usually the manually pedalled rickshaw. This mode of transportation however cannot carry a heavy load nor can it go very far. The motorised taxi on the other hand is often too expensive and in many cases is unable to traverse the narrow country lanes. Thus a motorised rickshaw will be a useful alternative. Such a rickshaw has been introduced in Bangkok (where it is called a samlor) and Jakarta (where it is known as a becak).[1] However there are many other major cities in SEEA such as Kuala Lumpur and Manila where they may also prove useful.

Yet another possibility is bicycle which is extensively used in SEEA. But strangely enough very few SEEA countries produce their own bicycles. Instead these countries tend to assemble bicycles mostly from imported components, as in Malaysia.

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[1] For further details, see R. Ocampo, 1982.

Finally, it should be remembered that high labour costs in the developed countries will continue to reduce the comparative advantage which these countries have in capital goods production. In fact, investible resources and technology have already moved to SEEA to produce a wide range of parts and components for the machinery sector. Gradually, production will move to simple machinery and equipment. These trends will continue and during the eighties it can be reasonably expected that capital goods development will continue at least at its present pace and the growth rate may even be higher as emphasis on import substitution extends over an expanding demand base for machinery and equipment. At the same time, the trend towards regional economic cooperation in the form of ASEAN and the Pacific Basin Community may help to enlarge the market for capital goods in the region.

To sum up, there are bright prospects for developing the capital goods industry in SEEA. Initially, emphasis will have to be on economic import substitution, e.g., in producer goods or items such as material handling and construction equipment, food processing machinery, heat exchangers, and some foundry equipment. Gradually however, export potential may be developed in electronic products and auto parts. Opportunities to develop new exports may lie in: (a) relatively simple and labour-intensive items such as hand tools, cutlery, foundry products, auto parts and machinery replacement parts (for agricultural and mining machinery); and (b) metal products that are linked to other export sectors such as overseas construction and food processing for export. The foundry industry merits priority attention. A basic need is selective modernisation and upgrading of foundries to achieve production specialization by type and weight of castings.

8. Main Findings and Recommendations

The capital goods industry occupies an important position in the manufacturing sector of three SEEA countries, namely Singapore, Korea and Malaysia. In terms of value added at constant (1975) prices, the capital goods industry contributed 53.2 per cent of the total manufacturing value added in Singapore, 20.4 per cent in Korea and 17.6 per cent in Malaysia. The capital goods industry is least important in Indonesia where its contribution to total manufacturing value added is less than 5 per cent. On the average, for all countries in the SEEA region, the capital goods industry contributed 18.6 per cent to total manufacturing value added.

Value added in the capital goods industry in SEEA is highest in Korea, Singapore and the British colony of Hong Kong and lowest in the Philippines. The total value added from the top three leading countries in SEEA amounted to $6,394.3 million or 84.2 per cent of the total value added in the SEEA region. The three leading countries also have the largest number of workers in the capital goods industry. The total employment in these three countries amounted to 745,000 workers for 72.4 per cent of total manufacturing employment in the capital goods industry in SEEA.

Labour productivity in the capital goods industry in SEEA is highest in Singapore followed by Korea and the British colony of Hong Kong and this is reflected in the earnings for workers in the industry which is highest in Singapore (qualified by exchange rate conversions).

The development of the capital goods industry in SEEA took place mainly in the 1970's and its rapid growth was boosted largely by

the transfer of the offshore electronics assembly industry to the region. The capital goods industry grew very rapidly in the 1970's especially in Singapore, Korea and Malaysia. Elsewhere in the region the industry grew only marginally or even declined in relative importance to other manufacturing sectors.

Within the capital goods industry, the electrical machinery industry is the most important of the three sub-sectors. On the average, for all countries in SEEA, this sub-sector contributed nearly 10 per cent to total manufacturing value added in recent years. This figure is nearly twice as large as the average contribution from the next largest sub-sector - transport equipment. The size of firms in the electrical machinery industry is large compared to that in the non-electrical machinery industry which is largely made up of small firms. These small machinery workshops and engineering firms have proved their competence in adapting imported technology to produce simple machinery and parts for the local manufacturing industry. Such firms should be given every incentive to expand and play a more vigorous role in the development of the capital goods industry in SEEA. (For further details of the importance of small enterprises, see Chee, 1979 and R. Amjad (ed.), 1981).

SEEA's imports of capital goods have increased nearly nine-fold in the last ten years and in 1980 was valued at $29,137.8 million at current prices. The three countries which showed the greatest increase in imports were Singapore, Indonesia and Malaysia. Within the capital goods industry, non-electrical machinery accounted for the largest share of capital goods imported by SEEA. Import figures also indicate that Korea had achieved a large measure of import substitution

in its capital goods industry while development was very slow in Burma.

SEEA's exports of capital goods increased even faster than its imports. It increased 26-fold and was valued at $13,020.6 million in 1980 at current prices. Thus there was a deficit of $16,117.2 million in the balance of trade in SEEA's capital goods with the rest of the world. Given past trends, the deficit in the balance of trade should be lower by the end of the decade. All countries in the region except Burma made rapid strides in the export of capital goods in the last ten years. Within the capital goods industry, electrical machinery accounted for the largest percentage of SEEA's capital goods exports in 1980. Export data also show that Singapore was the largest exporter of capital goods with exports valued at $5,105.5 million followed by Korea with $3,433.2 million and the British colony of Hong Kong with $2,392.3 million. These three countries accounted for nearly 85 per cent of SEEA's total exports of capital goods in 1980.

The major destinations of SEEA's exports of capital goods are North America, ESCAP's developing countries and EEC. These three countries account for 78.4 per cent of SEEA's total exports of capital goods in 1980.

Further developments in the capital goods industry in SEEA will have to overcome several major problems. Firstly, in the choice of industries governments cannot ignore those with comparative advantage in favour of more glamorous industries which have no scope of progressing beyond a highly protected infancy stage. In this respect, the decision to develop the motor vehicle industry by several countries in SEEA is a cause for concern. Secondly, some of the capital goods industries in SEEA especially the electronics industry are poorly integrated and have

relatively few backward and forward linkages. Thirdly, the capital goods industry in SEEA is poorly supported by a strong network of ancillary firms. Fourthly, the local market in many of the SEEA countries is relatively small. Fifthly, the capital goods industry in SEEA still turns out a large proportion of low quality products in an effort to compete on price. Other problems are inadequate expenditure on R & D, low productivity, a shortage of skilled workers and inability to adapt designs.

In view of the above problems we put forward the following suggestions. Firstly, proper planning is necessary in developing the capital goods industry. The right type of industries to develop is critical and the choice should, as far as possible, be based on comparative advantage. Countries which are planning to develop the wrong kind of industries such as automobiles should be clearly warned about the dangers of going into such industries. In this connection, greater awareness about the problems of the automobile industry in such countries as Korea and Australia may make it easier for economists to convince policy-makers about the futility of developing a high cost industry to serve a small-scale market. If countries in the region are unable to resist the attractions of the motor vehicle industry then they should be encouraged to develop the industry on a regional basis. The ASEAN Automobile Complementation Scheme provides a good basis for this type of regional cooperation and should be revived. For countries outside ASEAN producing selected automotive components may be more viable than trying to manufacture the entire car itself. Presently certain automobile manufacturers, especially those in Europe prefer to split component production among several countries so as to reduce costs. These manufacturers could be asked to set up component production

facilities locally in return for the privilege of exporting the cars c.b.u. to the countries concerned.

The need to make a proper selection of the type of capital goods for development cannot be over-emphasised because it cannot be taken for granted and the wrong choice will have adverse long-term effects on the manufacturing sector. Economists would like to think that the selection process is made through a meticulous process based on careful study but more than one economists have pointed out that the selection process is often haphazard and is based largely on the instincts and personal fancies of politicians (H. Oshima, 1984, p. 71).

The wrong decision will not only impose an immediate financial burden but will also have a detrimental effect on the economy in the long run. This is because many capital goods projects are not cheap to implement. For example, the Malaysian car project will cost at least $200 million (Chee, 1983b) while the cost for the Indonesian aircraft project has been estimated at nearly $300 million (Far Eastern Economic Review, July 12, 1984, p. 54). In the case of Malaysia and Indonesia their respective car and aircraft are one of several other capital goods projects in the pipeline. The failure of these projects will have disastrous consequences. For example, Nehru's decisions on industrialization in mid-1950's largely set the course of the Indian economy for the next few decades while Park's decisions on heavy industries in the mid-1970's were the major sources of the deep troubles Korea is facing in the 1980's. (For further details, see H. Oshima, 1984).

In view of the above danger, the need for systematic and careful selection is imperative. Short of experienced, specialized expertise in industrial technology, SEEA countries could enlist the help

of experts at United Nation agencies such as UNIDO, who besides direct assistance could suggest leading consulting firms in industrialized countries which have no vested interests or bias in the decision.

Secondly, incentives should be devised to encourage selected capital goods industries such as electronics to foster greater backward and forward linkages so as to increase the manufacturing value added in these industries. The current measures taken by Korea to develop its electronics industry should be emulated by other countries especially Malaysia and Singapore. There is little point in developing shallow capital goods industries which provide little more than unskilled employment for female workers especially in the more developed SEEA countries where wages have gone up and where the labour market has tightened considerably in recent years.

Thirdly, planning and development of the capital goods industry should incorporate plans for ancillary firm development which can form part of the overall promotional package for small industry development. This will form a sound basis for the development of the capital goods industry. For example, although the foundry industry is labour-intensive and the Philippines should be able to achieve a low DRC, the Philippines foundries are not at present competitive. The reason is many of them are small and are neglected by the government. Given a comprehensive assistance programme covering raw material supply, technical assistance, testing services and training, the small foundries should be able to provide a strong foundation for the capital goods industry (World Bank, May 1980).

It takes time and effort to upgrade and modernise the traditional ancillary firms and government assistance is necessary.

But very few governments in SEEA have paid adequate attention to their ancillary firms, so steps should be initiated in this direction. Equally important, there is a need for the large assemblers to develop better coordination and closer relationships with ancillary firms.

Developing a sound supporting industry to supply inputs will help to improve the competitiveness of many capital goods industries, especially in the electronics industry. In these industries, material costs and not wages form the bulk of manufacturing costs. The local availability of material inputs is an important reason for the competitiveness of the industry in the British colony of Hong Kong despite the high wages in the colony.

Fourthly, in view of the small domestic market in many SEEA countries, governments should encourage exports by providing adequate fiscal incentives and other assistance. In the long run, the region should intensify existing regional cooperation arrangements such as ASEAN and the Pacific Community. Regional cooperation will help SEEA achieve economies of scale in its capital goods industry and overcome market limitations. More specifically, ASEAN should make renewed attempts to implement the various complementation schemes and extend its ASEAN Preferential Arrangement to a wider range of capital goods.

Fifthly, measures should also be taken to encourage firms to improve the quality of their products. One of these measures will have to consider ways of increasing the supply of skilled workers for the capital goods industry. Other measures should include increased expenditure on R & D and finding ways to improve productivity and design adaptation, upgrading operating practices within existing plants, product planning, process control and maintenance, as well as an

expansion of training programmes, especially for shop supervisory personnel. SEEA should be prepared to allocate a larger proportion of their budget for R & D and productivity improvements. They should follow the example of Japan and Taiwan Province where Science Parks have been set up to act as a catalyst for technological development.

In Research and Development, ASEAN countries should get into the development of some standard products, redesigned and adapted for the ASEAN market. This has been done for some agricultural machinery (IRRI tiller) and in connection with the Asian utility vehicle. Other possibilities are basic, low-cost lines of appliances for the local and regional markets.

Finally, in many SEEA countries, incentives are provided through technical assistance, credit, protection and elimination of duty-free importation of capital goods in non-export industries. At present producer goods industries tend to receive less incentives than other industries. It is desirable that SEEA Governments establish a fairer level of incentives: narrowing the present disparity between effective incentives in the capital goods sector and manufacturing in general, and, within the capital goods sector itself, between under-protected producer goods and overprotected consumer items. Adjustments in tariff rates may best be put into effect gradually as capacity in specific product lines is improved.

