

INDUSTRIAL DEVELOPMENT NEWS

FOR ASIA AND THE PACIFIC



UNITED NATIONS
ECONOMIC AND SOCIAL COMMISSION
FOR ASIA AND THE PACIFIC
1990

NO.18/19

The Industrial Development News for Asia and the Pacific is published annually by the Economic and Social Commission for Asia and the Pacific.

Any uncredited article or information in this News may be copied, summarized or translated into any language providing acknowledgement of its use is made and a copy of the publication in which it appears is sent to the Editor. However, permission must be received from the original author before use may be made of any article, picture, drawing, cartoon or other account for which credit is specifically given.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

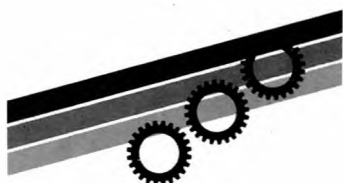
Mention of firm names and commercial products does not imply the endorsement of the United Nations.

News items, short articles and viewpoints on industrial development issues from readers are welcome. The Editor reserves the right to edit and publish manuscripts in accordance with the editorial requirements of this publication.

All correspondence should be addressed:

Chief
Division of Industry, Human
Settlements and Environment
Economic and Social Commission
for Asia and the Pacific
(ESCAP)
United Nations Building
Rajadamnern Avenue
Bangkok 10200, Thailand

ST/ESCAP/927



CONTENTS

	<i>Page</i>
VIEWS AND ISSUES	
1	A. Recent Industrial Progress in Selected Developing Economies of Asia and the Pacific: Trends and Issues 2
	B. Public Sector Industries and Privatization Issues in the Developing Asian and Pacific Region 13
	C. Regional Co-operation for Industrial and Social Progress: ESCAP's Major Concern 21
	D. Strategic Choice of Technology Transfer Policy 24
<hr/>	
NEWS: SELECTED ESCAP ACTIVITIES	
2	A. Regional Seminar on Transfer of Technology for Small and Medium Industries 38
	B. Workshop on Transfer of Technology for Entrepreneurial Development in Bangladesh 42
	C. Business Collaboration Meeting between Entrepreneurs from Developed and Developing Countries 42
	D. Promoting International Competitiveness and Efficient Resource Utilization in Manufacturing 43
	E. Human Resources Development for Industrial Growth 44
	F. Investment Promotion and the Role of the Private Sector 45

CONTENTS *(continued)*

Page

3

FORTHCOMING IMPORTANT EVENTS: HIGHLIGHTS

- A. Industrial Restructuring in Asia and the Pacific: Theme Topic for forty-seventh session of ESCAP 48
 - B. Asian and the Pacific Ministerial Meeting of Industry and Technology 51
-

4

ESCAP'S ADVISORY SERVICES TO MEMBERS AND ASSOCIATE MEMBERS IN THE AREAS OF TECHNOLOGY TRANSFER, ENVIRONMENTAL MANAGEMENT AND INDUSTRIAL DEVELOPMENT

53

5

SELECTED DATA AND INFORMATION

55

Views and Issues

1

Views and Issues

A. Recent Industrial Progress in Selected Developing Economies of Asia and the Pacific: Trends and Issues

1. Regional overview

The manufacturing sectors of many economies in the Asian and Pacific region enjoyed satisfactory growth during the 1970s and 1980s. Overall, the manufacturing sector in developing Asia grew by annual average rates of 6 and 5 per cent, respectively, during the periods 1965-1980 and 1980-1988. Table 1 provides detailed figures on the growth performance of the manufacturing sector in selected individual countries during the periods 1965-1980 and 1980-1988. After growing at around 7.9 per cent in 1987 and 9.2 per cent in 1988, the economies

of the Economic and Social Commission for Asia and the Pacific (ESCAP) region slowed down to a 6.1 per cent growth rate in 1989, largely owing to a considerable deceleration of the economies of East and South Asia and the continuing poor performance of the least developed countries. However, the region as a whole remained the most dynamic part of the world economy and appeared poised to grow in 1990 at about the same rate that was achieved in 1989. Much of the recent robust growth in the region has been propelled by a strong and expanding industrial sector in which manufacturing