In the administration of incentives, improved capability of small- and medium-sized producers deserves primary emphasis. They need assistance in raw material supply, layout and tooling, production problems, product testing and training of shop personnel. Government policy support should be carefully coordinated so that contradictions

such as those which hindered the development of the Malaysian agricultural machinery industry /Section 4(a)/ will not arise. All these actions should be guided by more specific product planning within a comprehensive strategy for the capital goods sector.

9. Conclusion

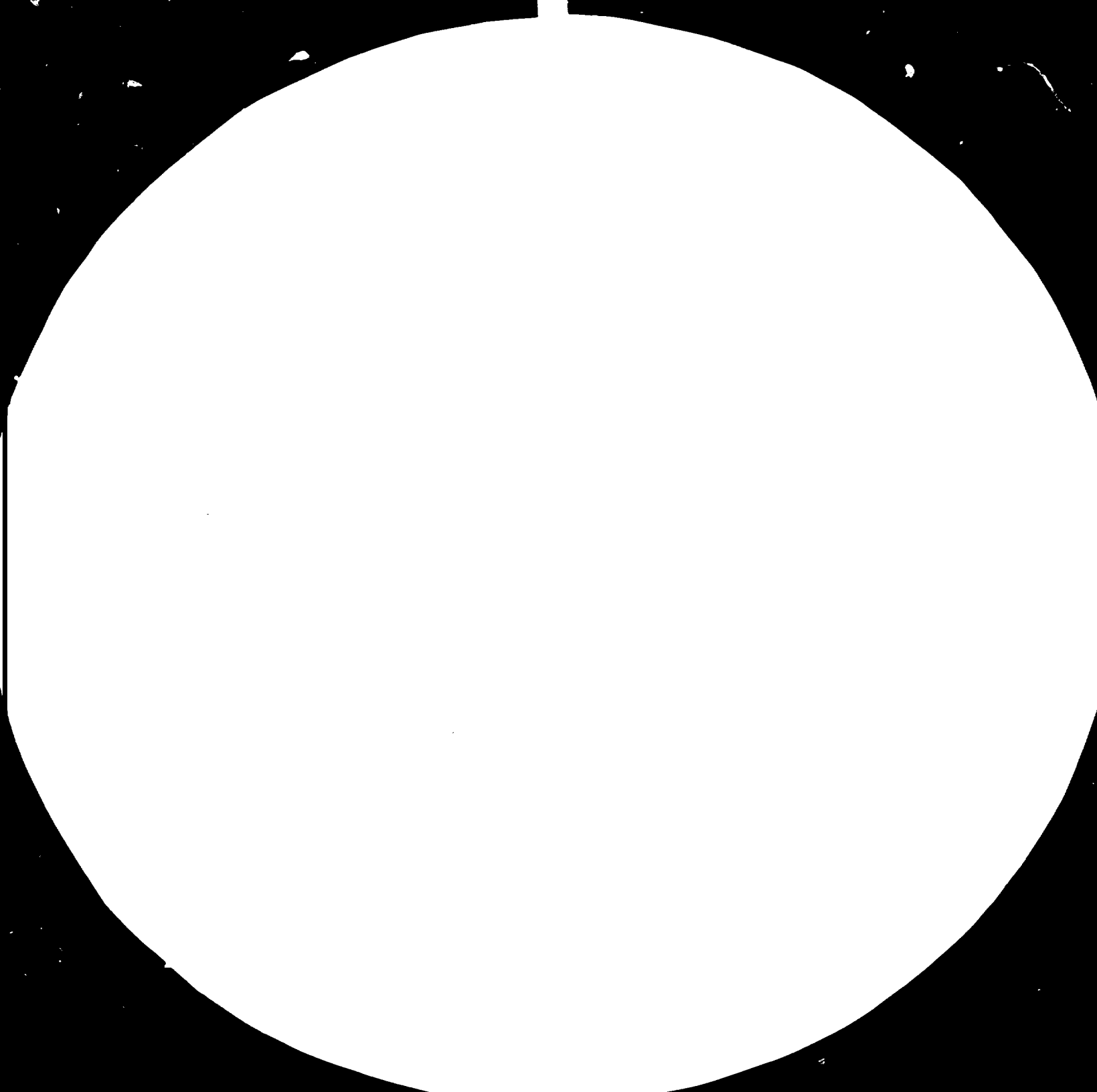
In conclusion, there are many advantages in developing the capital goods industry in SEEA. Firstly, the development of this industry offers a logical extension to the import substitution programme which has reached its limit in a number of SEEA countries. Secondly, SEEA countries have a comparative advantage in some of the capital goods industry especially those which are labour-intensive and do not require a high level of skill or technology. Thirdly, the production of capital goods in SEEA will ensure appropriate machinery which are more in keeping with the relative factor endowments of SEEA. Consequently the production will have a desirable effect on both income generation and employment opportunities.

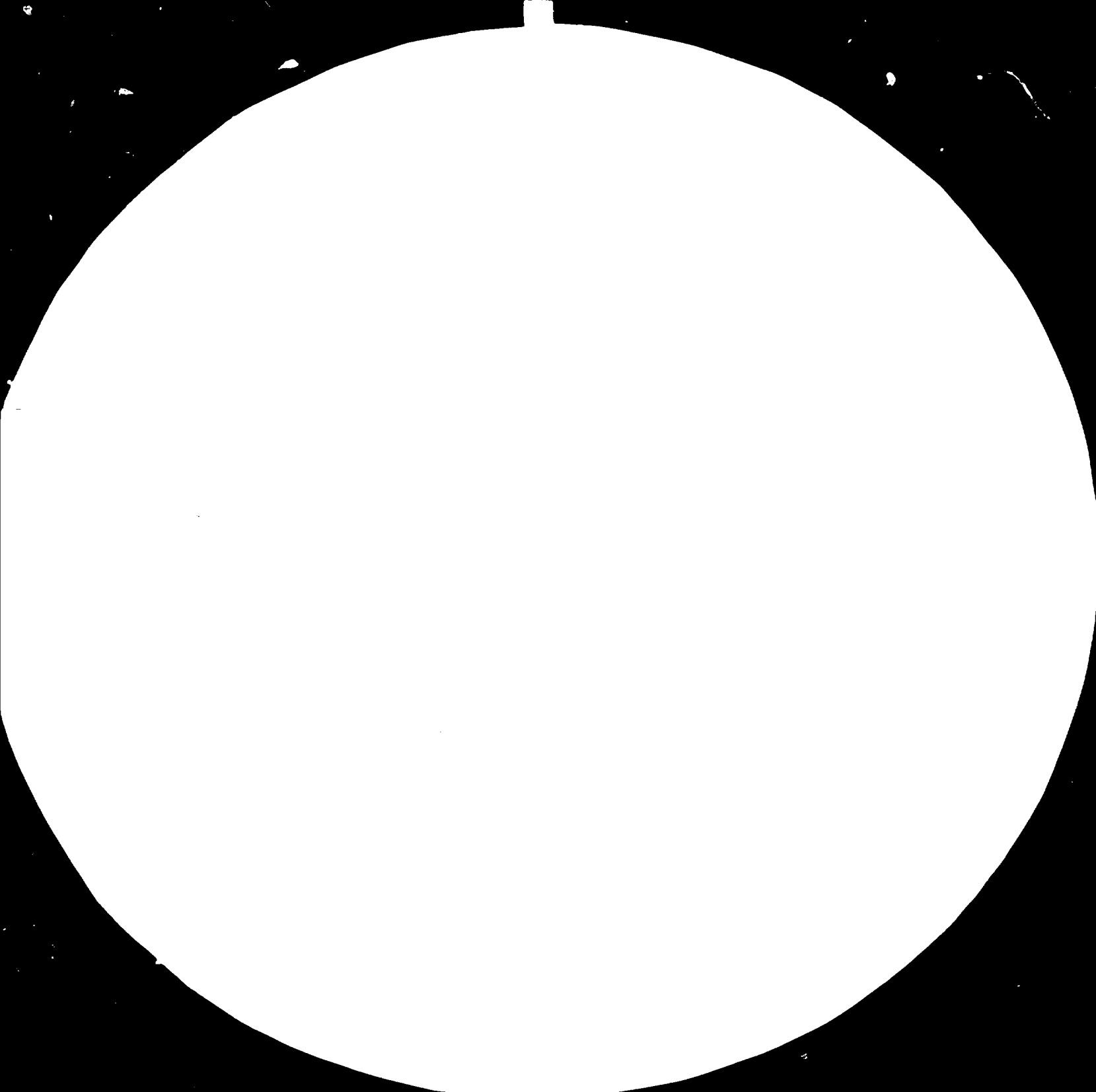
Fourthly, the ability to produce capital goods can contribute to the adaptation of imported equipment to obtain better local performance and help to satisfy the basic needs of the lower income groups. Fifthly, the capital goods industry has significant employment potential. For example, the development of the electronics industry in Malaysia and Singapore was a prime factor in eliminating the unemployment problem in those two countries in the 1970's.

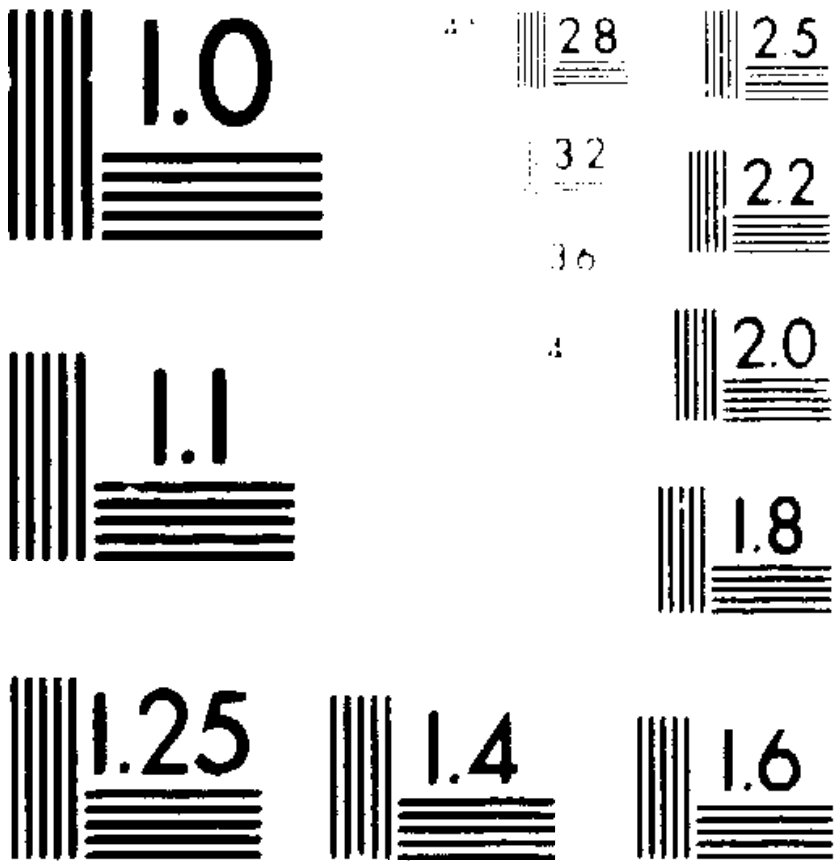
Sixthly, there are externalities in the capital goods industry. The skills generated in the capital goods industry are useful in other sectors. Thus we may consider capital goods production as being

essential for the development of indigenous skills and building up of skilled manpower resources in more sophisticated and precision manufacture. The relatively higher application of the labour force in machinery manufacture, as compared to sophisticated process technologies in other sectors, also results in greater employment opportunities, both directly and in the manufacture of sub-assemblies, components and spares. The manufacture of heavy machinery and equipment also brings, in its wake, considerable expansion of the engineering goods sector and can play a key role in the development of a wide range of metal fabricating industries. It can also serve as a base for absorption and future adaptation of technology and production techniques in a number of production branches. The growth of technological service facilities such as detailed engineering, which constitutes a major gap in many developing countries would also receive a fillip with the expansion of the capital goods sector. In fact, lack of emphasis on this sector can lead to a decline in technological development over a period of time, and under-utilisation of domestic factor resources, particularly manpower, apart from the fact that a very broad and diversified field of production may be left uncovered (K. Singh, 1975).

Finally, the development of the capital goods industry will help to achieve many of the objectives which governments in the region have accepted in common. These include the strengthening of agro-industrial linkages and agro and allied industries; an increased role for small industry; the orientation of industry to satisfy the basic needs of the poor; and the spatial dispersal of industry within individual countries (UNIDO, November 1983). For example, the development of the capital goods industry such as agricultural machinery will facilitate







the indigenous processing of primary products, which is important not only in enabling SEEA to retain a higher value added, but also from the point of view of spatial dispersal of industry within the countries and the strengthening of intersectoral linkages.

In view of the above advantages, governments in SEEA where the capital goods industry is poorly developed should take another look at this vital sector which can provide an alternative to the simple expediency of import substitution in consumer goods. The experience of Singapore, Korea and Malaysia in developing their capital goods industries should provide useful guidelines to help the other countries in the region.

TABLE 2.1

STRUCTURE OF PRODUCTION, SEEA, 1960 AND 1979

Country	GDP ($ million)		Distribution of Gross Domestic Product (per cent)							
			Agriculture		Industry		(Manufacturing)[a]		Services	
	1960	1979	1960	1979	1960	1979	1960	1979	1960	1979
Burma	1,280	4,950	33	45	12	14	8	10	55	41
Hong Kong	950	17,390	4	1	34	-	25	19	62	-
Indonesia	8,670	49,210	54	30	14	33	8	9	32	37
Korea	3,810	60,660	37	20	20	39	14	27	43	41
Malaysia	2,290	20,340	37	24	18	33	9	16	45	43
Philippines	6,980	29,380	26	24	28	35	20	24	46	41
Singapore	700	9,010	4	2	18	36	12	28	78	62
Thailand	2,560	27,640	40	26	19	28	13	19	41	46
Weighted Average	-	-	37.7	22.0	19.9	31.4	13.2	19.5	42.4	38.5

Note : [a]Manufacturing is a part of the industrial sector, but its share of GDP is shown separately because it typically is the most dynamic part of the industrial sector.

Source: World Bank, 1981.

TABLE 2.2

MANUFACTURING VALUE ADDED (MVA) AND MVA PER CAPITA IN SEEA, 1970, 1975 AND 1980

Country	Manufacturing value added (MVA) ($ million)				MVA per capita ($)			
	1970 (in constant 1970 prices)	1975 (in constant 1975 prices)	1980 (in constant 1975 prices)	1980 (in current prices)	1970 (in constant 1975 prices)	1975 (in constant 1975 prices)	1980 (in constant 1975 prices)	1980 (in current prices)
Burma	220.0	242.5	324.2	503.3	8	8	9	14
Hong Kong	1,760.1	2,760.1	3,298.6	6,076.9	446	502	681	1,255
Indonesia	1,397.2	2,708.1	4,476.0	6,153.6	12	20	29	41
Korea	2,391.5	5,450.8	10,008.2	17,394.2	76	157	264	458
Malaysia	1,045.3	1,638.4	3,080.6	4,839.7	100	137	226	355
Philippines	2,848.9	3,941.9	5,636.5	9,069.4	76	90	111	178
Singapore	850.6	1,386.2	2,321.8	3,112.8	410	616	957	1,283
Thailand	1,481.0	2,667.1	4,505.4	6,145.6	41	64	95	129
Total/Weighted Average	11,994.6	20,795.1	33,651.3	53,295.5	143.0	187.6	267.2	450.0

Source: UNIDO, 1983.

TABLE 2.3

GROWTH OF PRODUCTION, SEEA, 1960 - 1979

Country	Average annual growth rate (per cent)									
	GDP		Agriculture		Industry		Manufacturing		Services	
	1960-70	1970-79	1960-70	1970-79	1960-70	1970-79	1960-70	1970-79	1960-70	1970-79
Burma	2.6	4.3	4.1	3.9	2.8	5.4	3.3	5.0	1.5	4.3
Hong Kong	10.0	9.4	-	-11.0	-	4.3	-	6.1	-	10.1
Indonesia	3.9	7.6	2.7	3.6	5.2	11.3	3.3	12.5	4.8	9.2
Korea	8.6	10.3	4.4	4.8	17.2	16.5	17.6	17.8	8.9	8.8
Malaysia	6.5	7.9	-	5.0	-	9.9	-	12.4	-	8.4
Philippines	5.1	6.2	4.3	4.9	6.0	8.4	6.7	6.7	5.2	5.4
Singapore	8.8	8.4	5.0	1.7	12.5	8.6	13.0	9.3	7.7	8.5
Thailand	8.2	7.7	5.5	5.4	11.6	10.4	11.0	11.4	9.0	7.7
Average	6.7	7.7	4.3	2.3	9.2	9.4	9.2	10.2	6.2	7.8

Source: World Bank, 1981.

TABLE 2.4

STRUCTURE OF MANUFACTURING VALUE ADDED, AT CONSTANT (1975) PRICES IN CAPITAL GOODS INDUSTRY, SELECTED YEARS, SOUTHEAST AND EAST ASIA (PERCENTAGES)

COUNTRY	VALUE ADDED AT CONSTANT (1975) PRICES							
	Non-Electrical Machinery (ISIC 382)		Electrical Machinery (ISIC 383)		Transport Equipment (ISIC 384)		Capital Goods Industry (ISIC 382-384)	
	Year I*	Year II*	Year I*	Year II*	Year I*	Year II*	Year I*	Year II*
Hong Kong	1.81	2.59	10.77	10.89	4.13	2.95	16.71	16.43
Indonesia	1.24	0.65	2.28	2.85	3.15	1.44	6.67	4.94
Malaysia	2.49	3.09	6.04	12.00	1.06	2.52	9.59	17.61
Philippines	0.78	1.53	2.96	2.35	4.56	5.09	8.30	8.97
Korea	4.20	2.76	2.35	12.58	1.32	5.04	7.87	20.38
Singapore	5.33	8.73	3.68	28.28	7.41	16.21	16.42	53.22
Thailand	0.86	0.95	0.19	0.76	7.66	6.94	8.71	8.65
Weighted Average	2.17	4.09	8.09	14.87	3.94	7.41	12.67	26.13

*Note:

	Year I	Year II
Hong Kong	1973	1976
Indonesia	1975	1979
Malaysia	1968	1978
Philippines	1963	1977
Korea	1963	1979
Singapore	1967	1980
Thailand	1963	1975

(There is no data on Burma).

Source: UNIDO

TABLE 2.5

STRUCTURE OF MANUFACTURING EMPLOYMENT IN CAPITAL GOODS INDUSTRY, SELECTED YEARS, SOUTHEAST AND EAST ASIA (PERCENTAGES)

COUNTRY	EMPLOYMENT							
	Non-Electrical Machinery (ISIC 382)		Electrical Machinery (ISIC 383)		Transport Equipment (ISIC 384		Capital Goods Industry (ISIC 382-384)	
	Year I*	Year II*	Year I*	Year II*	Year I*	Year II*	Year I*	Year II*
Hong Kong	1.79	1.56	11.01	13.52	2.66	1.62	15.46	16.70
Indonesia	1.17	1.27	1.39	3.27	2.57	3.14	5.13	7.68
Malaysia	4.82	2.99	1.54	16.17	2.82	3 42	9.18	22.58
Philippines	1.32	2.35	3.78	5.05	3.99	3.70	9.09	11.10
Korea	3.57	4.65	2.62	11.91	5.03	5.72	11.22	22.28
Singapore	3.30	7.05	3.16	30.73	7.24	9.57	13.70	47.35
Thailand	1.44	1.30	1.31	6.14	1.43	2.28	4.18	9.72
Weighted Average	2.58	4.02	8.12	13.86	3.65	5.10	11.60	22.34

*Note and Source: See Table 2.4.

TABLE 2.6

SINGAPORE: STRUCTURE OF MANUFACTURING VALUE ADDED, AT CONSTANT (1975) AND CURRENT PRICES AND OF MANUFACTURING EMPLOYMENT, SELECTED YEARS (PERCENTAGES)

BRANCH	ISIC	VALUE ADDED AT CONSTANT PRICES 1967	VALUE ADDED AT CONSTANT PRICES 1980	VALUE ADDED AT CURRENT PRICES 1967	VALUE ADDED AT CURRENT PRICES 1980	EMPLOYMENT 1967	EMPLOYMENT 1980
TOTAL MANUFACTURING	300	100.00	100.00	100.00	100.00	100.00	100.00
Food products	311	8.34	3.80	10.48	3.06	11.34	3.41
Beverages	313	2.34	1.21	6.05	1.27	3.47	0.93
Tobacco	314	1.93	0.47	6.25	0.62	2.01	0.45
Textiles	321	1.45	1.57	1.01	1.84	2.43	3.39
Wearing apparel, except footwear	322	2.10	1.86	2.22	3.10	8.89	9.42
Leather products	323	0.27	0.06	0.40	0.15	1.09	0.42
Footwear, except rubber or plastic	324	0.38	0.11	0.60	0.22	1.79	0.51
Wood products, except furniture	331	3.78	0.82	5.44	2.11	9.91	3.60
Furniture, except metal	332	2.45	0.81	1.01	0.98	1.50	2.12
Paper and products	341	0.52	0.83	1.21	1.10	1.90	1.49
Printing and publishing	342	6.81	3.90	7.86	3.24	8.14	4.16
Industrial chemicals	351	0.98	1.09	0.81	1.27	0.56	0.75
Other chemicals	352	1.93	3.50	4.03	3.55	2.96	1.50
Petroleum refineries a/	353	28.63	14.12	14.72	17.15	1.07	1.17
Misc. petroleum and coal products	354	-	-	-	-	-	-
Rubber products	355	3.82	1.09	6.85	1.10	8.40	1.42
Plastic products	356	0.24	0.79	0.81	2.03	1.33	3.21
Pottery, china, earthenware	361	0.11	0.03	1.41b/	0.29b/	1.41b/	0.33b/
Glass and products	362	0.79	0.23	-	-	-	-
Other non-metall. mineral products	369	3.60	2.14	3.33	2.03	3.84	1.29
Iron and steel	371	2.14	1.46	3.23c/	1.54	2.81c/	0.65
Non-ferrous metals	372	1.00	0.32	-	0.26	-	0.16
Fabricated metal products	381	7.00	3.72	6.65	4.85	8.01	6.13
Machinery, except electrical	382	5.33	8.73	2.82	8.69	3.30	7.05
Machinery electric	383	3.68	28.28	3.23	23.63	3.16	30.73
Transport equipment	384	7.41	16.21	6.85	12.36	7.24	9.57
Professional & scient. equipment	385	2.00	1.91	2.22d/	2.01	3.43d/	3.67
Other manufactured products	390	0.98	0.94	-	1.55	-	2.47

a/ Includes 354.
b/ Includes 362.
c/ Includes 372.
d/ Includes 390.

Source: See Table 2.4.