activities have appeared as the main source of stimulus. The economies of the region have faced rapidly changing internal and external conditions which required adoption of significant industrial restructuring measures. Although the process of industrial restructuring is yet to materialize significantly and there are many challenges which lie ahead, the region as a whole has been relatively capable in achieving a well diversified industrial structure within a short period of time. The recent success of China and India, two economies with huge domestic markets, in achieving the kind of industrial growth rates usually associated with the economies of East and South-East Asia, has increased the region's prospects for accelerated industrial development and broad-based structural change.

Although the developing economies of the region as a whole have performed satisfactorily in increasing manufacturing output, an examination of subregional and country-level data reveals that the industrial development and growth have so far been concentrated in a few economies. The share of South Asia, including Afghanistan and Myanmar, in total world manufacturing value added was 1.23 per cent in 1975, increasing marginally to

Table 1. Average annual growth rates of manufacturing production in selected developing economies, 1965-1988

Economies	(Percentage)	
	1965-1980	1980-1988
Bangladesh	6.8	2.4
China	9.5	11.0
India	4.5	8.3
Indonesia	12.0	13.1
Malaysia	11.8 ^{a/}	7.3
Pakistan	5.7	8.1
Philippines	7.5	-0.3
Republic of Korea	18.7	13.5
Singapore	13.2	4.8
Sri Lanka	3.2	6.2
Thailand	11.2	6.8

Source: World Bank, *World Development Report 1990* (New York, Oxford University Press, 1990), table 2, pp. 180-181.

a/: For 1970-1980, from World Bank, *World Development Report 1982* (New York, Oxford University Press, 1982), table 2, p. 113.

1.45 per cent in 1987. During the same period, the share of East and South-East Asian economies more than doubled from 1.67 per cent in 1975 to 3.89 per cent in 1987. The annual average rate of growth of manufacturing value added in South Asia was 2.36 per cent between 1975 and 1980. It increased at the rate of 6.3 per cent per annum during 1980-1987. In the case of East and South-East Asia, the rate of growth of manufacturing value added was 12.14 per cent per annum during the period 1975-1980, decreasing to 9.8 per cent during the period 1980-1987. World manufacturing value added grew by 2.6 per cent during 1980-1987 and Japan had a growth rate of 3 per cent per annum during the same period.

The recent growth rates of manufacturing value added in South Asia, including Afghanistan and Myanmar, are given in Table 2. The region as a whole improved its growth rate of manufacturing value added to 7.9 per cent in 1987, from 4.7 per cent in 1986. The manufacturing value added in the subregion slightly decreased to 6.9 per cent in 1988, but was expected to increase to 9.4 per cent in 1989.

The industrial and manufacturing growth rates in East and South-East Asia were remarkable during the 1970s and the subregion was able to sustain its manufacturing value added, as shown in Table 3. The South-East Asian subregion showed a growth rate in manufacturing value added of 13.6 per cent in 1986, decreasing slightly to 13.1 per cent in 1987. The same rate prevailed during 1988 and was expected to slightly decrease in 1989 to 11.9 per cent.

Thus, in the light of past trends, industrial growth and manufacturing output in East and South-East Asia is expected to remain robust owing to the subregion's vitality in intra-regional and extraregional trade, progressive industrial restructuring and structural adjustment. Furthermore, the accelerated inflow of external resources adds further dynamism to the already resource-rich countries of the ASEAN (Association

of South-East Asian Nations) region, as well as to the newly industrializing economies of East Asia.

The manufacturing sectors of the newly industrializing economies experienced a growth rate of about 16 per cent in 1987, exceeding their aggregate gross domestic product (GDP) growth rate of 11.4 per cent.^{1/}

^{1/} Asian Development Bank, *Annual Report 1987*, p.14.