TABLE 2.7

PRINCIPAL STATISTICS OF CAPITAL GOODS INDUSTRY, SINGAPORE, 1982

Industrial Code		Industry	Establishments	Workers	Output	Value Added	Sales	
							Total	Direct Exports
			Number		Singapore Thousand Dollars			(S$'000)
382		Machinery except Electrical & Electronic	314	23,802	2,322,086	1,012,411	2,363,095	1,701,552
	38220	Refrigerating, air conditioning and ventilating machinery	26	2,626	227,218	93,200	247,628	156,142
	38231	Oil-field and gas-field machinery and equipment	35	7,891	1,341,071	596,952	1,367,026	1,192,134
	38232	Construction machinery and parts	16	356	22,240	6,453	22,415	3,992
	38233	Lifting and hoisting machinery, except electrical	13	566	76,825	28,854	89,168	47,335
	38234	Lifts, escalators and conveyors	13	1,790	86,682	29,499	81,533	8,389
	38241	Lathes, milling machines and tools	6	814	50,813	23,788	51,645	45,769
	38243	Dies, tools, jigs and fixtures	21	669	18,837	12,929	19,097	6,529
	38292	General engineering works	49	1,411	91,966	33,148	97,801	70
		Other machinery and equipment, except electrical and electronic	135	7,679	406,433	187,588	406,781	241,192
383		Electrical Machinery, Apparatus, Appliances and Supplies	114	14,405	995,203	387,711	995,624	624,079
	38311	Electric motors and generators	12	1,972	122,912	53,939	119,921	80,116

...cont.

TABLE 2.7 (contd.)

Industrial Code	Industry	Establishments
		Number
38319	Electrical industrial apparatus except electrical instruments	10
38321	Transformers	10
38322	Switchgear and switchboard apparatus, including switches	32
38332) 38333) 38339)	Electrical cables and wires	17
38341) 38342) 38343)	Storage and primary batteries	5
38350	Electrical lighting equipment, fittings and parts	8
38360	Electrical household appliances	9
	Other electrical machinery, apparatus, appliances and supplies, n.e.c.	11
384	Electronic Products and Components	186
38411	Computers and computer peripheral	9
38412	Electronic office machinery and equipment	5
38413	Communication equipment	13

Workers	Output	Value Added	Sales	
			Total	Direct Exports
	Singapore Thousand Dollars (S$'000)			
548	45,256	14,183	44,237	7,633
1,019	43,560	15,265	44,032	8,404
2,688	163,282	62,136	163,242	87,561
1,238	114,327	32,786	114,346	25,047
2,617	177,646	86,853	176,837	161,336
469	17,728	5,781	17,414	2,243
3,271	276,827	100,048	282,026	240,848
583	33,665	16,720	33,567	10,891
60,760	5,297,570	1,484,448	5,297,484	4,559,201
1,280	231,173	79,946	239,538	197,483
4,513	418,948	176,304	427,244	346,119
1,059	67,028	24,563	67,151	51,908

...cont.

TABLE 2.7 (contd.)

Industrial Code	Industry	Establishments
		Number
38422) 38423)	Television sets - monochrome and colour	8
38424	Microphones, loudspeakers and amplifiers	9
38427	Gramophone records and pre-recorded magnetic tapes	26
38421) 38428)	Radio receiving sets and audio and video combination equipment	19
38441) 38442) 38443) 38449)	Semi-conductor devices	14
38461	Capacitors and resistors	22
38462	Printed circuit boards	13
	Other electronic products & components n.e.c.	48
385	Transport Equipment	295
38511) 38512)	Ships, tankers and other ocean-going vessels	120
38513	Barges, lighters and boats	47
38514	Marine engine and ship parts	72
38531	Motor vehicles	6

Workers	Output	Value Added	Sales	
			Total	Direct Exports
	Singapore Thousand Dollars (S$'000)			
6,820	751,932	180,104	805,185	716,373
1,938	82,352	29,709	82,914	48,534
1,472	88,447	32,729	88,235	27,709
12,203	697,483	181,994	732,466	704,030
14,457	1,868,028	366,667	1,758,524	1,680,697
3,458	129,064	65,899	127,743	79,545
5,988	525,328	201,767	523,894	467,661
7,572	437,788	144,766	444,590	239,143
30,749	2,075,470	1,005,973	2,190,012	1,116,064
18,172	1,115,568	513,827	1,270,246	702,424
4,524	387,128	128,877	367,089	161,159
2,403	151,375	85,217	151,237	14,338
1,181	53,415	17,321	55,595	12,973

...cont.

TABLE 2.7 (contd.)

Industrial Code	Industry	Establishments	Workers	Output	Value Added	Sales	
						Total	Direct Exports
		Number		Singapore Thousand Dollars (S$'000)			
38532	Motor vehicle bodies	6	240	18,633	6,007	18,581	2,131
38533	Motor vehicle parts and accessories	17	446	18,027	8,403	18,710	11,727
38551) 38559)	Aircraft equipment and aircraft repairing and servicing	11	3,169	297,041	231,111	273,536	189,515
	Other transport equipment	16	614	34,283	15,211	35,018	21,796
Total		909	129,726	10,690,329	3,890,543	10,846,215	8,000,896
Total Manufacturing		3,597	276,753	36,961,606	9,383,430	36,946,817	22,227,266

Note : S$1.00 = $0.47 or $1.00 = S$2.15.

Source: Singapore, 1982.

TABLE 2.8

WEST MALAYSIA: STRUCTURE OF MANUFACTURING VALUE ADDED, AT CONSTANT (1975) AND CURRENT PRICES AND OF MANUFACTURING EMPLOYMENT, SELECTED YEARS (PERCENTAGES)

BRANCH	ISIC	VALUE ADDED AT CONSTANT PRICES 1968	VALUE ADDED AT CONSTANT PRICES 1978	VALUE ADDED AT CURRENT PRICES 1968	VALUE ADDED AT CURRENT PRICES 1978	EMPLOYMENT 1968	EMPLOYMENT 1978
TOTAL MANUFACTURING	300	100.00	100.00	100.00	100.00	100.00	100.00
Food products	311	22.03	16.21	16.06	20.75	15.32	12.05
Beverages	313	2.01	2.51	4.13	2.45	1.82	1.23
Tobacco	314	3.95	3.23	6.54	2.79	3.26	1.60
Textiles	321	4.34	6.77	2.29	6.52	4.06	9.65
Wearing apparel, except footwear	322	1.00	1.56	0.57	1.32	2.22	3.98
Leather products	323	0.14	0.08	0.11	0.09	0.28	0.21
Footwear, except rubber or plastic	324	0.27	0.18	0.23	0.13	0.40	0.43
Wood products, except furniture	331	15.21	13.26	10.78	9.69	15.33	12.56
Furniture, except metal	332	1.00	0.87	1.03	0.70	2.00	2.03
Paper and products	341	0.78	1.09	0.69	0.89	1.33	1.28
Printing and publishing	342	6.13	4.31	6.08	3.90	7.54	4.28
Industrial chemicals	351	2.53	2.05	2.41	2.51	0.93	0.99
Other chemicals	352	3.63	3.26	6.65	3.19	3.69	2.30
Petroleum refineries	353	2.78	1.60	4.59	3.30	0.29	0.13
Misc. petroleum and coal products	354	0.20	0.16	-	0.04	0.02	0.03
Rubber products	355	12.54	10.34	5.85	9.92	6.53	8.20
Plastic products	356	0.84	1.44	0.92	1.81	1.50	3.07
Pottery, china, earthenware	361	0.30	0.31	0.11	0.25	0.26	0.48
Glass and products	362	0.54	0.55	0.46	0.90	0.51	0.56
Other non-metall. mineral products	369	4.69	4.82	6.54	3.94	5.08	3.50
Iron and steel	371	2.02	2.82	2.18	2.83	2.21	2.14
Non-ferrous metals	372	0.40	0.34	0.23	0.32	0.18	0.32
Fabricated metal products	381	2.92	3.62	4.47	3.75	6.43	4.52
Machinery, except electrical	382	2.49	3.09	2.87	2.90	4.82	2.99
Machinery electric	383	6.04	12.00	2.29	10.78	1.54	16.17
Transport equipment	384	1.06	2.52	2.18	3.03	2.82	3.42
Professional & scient. equipment	385	0.09	0.57	9.75a/	0.70	9.63a/	0.83
Other manufactured products	390	0.07	0.45	-	0.57	-	1.04

a/ Includes 390.

Source: See Table 2.4.

TABLE 2.9

PRINCIPAL STATISTICS OF CAPITAL GOODS INDUSTRY, MALAYSIA, 1981

Industry	Number of Establishments	Revenue (M$'000)	Expenditure (M$'000)	Total Employment	Value of Fixed Assets Owned (M$'000)
Manufacture of Machinery except Electrical	1,519	978,513	913,852	22,356	235,853
Manufacture of engines and turbines	31	9,622	9,830	307	3,182
Manufacture of agricultural machinery and equipment	55	72,719	67,773	1,535	16,980
Manufacture of metal and wood working machinery	62	20,402	19,227	850	14,813
Manufacture of special industrial machinery and equipment except metal and wood working machinery	93	100,292	95,596	2,057	15,875
Manufacture of office computing and accounting machinery	8	8,621	7,721	77	259
Manufacture of refrigerating, exhaust, ventilating and air-conditioning machinery	125	341,548	310,209	3,760	72,853
Machinery and equipment, n.e.c.	1,139	425,309	403,496	13,770	111,891

...cont.

TABLE 2.9 (contd.)

Industry	Number of Establishments	Revenue (M$'000)	Expenditure (M$'000)	Total Employment	Value of Fixed Assets Owned (M$'000)
Manufacture of Electrical Machinery, Apparatus, Appliances and Supplies	318	4,535,868	4,182,878	81,118	928,425
Manufacture of electrical industrial machinery and apparatus	79	106,854	101,947	2,277	31,038
Radio and television sets, sound reproducing and recording equipment	43	471,629	461,261	9,892	124,257
Semi-conductors and other electronic components and communication equipment and apparatus	76	3,425,204	3,117,497	60,791	534,839
Manufacture of electrical appliances and housewares	15	103,769	97,335	1,664	45,848
Manufacture of cables and wares	15	240,151	229,173	2,658	128,540
Manufacture of dry cells and storage batteries	37	106,416	96,669	1,406	34,916
Manufacture of electric lamps and tubes	7	16,954	16,268	310	11,734
Manufacture of miscellaneous electrical apparatus and supplies, n.e.c.	46	64,892	62,728	2,120	17,253

...cont.

TABLE 2.9 (contd.)

Industry	Number of Establishments	Revenue (M$'000)	Expenditure (M$'000)	Total Employment	Value of Fixed Assets Owned (M$'000)
Manufacture of Transport Equipment	419	1,292,820	1,247,468	21,321	472,525
Shipbuilding and boatbuilding and repairing	132	421,105	396,463	6,208	215,267
Manufacture of motor vehicle bodies	120	83,397	80,605	1,913	11,871
Manufacture and assembly of motor vehicles	28	530,369	524,593	7 206	105,052
Manufacture of motor vehicle parts and accessories	84	103,041	107,324	3,373	85,192
Manufacture and assembly of motor-cycles and scooters	16	102,682	89,310	1,159	25,702
Manufacture and assembly of bicycles, tricycles, trishaws and their parts and accessories[1]	39	52,226	49,173	1,462	29,441
Total	2,256	6,807,201	6,344,198	124,795	1,636,803
Total Manufacturing	20,429	38,692,758	36,736,172	578,682	10,437,985

Note : M$1.00 = $0.42 or $1.00 = M$2.40.

[1] Includes manufacture of transport equipment, n.e.c.

Source: Malaysia, 1981.

TABLE 2.10

KOREA: STRUCTURE OF MANUFACTURING VALUE ADDED, AT CONSTANT (1975) AND CURRENT PRICES AND OF MANUFACTURING EMPLOYMENT, BY COUNTRY, SELECTED YEARS (PERCENTAGES)

BRANCH	ISIC	VALUE ADDED AT CONSTANT PRICES		VALUE ADDED AT CURRENT PRICES		EMPLOYMENT	
		1963	1979	1963	1979	1963	1979
TOTAL MANUFACTURING	300	100.0	100.00	100.00	100.00	100.00	100.00
Food Products	311	14.66	9.09	8.79	7.06	8.60	6.67
Beverages	313	5.65	3.72	9.12	3.34	3.85	1.35
Tobacco	314	12.01	3.63	13.68	6.13	2.25	0.62
Textiles	321	10.75	14.48	17.43	13.77	27.87	19.18
Wearing apparel, except footwear	322	2.18	4.11	2.12	4.37	3.41	9.05
Leather products	323	0.25	1.23	0.33	0.84	0.45	1.14
Footwear, except rubber or plastic	324	0.27	0.36	0.33	0.64	0.66	1.05
Wood products, except furniture	331	3.31	1.98	3.42	1.80	2.94	2.74
Furniture, except metal	332	1.03	0.35	0.65	0.57	1.26	0.78
Paper and products	341	3.44	1.94	3.75	2.09	2.73	2.21
Printing and publishing	342	4.42	1.69	4.07	2.25	4.04	2.12
Industrial chemicals	351	3.29	5.62	3.75	4.26	2.02	1.95
Other chemicals	352	4.22	5.95	5.86	4.80	4.54	2.37
Petroleum refineries	353	-	2.56	-	1.76	-	0.17
Misc. petroleum and coal products	354	1.97	1.03	2.44	0.99	3.57	0.59
Rubber products	355	5.49	2.95	2.93	3.35	4.93	4.62
Plastic products	356	-	1.32	0.37	2.29	0.25	2.51
Pottery, china, earthenware	361	1.97	0.21	0.43	0.44	1.46	0.72
Glass and products	362	1.61	0.95	0.94	1.03	0.42	0.93
Other non-metall. mineral products	369	4.92	4.08	4.66	4.30	3.79	3.07
Iron and steel	371	2.29	5.60	2.93	6.94	2.62	3.51
Non-ferrous metals	372	1.64	1.27	0.49	1.00	0.73	0.78
Fabricated metal products	381	2.15	3.20	2.28	3.77	3.67	4.64
Machinery, except electrical	382	4.20	2.76	2.28	4.49	3.57	4.65
Machinery electric	383	2.35	12.58	2.44	8.90	2.62	11.91
Transport equipment	384	1.32	5.04	3.26	5.99	5.03	5.72
Professional & scient. equipment	385	0.37	1.08	0.26	1.02	0.43	1.40
Other manufactured products	390	4.24	1.20	1.00	1.83	2.31	3.53

Source: See Table 2.4.

TABLE 2.11

FIXED INVESTMENT IN MANUFACTURING[1]

Unit: Billion Won (%)

	1973-1976	1977-1981	Cumulative Total 1973-1981	
			Amount	[3]
Total Investment	3,431 (100.0)[2]	16,026 (100.0)	19,457 (100.0)	
Manufacturing	2,166 (63.1)	9,151 (57.1)	11,317 (58.2)	(100.0)
Heavy and Chemical Industries	1,575 (45.9)	7,222 (45.1)	8,797 (45.2)	(77.7)
Machinery	219 (6.4)	1,480 (9.2)	1,699 (8.7)	(15.0)
General machinery	86 (2.5)	702 (4.4)	788 (4.1)	(7.0)
Other machinery	133 (3.9)	778 (4.9)	911 (4.7)	(8.1)
Transport Machinery	263 (7.7)	940 (5.9)	1,203 (6.2)	(10.6)

Notes : [1]Total fixed investment (Current Price) of firms employing more than 100 persons.

[2]( ) as per cent of total investment.

[3]( ) as per cent of manufacturing investment.

Source: Y. Park, 1983.

TABLE 2.12

CHANGES IN INDUSTRIAL STRUCTURE IN KOREA IN THE 1970's[1]
(Percentage)

	1970	1976	1978
Agriculture, Forestry, Fishery and Mining	19.7	15.2	14.3
Manufacturing	35.7	47.7	46.8
Light industry	22.7	25.0	22.7
Heavy industry	13.0	22.7	24.1
chemical	6.5	11.7	10.1
basic metal	2.8	4.1	5.6
machinery	3.7	6.8	8.4
Others	44.6	37.1	38.9
Total	100.0	100.0	100.0

Note : [1]Industrial origin of GNP at current factor cost.

Source: Same as Table 2.11.

TABLE 2.13

KOREA: PRODUCTION OF MACHINERY BY ITEM, 1973-1979

	1973	1975	1977	1978	1979	Average Annual Increase Rate (1973-79) (%)
Industrial Machinery (A)	78.88	84.52	182.54	270.20	571.39	49.3
General Machinery (B)	234.01	352.30	807.58	1,467.47	2,120.77	54.8
Electrical Machinery (C)	753.86	1,036.60	2,419.55	3,920.94	4,989.60	47.6
Transportation Machinery and Equipment (D)	453.35	763.34	2,284.46	3,379.73	3,666.64	55.6
Total Machinery & Equipment Industry (E)	2,238.15	2,808.65	6,355.25	10,578.40	13,025.65	45.7
A/B (%)	40.9	23.9	22.6	18.4	26.9	-
A/E (%)	4.27	3.0	2.7	2.6	4.4	-
B/E (%)	10.5	12.5	12.2	13.9	16.3	-
C/E (%)	33.7	36.9	36.4	37.1	38.3	-
D/E (%)	20.3	27.2	34.4	31.9	28.1	-

Source: Economic Planning Board, Report on Mining and Manufacturing.

TABLE 2.14

KOREA: PRODUCTION BY MAJOR ELECTRONICS ITEMS, 1968-1980

(In 1,000 U.S. dollars, %)

	1968		1975		1979		1980	
	Amount	Ratio	Amount	Ratio	Amount	Ratio	Amount	Ratio
Consumer Electronics								
Radios	6,044	13.8	49,416	5.8	58,506	1.8	33,326	1.2
B/W TVs	6,537	14.9	82,474	9.6	406,929	12.4	303,608	10.6
Color TVs	–	–	5,592	0.7	71,443	2.2	190,208	6.7
Tape Recorders	–	–	42,282	4.9	264,831	8.0	235,093	8.2
Record-players	319	0.7	17,964	2.1	128,643	3.9	131,951	4.6
Amplifiers	–	–	38,181	4.4	153,071	4.7	78,343	2.7
Electronic Watches	–	–	10,233	1.2	111,551	3.4	73,599	2.6
Others	–	–	23,881	2.8	250,699	7.6	101,423	3.6
Sub-total	12,900	29.4	270,023	31.4	1,374,230	41.9	1,147,551	40.2
Industrial Equipment								
Telephones	1,110	2.5	7,280	0.9	18,590	0.6	19,808	0.7
Telephone Exchangers	2,903	6.6	43,769	5.1	92,193	2.8	105,244	3.7
Transceivers	–	–	5,268	0.6	25,451	0.8	17,965	0.6
Desk Top Calculators	–	–	21,310	2.5	38,425	1.2	24,884	0.9
Others	2,687	6.1	16,014	1.8	143,874	4.4	196,534	6.9
Sub-total	6,700	15.3	93,641	10.9	319,533	9.7	364,435	12.8
Parts & Components								
Electron Tubes	94	0.2	11,318	1.3	58,972	1.8	70,977	2.5
Diodes	5	–	21,746	2.5	35,432	1.1	33,321	1.2
Transistors	5,469	12.5	81,026	9.4	121,046	3.7	82,632	2.9
Resistors	931	2.1	7,945	0.9	48,394	1.5	39,874	1.4
Condensers	843	1.9	29,013	3.4	130,307	4.0	105,465	3.7
Integrated Circuits	9,439	21.5	128,533	15.0	288,753	8.8	294,365	10.3
Speakers	1,301	3.0	8,710	1.0	45,972	1.4	35,636	1.2
Switches	77	0.2	1,506	0.2	22,868	0.7	15,117	0.5
TV Turners	–	–	13,641	1.6	69,409	2.1	63,929	2.2
Memory Planes	2,255	5.1	15,286	1.8	28,963	0.9	22,652	0.8
Others	3,886	8.9	177,859	20.7	736,845	22.5	576,512	20.2
Sub-total	24,300	55.4	496,593	57.7	1,586,961	48.4	1,340,500	47.0
Total	45,900	100.0	860,257	100.0	3,280,724	100.0	2,852,486	100.0

Source : The Electronics Industry Association of Korea

TABLE 2.15

KOREA: INDUSTRIAL MACHINERY AND EQUIPMENT PRODUCTION

$ million

	1971	1973	1975	1977	1978	1979
Construction, Mining Machinery and Equipment	2.17 (9.7)	12.77 (16.2)	19.59 (23.2)	57.07 (36.2)	16.24 (8.9)	215.32 (37.7)
Textile Machinery	6.29 (28.3)	30.69 (38.9)	29.82 (35.3)	57.17 (36.3)	64.41 (35.3)	97.85 (17.1)
Food and Beverage Making Machinery	1.91 (8.6)	5.86 (7.4)	9.10 (10.8)	12.32 (7.8)	13.54 (7.4)	30.13 (5.3)
Industrial Chemical Machinery and Equipment	2.14 (9.6)	6.48 (8.2)	8.33 (9.8)	8.47 (5.4)	17.30 (9.5)	122.20 (21.4)
Other Industrial Machinery	9.75 (43.8)	23.08 (29.3)	17.69 (20.9)	22.55 (14.3)	71.06 (38.9)	105.88 (18.5)
Total	22.26 (100.0)	78.88 (100.0)	84.52 (100.0)	157.56 (100.0)	182.54 (100.0)	569.32 (100.0)

Note : The figures in parentheses denote the share over total.

Source: Economic Planning Board, Report on Mining and Manufacturing.

TABLE 3.1

VALUE ADDED OF THE CAPITAL GOODS INDUSTRY,
SOUTHEAST AND EAST ASIA, SELECTED YEARS[1]

COUNTRY	Year	Non-Electrical Machinery (ISIC 382) Value ($'000)	%	Electrical Machinery (ISIC 383) Value ($'000)	%	Transport Equipment (ISIC 384) Value ($'000)	%	Total Value ($'000)	%
Hong Kong	1973	27886	9.3	199688	66.8	71568	23.9	299142	100.0
	1979	96169	10.5	730847	79.6	90726	9.9	917742	100.0
Indonesia	1975	19352	17.2	44055	39.3	48851	43.5	112258	100.0
	1979	41280	16.9	92160	37.9	109920	45.2	243360	100.0
Korea	1963	10769	28.6	11538	30.6	15384	40.8	37691	100.0
	1979	854911	23.2	1692468	45.9	1138986	30.9	3686365	100.0
Malaysia	1968	8167	39.1	6534	31.2	6207	29.7	20908	100.0
	1978	66551	17.4	247191	64.5	69576	18.1	383318	100.0
Philippines	1968	6394	8.4	31458	41.4	38107	50.2	75959	100.0
	1977	26191	13.9	80194	42.7	81544	43.4	187929	100.0
Singapore	1967	4574	21.9	5227	25.0	11107	53.1	20908	100.0
	1980	348131	19.4	946729	52.9	495327	27.7	1790187	100.0
Thailand	1963	1793	18.9	2072	21.8	5619	59.3	9484	100.0
	1975	20236	5.3	217859	56.6	146808	38.1	385003	100.0

[1]Data for Burma are not available.

Source: See Table 2.4.

TABLE 3.2

NUMBER OF EMPLOYEES IN THE CAPITAL GOODS INDUSTRY, SOUTHEAST AND EAST ASIA, SELECTED YEARS[1]

COUNTRY	Year	Non-Electrical Machinery (ISIC 382)		Electrical Machinery (ISIC 383)		Transport Equipment (ISIC 384)		Total	
		No.	%	No.	%	No.	%	No.	%
Hong Kong	1973	11700	11.6	72000	71.2	17400	17.2	101100	100.0
	1979	13600	9.4	117700	80.9	14100	9.7	145400	100.0
Indonesia	1975	8800	22.9	10400	27.0	19300	50.1	38500	100.0
	1979	11000	16.6	28200	42.5	27100	40.9	66300	100.0
Korea	1963	13600	31.8	10000	23.4	19200	44.8	42800	100.0
	1979	96900	20.9	248400	53.5	119300	25.6	464600	100.0
Malaysia	1968	6260	52.5	2000	16.8	3660	30.7	11920	100.0
	1978	11200	13.3	60500	71.6	12800	15.1	84500	100.0
Philippines	1963	3800	14.5	10900	41.6	11500	43.9	26200	100.0
	1977	15900	21.2	34100	45.5	25000	33.3	75000	100.0
Singapore	1967	1940	24.1	1860	23.1	4260	52.8	8060	100.0
	1980	20100	14.9	87620	64.9	27280	20.2	135000	100.0
Thailand	1963	2144	34.5	1944	31.2	2133	34.3	6221	100.0
	1975	7725	13.3	36551	63.2	13568	23.5	57844	100.0

[1]Data for Burma are not available.

Source: See Table 2.4.

TABLE 3.3

VALUE ADDED PER EMPLOYEE IN THE CAPITAL GOODS INDUSTRY
SOUTHEAST AND EAST ASIA, SELECTED YEARS[1]

COUNTRY	Year	Non-Electrical Machinery (ISIC 382)	Electrical Machinery (ISIC 383)	Transport Equipment (ISIC 384)	Weighted Average $
Hong Kong	1973	2383	2773	4113	2,959
	1979	7071	6209	6434	6,312
Indonesia	1975	2199	4236	2531	2,916
	1979	3753	3268	4056	3,671
Korea	1963	792	1154	901	881
	1979	8823	6813	9547	7,934
Malaysia	1968	1305	3267	1696	1,754
	1978	5942	4086	5436	4,536
Philippines	1963	1683	2886	3314	2,899
	1977	1647	2352	3262	2,506
Singapore	1967	2358	2810	2607	2,594
	1980	17320	10805	18157	13,261
Thailand	1963	836	1066	2634	1,525
	1975	2620	5963	10820	6,656

[1]Data for Burma are not available.

Source: See Table 2.4.

TABLE 3.4

MEAN SIZE OF ESTABLISHMENT IN THE CAPITAL GOODS INDUSTRY, SOUTHEAST AND EAST ASIA, SELECTED YEARS[1]

No. of Employees

COUNTRY	Year	Non-Electrical Machinery (ISIC 382)	Electrical Machinery (ISIC 383)	Transport Equipment (ISIC 384)
Hong Kong	1973	8	91	100
	1979	9	63	46
Indonesia	1975	90	135	164
	1979	87	285	155
Korea	1963	17	34	22
	1979	55	159	127
Malaysia	1968	14	34	30
	1978	37	358	100
Philippines	1963	29	103	39
	1977	17	141	31
Singapore	1967	27	60	112
	1980	68	301	108
Thailand	1963	20	65	36
	1975	22	356	114

[1]Data for Burma are not available.

Source: See Table 2.4.

TABLE 3.5

WAGE RATE IN THE CAPITAL GOODS INDUSTRY, SOUTHEAST AND EAST ASIA, SELECTED YEARS[1]

COUNTRY	Year	Non-Electrical Machinery (ISIC 382)	Electrical Machinery (ISIC 383)	Transport Equipment (ISIC 384)	Weighted Average $
Hong Kong	1973	1400	1519	2757	1,718
	1979	3780	2883	4904	3,163
Indonesia	1975	520	666	910	775
	1979	886	944	1047	976
Korea	1963	339	308	441	378
	1979	3554	2576	3921	3,125
Malaysia	1968	638	791	651	668
	1978	1736	1407	2262	1,580
Philippines	1963	740	634	712	684
	1978	883	1029	1226	1,064
Singapore	1967	1162	1247	1503	1,362
	1980	5317	3436	6227	4,294
Thailand	1963	381	374	453	403
	1975	858	1596	1330	1,435

[1]Data for Burma are not available.

Source: See Table 2.4.

TABLE 3.6

OWNERSHIP AND FOREIGN CAPITAL IN ASIAN ELECTRONICS INDUSTRY

		Korea (1978)	Taiwan (1977)	Hong Kong (1976)	Philippines (1980)	Thailand (1978)	Malaysia (1977)	Singapore (1979)	Indonesia (1979)
Number of Companies or Establishments	Local	536	974	n.a.	5	49		102	59
	Joint-Venture	172	47	69	5	37		157	11
	Foreign	44	37		9				2
	Total	752	1,058		19	86	170	259	72
		(1977)							
	(Foreign + J.V.)								
	U.S.A.	35	29	39	6	8		25	n.a.
	Japan	170	45	14	2	13		50	
	U.K.	-	-	3	1			10	
	Netherlands	-	3	-	1		n.a.	n.a.	
	Others	6	7	13	4	16		72	
	Total	211	84	69	14	37		157	
		Million US$	1,000 NT$	Million HK$		Million Baht	1,000 M$		Million Rupiah
Amount of Registered or Paid-Up Capital, Investments	Local	n.a.	339,910 (68.6)	n.a.		458 (59.3)	57,663 (28.0)		20,154 (44.1)
	Joint-Venture	155	34,954 (7.0)	509		314 (40.7)	148,226 (72.0)		20,970 (45.9)
	Foreign		120,713 (24.4)						4,551 (10.0)
	Total		495,577 (100.0)			772 (100.0)	205,889(1)		45,675 (100.0)
	(Foreign + J.V.)								
	U.S.A.	52 (33.5)	66,303 (42.6)	513 (85.6)		104 (22.7)	47,432 (27.2)		
	Japan	92 (59.4)	60,185 (38.7)	49 (8.2)		221 (48.1)	56,243 (32.3)		
	U.K.	-	-	-	n.a.		11,512 (6.6)		n.a.
	Netherlands	-	26,134 (16.8)				n.a.		
	Others	11 (7.1)	3,045 (1.9)	37 (6.2)		134 (29.2)	59,075 (33.9)		
	Total	155 (100.0)	155,667 (100.0)	559 (100.0)		459 (100.0)	174,262(2) (100.0)		
		Investment Paid-Up Capitals				Registered Paid-Up Capitals			Investments

Source: Institute of Developing Economies, 1982, p. 179.

TABLE 4.1

EXPORTS OF AGRICULTURAL MACHINERY BY TYPE,
SOUTH EAST AND EAST ASIA, 1980

Type of Agricultural Machinery Country	$'000	%
Agricultural machinery for soil prep. (7121)		
1. Indonesia	1	-
2. Malaysia	600	11.1
3. Philippines	24	0.4
4. Korea	3597	66.5
5. Singapore	416	7.7
6. Thailand	772	14.3
Total	5410	100.0
Agr. mach. F. Harvesting, etc. (7122)		
1. Malaysia	120	3.4
2. Philippines	12	0.3
3. Korea	60	1.7
4. Singapore	3338	94.3
5. Thailand	11	0.3
	3541	100.0
Milking machines, etc. (7123)		
1. Korea	16	19.3
2. Singapore	67	80.7
	83	100.0
Tractors (7125)		
1. Indonesia	34	0.4
2. Malaysia	189	2.2
3. Philippines	1831	20.9
4. Korea	1037	11.9
5. Singapore	5186	59.3
6. Thailand	465	5.3
	8742	100.0
Agr. mach., N.E.S. (7129)		
1. Hong Kong	2	0.1
2. Indonesia	78	4.7
3. Malaysia	241	14.6
4. Korea	8	0.5
5. Singapore	794	48.0
6. Thailand	531	32.1
	1654	100.0
Total (712)		
1. Hong Kong	2	0.01
2. Indonesia	114	0.59
3. Malaysia	1150	5.92
4. Philippines	1867	9.61
5. Korea	4718	24.28
6. Singapore	9801	50.44
7. Thailand	1780	9.16
Total	19432	100.00

Source: See Table 2.4.

TABLE 4.2

AGRICULTURAL MACHINERY IN THAILAND:
CAPACITY UTILIZATION AND PRODUCTION VALUE
1978

	Type of Product			Total
	2 w. tiller	4 w. tiller	Tractor	
Production capacity (units/year)	57,000	7,000	3,000	67,00
Production (units)	39,568	3,808	2,158	45,53
Capacity utilization (percent)	69.4	54.4	71.9	-
Value of production (million ฿)	210 (26.9)	70 (9.0)	500 (64.1)	78 (10
Average domestic price (baht/unit)	5,307	18,382	231,696	-

Figures in parentheses are percentages.

Source: Bank of Thailand.

TABLE 4.3

EXPORTS OF ELECTRONIC COMPONENTS (7293)
SOUTH EAST AND EAST ASIA, 1980

Country	$'000	%
1. Hong Kong	295168	9.3
2. Indonesia	90638	2.9
3. Malaysia	1053139	33.0
4. Philippines	45296	1.4
5. Korea	517495	16.2
6. Singapore	1186788	37.2
7. Thailand	9	-
	3188533	100.0

Source: See Table 2.1.

TABLE 4.4

AGGREGATE DATA ON THE ELECTRONICS INDUSTRY IN SINGAPORE, 1970-1980

Year	No. of Establishments	No. of Workers	% of Mfg Workforce	Output (S$m.)	% of Mfg Output	Output Per Worker (S$'000)	Value-Added Per Worker (S$'000)	Average Remuneration Per Employee (S$'000)	Direct Export As % of Total Sales	Direct Export As % of Total Mfg Direct Export
1970	35	11,251	9.3	212.8	5.5	18.9	8.8	2.1	73.9	9.3
1971	49	15,874	11.3	319.0	6.8	20.1	8.9	2.7	84.8	11.3
1972	53	27,270	16.0	616.8	10.8	22.6	10.5	2.9	93.0	16.0
1973	64	39,210	19.7	1,096.8	13.8	28.0	10.8	3.3	92.8	19.7
1974	91	46,247	22.4	1,603.6	12.0	34.7	14.5	3.9	90.9	18.7
1975	95	32,026	16.7	1,457.9	11.6	45.5	14.8	5.2	90.9	16.7
1976	105	43,718	21.1	1,987.8	13.0	45.5	14.6	5.0	91.0	21.1
1977	115	46,441	21.2	2,322.7	13.3	50.0	15.2	5.4	90.6	21.2
1978	135	53,440	21.9	2,821.9	14.3	52.8	16.7	5.6	89.5	21.9
1979	168	57,255	21.3	4,092.7	16.2	71.5	22.2	7.3	86.5	21.0
1980	172	71,727	25.1	5,344.0	16.9	74.5	29.1	7.1	87.1	23.5
1981	223	73,460	26.1	5,934.9	16.1	80.8	23.2	8.3	85.2	22.8
1982	228	64,467	23.4	5,504.4	15.1	85.4	24.2	10.2	84.8	21.3

Note : Industry covers codes 38211/12, 38321, 38322, 38329.
S$1.00 approximately equals $0.50 or $1.00 = S$2.00.

Source: Singapore, Department of Statistics, Census of Industrial Production, 1970-1980.

TABLE 4.5

EXPORTS OF MOTOR VEHICLES (SITC 732) SOUTH EAST AND EAST ASIA, 1980

Country	$'000	%
1. Hong Kong	838	0.2
2. Indonesia	4109	1.1
3. Malaysia	6766	1.8
4. Philippines	31534	8.2
5. Korea	118964	30.9
6. Singapore	211244	55.0
7. Thailand	10794	2.8
Total	384249	100.0

Source: See Table 2.4.

TABLE 5.1

IMPORTS OF CAPITAL GOODS, SOUTH EAST AND EAST ASIA, SELECTED YEARS, AT CURRENT PRICES[1]

($'000)

Year	Non-electrical Machinery (SITC 71) Value	%	Electrical Machinery (SITC 72) Value	%	Transport Equipment (SITC 73) Value	%	Total Value	%
Hong Kong								
1970	160025	33.5	248754	52.0	69205	14.5	477984	100.0
1975	406214	35.7	582109	51.1	150050	13.2	1138373	100.0
1980	1578999	32.4	2317763	47.6	971391	20.0	4868153	100.0
Indonesia								
1970	149687	49.0	52262	17.1	103419	33.9	305369	100.0
1975	824254	46.5	395724	22.3	552944	31.2	1772922	100.0
1980	1855004	51.0	748641	20.6	1030176	28.3	3633821	100.0
Malaysia								
1970	169096	43.2	63581	16.3	158440	40.5	391117	100.0
1975	489360	42.5	354849	30.8	306912	26.7	1151121	100.0
1980	1418409	34.0	1676563	40.2	1073529	25.8	4168501	100.0
Philippines								
1970	242587	56.6	64952	15.2	120736	28.2	428275	100.0
1975	685262	57.0	170065	14.1	347350	28.9	1202677	100.0
1980	1017910	51.5	400529	20.2	559784	28.3	1978223	100.0
Singapore								
1970	275456	49.1	160328	28.6	125554	22.4	561338	100.0
1975	990351	46.5	793287	37.2	346643	16.3	2130281	100.0
1980	2511163	35.6	2894547	41.0	1647380	23.4	7053090	100.0
Korea								
1970	305858	51.9	132892	22.5	150773	25.6	589523	100.0
1975	849508	44.5	512358	26.8	547400	28.7	1909266	100.0
1980	2319091	46.6	1606057	32.3	1049559	21.1	4974707	100.0
Thailand								
1970	220148	47.9	104677	22.8	135078	29.4	459903	100.0
1975	579160	50.8	192106	16.8	369412	32.4	1140678	100.0
1980	984211	42.0	678654	29.0	678592	29.0	2341457	100.0
Burma								
1970	29658	60.5	6628	13.5	12711	25.9	48997	100.0
1975	45648	56.0	9669	11.9	26244	32.2	81561	100.0
1980	62506	52.2	15325	12.8	41984	35.0	119815	100.0
Total	SITC 71		SITC 72		SITC 73		SITC 71-73	
1970	1552515	47.6	834074	25.6	875916	26.8	3262505	100.0
1975	4869757	46.3	3010167	28.6	2646955	25.1	10526879	100.0
1980	11747293	40.3	10338079	35.5	7052395	24.2	29137767	100.0

[1]Data for Burma not available.

Source: See Table 2.4.

TABLE 5.2

EXPORTS OF CAPITAL GOODS, SOUTH EAST AND EAST ASIA,
SELECTED YEARS, AT CURRENT PRICES

($'000)

Year	Non-electrical Machinery (SITC 71)		Electrical Machinery (SITC 72)		Transport Equipment (SITC 73)		Total	
	Value	%	Value	%	Value	%	Value	%
Hong Kong								
1970	15359	6.4	213287	88.9	11383	4.7	240029	100.0
1975	98176	14.6	562237	83.7	11694	1.7	672107	100.0
1980	515971	21.6	1849038	77.3	27260	1.1	2392269	100.0
Indonesia								
1970	3584	100.0	n.a.	-	n.a.	-	3584	100.0
1975	14766	46.1	12948	40.4	4345	13.6	32059	100.0
1980	4095	3.8	97143	89.2	7724	7.1	108962	100.0
Malaysia								
1970	12211	44.4	4726	17.2	10556	38.4	27493	100.0
1975	84599	35.4	126556	53.0	27620	11.6	238775	100.0
1980	101393	6.8	1281406	86.3	102399	6.9	1485198	100.0
Philippines								
1970	655	82.0	30	3.8	114	14.3	799	100.0
1975	6777	57.6	2234	19.0	2761	23.4	11772	100.0
1980	12312	10.0	77171	62.4	34213	27.7	123696	100.0
Singapore								
1970	61931	36.4	62100	36.5	46116	27.1	170147	100.0
1975	375008	30.7	620356	50.8	224637	18.4	1220001	100.0
1980	1157667	22.7	3120613	61.1	827208	16.2	5105488	100.0
Korea								
1970	8082	13.5	43733	73.0	8105	13.5	59920	100.0
1975	76276	10.9	440868	62.9	183602	26.2	700746	100.0
1980	364796	10.6	1917558	55.9	1149984	33.5	3432338	100.0
Thailand								
1970	334	42.4	399	50.6	55	7.0	788	100.0
1975	3995	14.0	23283	81.6	1245	4.4	28523	100.0
1980	27502	7.4	331045	88.8	14133	3.8	372680	100.0
Total								
1970	102156	20.3	324275	64.5	76329	15.2	502760	100.0
1975	659597	22.7	1788482	61.6	455904	15.7	2903983	100.0
1980	2183736	16.8	8673974	66.6	2162921	16.6	13020631	100.0

Note : n.a. = not available.
Data for Burma are not available.

Source: See Table 2.4.

TABLE 5.3

EXPORTS OF CAPITAL GOODS BY DESTINATION, SOUTH EAST AND EAST ASIA, SELECTED YEARS, AT CURRENT PRICES[1]

SITC	Product Group	Year	Value of Exports to World ($'000)	Percent Share of Exports to North America	EEC	Japan	Other DMES	CPES	ESCAP DCS	Other DCS
	Hong Kong									
71	Non-electrical Machinery	1970	15359	25.5	1.6	0.3	4.4	-	45.8	19.4
		1975	98176	25.3	37.9	0.4	10.0	-	17.0	8.2
		1980	515971	63.0	11.5	1.2	3.5	-	13.5	5.9
72	Electrical Machinery	1970	213287	66.9	14.7	3.1	3.1	-	3.0	5.5
		1975	562237	53.6	22.6	1.5	6.5	0.1	5.6	8.7
		1980	1849038	40.3	25.1	1.0	8.1	0.1	11.9	11.9
73	Transport Equipment	1970	11383	52.7	5.5	17.9	1.2	-	21.1	1.5
		1975	11694	26.0	8.8	1.1	5.8	-	34.6	23.7
		1980	27260	44.1	9.1	0.2	6.2	-	15.6	24.8
	Indonesia									
71	Non-electrical Machinery	1970	3584	1.1	21.1	6.2	21.6	0.2	49.8	-
		1975	14766	5.1	20.6	0.3	14.5	-	57.3	-
		1980	4095	0.2	1.1	2.2	0.6	1.1	91.9	2.8
72	Electrical Machinery	1975	12948	7.6	0.3	1.3	0.8	-	90.0	-
		1980	97143	0.1	0.5	0.8	-	-	98.6	-
73	Transport Equipment	1975	4345	6.1	31.4	3.8	17.4	0.3	30.1	-
		1980	7724	0.2	41.7	1.4	1.9	-	54.3	-
	Malaysia									
71	Non-electrical Machinery	1970	12211	0.1	1.0	0.2	0.5	-	97.1	0.9
		1975	84599	4.2	18.6	15.3	3.6	0.2	56.0	1.7
		1980	101393	4.9	11.8	6.1	17.4	-	50.9	8.1
72	Electrical Machinery	1970	4726	0.6	1.4	0.8	1.2	-	59.3	32.5
		1975	126556	55.9	8.8	6.6	1.3	-	26.0	1.2
		1980	1281406	51.4	16.2	4.9	1.0	-	25.4	0.6
73	Transport Equipment	1970	10556	0.3	3.1	0.5	2.5	-	93.3	0.3
		1975	27620	1.4	10.0	0.5	15.8	-	69.5	2.2
		1980	102399	4.5	63.6	0.4	13.8	-	14.9	2.6

...cont.

Table 5.3 (contd.)

SITC	Product Group	Year	Value of Exports to World ($'000)	Percent Share of Exports to North America	EEC	Japan	Other DMES	CPES	ESCAP DCS	Other DCS
	Philippines									
71	Non-electrical Machinery	1970	655	2.2	-	1.5	0.3	-	73.0	16.0
		1975	6777	8.7	1.0	0.5	19.5	-	66.6	3.1
		1980	12312	37.5	4.1	2.4	9.5	-	41.2	2.5
72	Electrical Machinery	1975	2234	26.6	15.7	12.5	8.4	-	36.2	-
		1980	77171	50.1	6.9	1.6	1.0	-	38.4	1.2
73	Transport Equipment	1970	114	4.9	-	-	0.1	-	95.0	-
		1975	2761	8.4	1.0	0.6	78.1	-	6.9	-
		1980	34213	1.9	32.7	16.2	18.9	-	10.0	2.9
	Republic of Korea									
71	Non-electrical Machinery	1970	8082	49.8	9.2	31.4	0.1	-	7.8	1.6
		1975	76276	44.2	13.0	24.4	2.5	-	8.8	6.9
		1980	364796	38.2	4.8	14.0	1.4	-	14.1	23.0
72	Electrical Machinery	1970	43733	67.8	1.6	14.2	0.3	-	15.7	0.3
		1975	440868	52.0	8.4	25.8	1.2	-	10.4	1.7
		1980	1917558	41.1	13.7	13.7	2.5	-	13.7	13.0
73	Transport Equipment	1970	8105	40.3	1.8	49.9	-	-	3.1	0.1
		1975	183602	13.9	11.2	4.2	13.3	-	4.4	52.8
		1980	1149984	31.2	10.2	2.5	10.3	-	8.4	34.7
	Singapore									
71	Non-electrical Machinery	1970	61931	14.9	3.7	1.4	1.7	0.1	77.4	0.4
		1975	375008	7.8	15.6	6.8	17.0	-	44.9	6.8
		1980	1157667	17.2	7.6	4.1	5.1	-	57.8	6.0
72	Electrical Machinery	1970	62100	43.8	11.9	0.4	1.0	-	32.9	8.9
		1975	620356	40.6	19.6	1.5	2.7	-	29.5	4.9
		1980	3120613	35.2	19.2	2.6	2.9	0.1	26.4	11.0
73	Transport Equipment	1970	46116	4.9	2.5	-	3.5	-	86.0	0.7
		1975	224637	24.2	7.5	1.6	6.5	-	48.3	10.3
		1980	827208	29.4	5.6	0.7	5.4	-	39.6	17.3
	Thailand									
71	Non-electrical Machinery	1970	334	4.4	0.4	-	0.1	-	90.2	4.3
		1975	3995	1.7	0.8	11.9	11.3	-	72.6	1.3
		1980	27502	0.9	0.4	4.0	2.9	-	73.1	18.3
72	Electrical Machinery	1970	399	-	-	-	-	-	71.5	28.5
		1975	23282	7.2	4.5	1.5	0.7	-	83.5	2.0
		1980	331045	24.4	3.2	0.4	0.4	-	70.6	1.0
73	Transport Equipment	1975	1245	2.2	5.2	0.3	1.0	-	87.8	2.8
		1980	14133	2.0	7.5	2.5	2.4	-	83.1	2.3

TABLE 5.3 (contd.)

Total for Subsector		Value of Exports to World (1980) ($'000)	Percent Share of Exports to						
			North America	EEC	Japan	Other DMES	CPES	ESCAP DCS	Other DCS
SITC 71	Non-electrical Machinery	2,183,736	30.8	8.1	5.1	4.7	-	39.9	9.0
SITC 72	Electrical Machinery	7,519,124	45.3	20.6	5.7	4.0	0.1	26.5	11.0
SITC 73	Transport Equipment	2,162,921	28.6	11.4	1.9	8.6	-	21.4	25.6
	Total (SITC 71 - 73)	11,865,781	39.6	16.6	4.9	5.0	-	28.0	13.3

Note : [1]Data for Burma not available.

Source: See Table 2.1.

TABLE 7.1

ESTIMATED GROWTH RATES OF CAPITAL GOODS INDUSTRY IN SEEA, 1963-1980
(Percentages)

Country	Non-Electrical Machinery	Electrical Machinery	Transport Equipment	Average for All Sub-sectors
Hong Kong	22.9	24.1	4.0	20.5
Indonesia	20.9	20.3	22.5	31.3
Korea	31.4	36.6	30.9	33.2
Malaysia	23.3	43.8	27.3	33.8
Philippines	17.0	11.0	8.8	10.6
Singapore	39.5	49.2	33.9	40.8
Thailand	23.4	47.4	31.2	36.2
All Countries (Weighted Average)	25.5	33.2	22.7	28.1

Note: Calculated from data in Table 7.1.

TABLE 7.2

Peninsular Malaysia: Annual Growth Rate of Domestic Market

	1959 - 1973	1963 - 1973	1968 - 1973
Consumer Non-durables	12.6	9.1	11.1
Foods	10.1	7.4	7.5
Beverages	11.4	10.5	11.5
Tobacco	10.4	5.4	7.1
Textiles	25.6	15.1	18.8
Wearing Apparel & Made Up Goods	10.9	3.9	7.5
Footwear	n.a.	n.a.	n.a.
Chemicals	14.8	10.2	12.0
Pottery, China & Earthenware	15.1	15.0	23.0
Printing & Publishing	15.3	12.2	15.2
Plastics	n.a.	n.a.	n.a.
Consumer Durables	12.3	9.1	6.9
Furniture	15.4	11.1	16.2
Automobiles	11.6	9.4	4.3
Bicycles	12.0	5.2	10.3
Intermediate Goods	14.5	13.0	15.7
Wood & Cork	10.0	9.5	8.1
Paper & Paper Products	18.7	14.6	17.6
Leather & Leather Products	16.9	10.7	15.4
Rubber & Rubber Products	10.2	10.4	11.8
Chemicals	16.5	14.8	19.2
Petroleum	17.8	16.3	20.1
Non-metallic Mineral Products	15.5	10.6	14.7
Capital Goods	21.1	16.2	24.6
Basic Metals	26.0	19.5	28.0
Metal Products	14.9	9.8	13.9
Non-electrical Machinery	22.1	14.9	22.8
Electrical Machinery	20.9	18.7	30.8
Transport Equipment	17.0	15.8	22.3
Miscellaneous	n.a.	n.a.	n.a.
TOTAL	14.6	11.7	15.3

Note : n.a. = not available.

Source: Chee.

TABLE 7.3

PROJECTED GROWTH IN VALUE ADDED IN THE CAPITAL GOODS INDUSTRY IN SEEA FOR 1985 - 1990 AT CURRENT PRICES
($ million)

Country	Non-Electrical Machinery			Electrical Machinery			Transport Equipment			Total		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hong Kong	664.0	929.0	1,274.0	5,631.0	7,858.0	10,739.0	115.0	140.0	202.0	5,063.0	7,138.0	9,844.0
Indonesia	236.0	333.0	459.0	499.0	704.0	971.0	731.0	1,025.0	1,406.0	1,447.0	2,036.0	2,802.0
Korea	12,591.0	17,237.0	23,164.0	38,675.0	52,297.0	69,513.0	16,066.0	22,022.0	29,626.0	63,335.0	86,327.0	115,567.0
Malaysia	588.0	822.0	1,125.0	14,516.0	19,326.0	25,334.0	911.0	1,260.0	1,709.0	9,272.0	12,619.0	16,871.0
Philippines	142.0	202.0	281.0	214.0	311.0	411.0	167.0	244.0	348.0	478.0	696.0	987.0
Singapore	7,232.0	9,716.0	12,840.0	39,286.0	51,750.0	67,194.0	6,744.0	9,177.0	12,266.0	40,917.0	54,818.0	72,265.0
Thailand	339.0	474.0	649.0	55,522.0	73,390.0	95,588.0	6,297.0	8,625.0	11,595.0	29,287.0	39,629.0	52,730.0
Total	21,792.0	29,713.0	39,792.0	154,343.0	205,636.0	269,750.0	31,031.0	42,493.0	57,152.0	149,799.0	203,263.0	271,056.0

Source: See Table 7.1.

TABLE 7.4

PROJECTED GROWTH IN VALUE ADDED IN THE CAPITAL GOODS INDUSTRY IN SEEA FOR 1990 - 2000 AT CURRENT PRICES
($ million)

Country	Non-Electrical Machinery			Electrical Machinery			Transport Equipment			Total		
	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High
Hong Kong	2,662.0	7,305.0	18,812.0	25,058.0	68,082.0	173,780.0	115.0	207.0	628.0	16,441.0	46,073.0	120,834.0
Indonesia	796.0	2,222.0	5,809.0	1,592.0	4,468.0	11,736.0	2,831.0	7,797.0	20,140.0	5,045.0	14,039.0	36,592.0
Korea	103,091.0	284,499.0	641,852.0	478,453.0	1,183,001.0	2,778,108.0	126,309.0	325,275.0	791,936.0	599,361.0	1,517,704.0	3,640,358.0
Malaysia	2,440.0	6,673.0	17,134.0	309,629.0	730,681.0	1,645,968.0	5,319.0	14,083.0	35,134.0	92,037.0	232,057.0	564,492.0
Philippines	335.0	969.0	2,614.0	288.0	884.0	2,511.0	180.0	567.0	1,645.0	618.0	1,907.0	5,436.0
Singapore	111,815.0	271,161.0	625,884.0	1,237,628.0	2,828,799.0	4,769,132.0	67,481.0	170,021.0	406,005.0	698,044.0	1,678,616.0	3,845,525.0
Thailand	1,420.0	3,882.0	9,959.0	1,538,480.0	3,553,142.0	7,850,830.0	50,728.0	130,345.0	316,721.0	351,221.0	870,747.0	2,049,812.0
Total	222,559.0	556,711.0	1,322,064.0	3,591,128.0	8,369,057.0	17,232,065.0	252,963.0	648,295.0	1,572,299.0	1,762,767.0	4,361,143.0	10,253,049.0

Source: See Table 7.1.

TABLE 7.5

PROJECTED REQUIREMENTS OF MAJOR SPECIFIC CAPITAL GOODS IN MAJOR CAPITAL GOODS PRODUCING COUNTRIES IN SEEA, 1990 AND 2000 AT CURRENT PRICES

$ million

Country/Capital Goods	1990	2000
SINGAPORE		
Non-Electrical Machinery		
Oil-field and gas field machinery and equipment	46,199	1,414,678
Electrical Machinery		
Electronic Products and Components	53,532	1,639,218
Transport Equipment		
Ships, Tankers and other Ocean-going vessels	18,276	559,632
KOREA		
Non-Electrical Machinery		
Machinery and mechanical appliances, having individual functions, n.e.s.	5,322	93,567
Electrical Machinery		
Radio telegraphic and radiotelephonic transmission and reception apparatus; parts of broadcasting apparatus	5,248	92,259
Transport Equipment		
Ships, boats and other vessels, n.e.s.	28,044	493,041
MALAYSIA		
Non-Electrical Machinery		
Machinery and equipment, n.e.s.	10,065	185,093
Electrical Machinery		
Semi-conductors and other electronic components and communication equipment and apparatus	25,195	463,307
Transport Equipment		
Manufacture and assembly of motor vehicles	15,690	288,519

TABLE 7.6

EXPORT PROJECTIONS, KOREA, 1980 - 1986

(In billion U.S. dollars)

Product	1980		1981		1986		Average Increase Rate (1982-86)
	Amount	Share	Amount	Share	Amount	Share	
Total	17.5	100.0	21.0	100.0	53.0	100.0	20.3
Primary Products	1.6	9.1	1.8	8.5	2.9	5.5	10.2
Light Industry Products	8.3	47.6	9.9	47.1	20.9	39.5	16.1
Fiber & Fiber Products	5.2	29.9	6.3	29.8	12.4	23.4	14.6
Footwear	0.9	5.0	1.1	5.1	2.2	4.2	15.9
Chemicals	0.8	4.5	0.7	3.3	1.4	2.7	15.9
Iron & Steel Products	2.5	14.4	3.1	14.5	7.0	13.2	18.1
Machinery	3.5	19.8	4.4	20.9	17.3	32.6	31.5
General Machinery	0.4	2.1	0.4	1.7	2.2	4.1	43.5
Electric & Electronic Products	1.9	11.0	2.2	10.6	6.9	13.0	25.3
Transportation Equipment	1.2	6.6	1.8	8.6	8.2	15.4	35.3
Others	0.8	4.6	1.1	5.2	3.5	6.6	26.0

Source: Economic Planning Board.

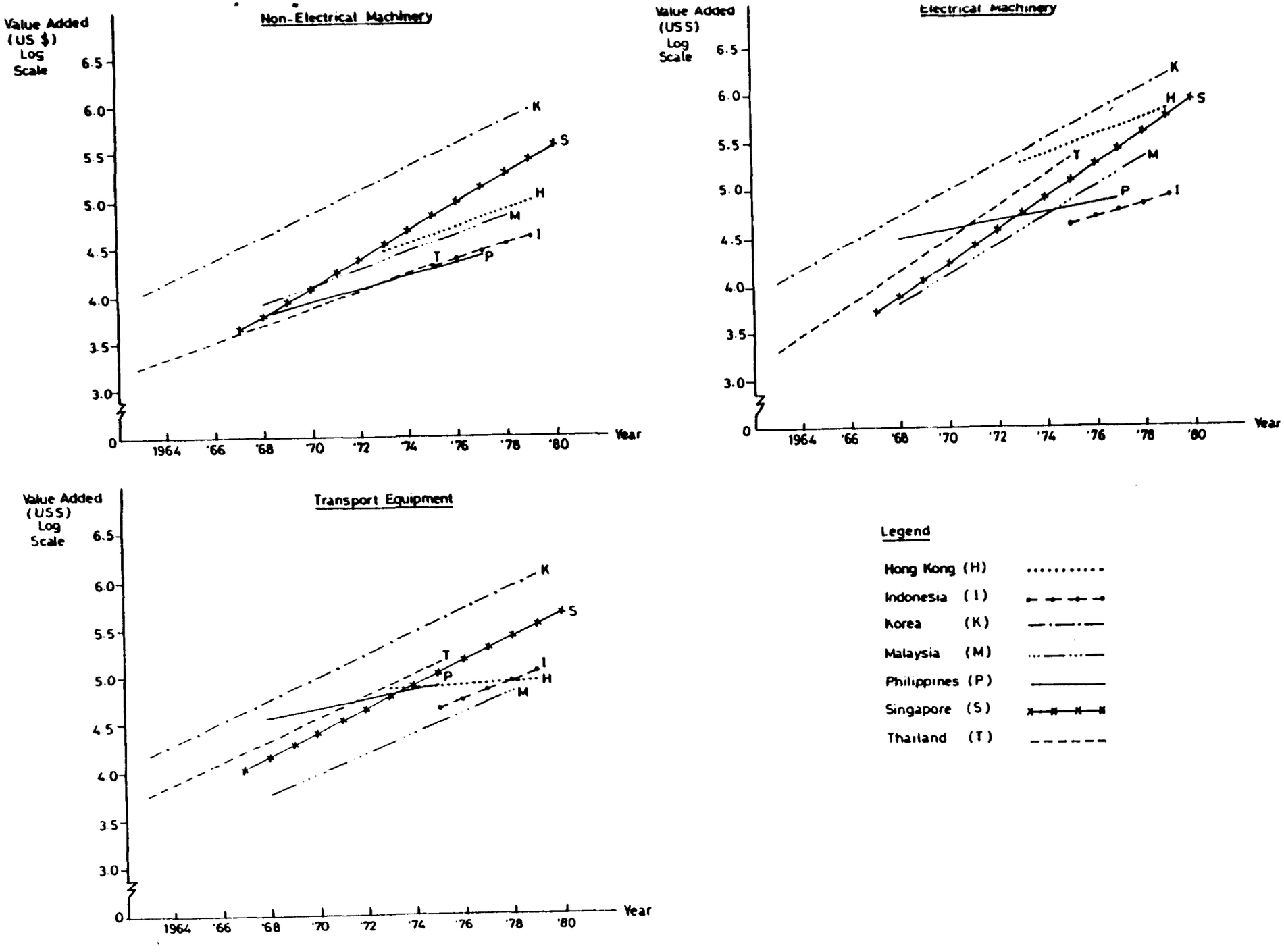


FIGURE 1

GROWTH IN VALUE ADDED IN THE CAPITAL GOODS INDUSTRY IN SEEA, 1964 – 1980

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