Table 2. Growth rates of manufacturing value added in South Asia, including Afghanistan and Myanmar, 1985-1989

Country or area	(Percentage)					
	1985 ^{1/} MVA	1986 ^{1/} MVA	1987 ^{1/} MVA	1988 ^{2/} MVA	1989 ^{2/} MVA ^{a/}	1990 ^{2/} MVA ^{a/}
South Asia, including Afghanistan and Myanmar	6.9	4.7	7.9	6.9	9.4	6.5
Afghanistan ^{1/}	6.5	3.5	5.1	4.9	4.4	...
Bangladesh	3.3	-2.9	9.0	-0.3	...	...
Bhutan	...	...	...	0.5	10.3	3.5
India	6.8	4.4	8.1	7.2	10.3	6.5
Myanmar	8.6	2.7	3.7	-0.9	-4.0	-4.5
Nepal	-9.9	17.0	4.4	2.9	-1.7	8.6
Pakistan	8.2	7.8	7.4	7.6	7.5	7.7
Sri Lanka	-6.2	8.4	8.0	8.5	5.4	4.9

Sources: ^{1/} UNIDO, *Industry and Development: Global Report 1988/89* (UNIDO publication, Sales No. 88.III.E.6), p. 87.

^{2/} UNIDO, *Industry and Development: Global Report 1989/90* (UNIDO publication, Sales No. E.89.III.E.5), p. 6.

^{a/}: Projection.

Table 3. Growth rates of manufacturing value added in South-East Asia, 1985-1989

Country or area	(Percentage)					
	1985 ^{1/} MVA	1986 ^{1/} MVA	1987 ^{1/} MVA	1988 ^{2/} MVA	1989 ^{2/} MVA ^{a/}	1990 ^{2/} MVA ^{a/}
South-East Asia ^{1/}	1.0	13.6	13.1	13.0	11.9	-
Hong Kong	-4.0	15.9	19.0	6.4	2.7	2.3
Indonesia	8.3	6.8	8.3	8.0	8.6	9.7
Malaysia	-3.8	-0.3	5.4	10.8	10.2	10.2
Philippines	7.3	21.2	0.4	10.0	10.1	9.2
Republic of Korea	3.5	19.2	21.1	13.7	14.4	11.2
Singapore	-6.7	8.6	14.4	21.3	9.1	5.6
Thailand	0.8	5.0	5.4	11.8	12.6	9.9

Sources: ^{1/} UNIDO, *Industry and Development: Global Report 1988/89* (UNIDO publication, Sales No. 88.III.E.6), p. 92.

^{2/} UNIDO, *Industry and Development: Global Report 1989/90* (UNIDO publication, Sales No. E.89.III.E.5), p. 6.

^{a/}: Projection.

Thus, the manufacturing sectors in the ASEAN and newly industrializing economies exhibited a very high growth rate. Manufacturing, as a share of GDP, increased significantly in almost all the economies. The manufacturing sectors of these economies have exhibited rapid growth – in excess of 10 per cent since 1960. Indonesia and the Philippines had lagged behind slightly, but have picked up recently. While examining the manufacturing growth, it has to be kept in mind that the South-East Asian economies were basically the major producers and exporters of primary resource products in the beginning, and this brought them certain advantages. By Asian standards, they had achieved relatively higher levels of per capita income during the 1950s and 1960s. Based on a relatively prosperous primary export sector, they also encouraged the free flow of a wide range of manufactured goods. It is, however, to be noted that although markets for manufactured goods were created in those economies, the local production of such goods was limited in the earlier period to a very narrow range of consumer products. Therefore, they moved at an early stage to establish import-substitution industries. They felt that specialization in just a few primary products would lead their economies to a vulnerable situation in world trade. Almost all of them followed a policy of import substitution during the 1950s and moved quickly to export promotion activities thereafter. The structural patterns of manufacturing in these economies have revealed that domestic production consisted mainly of consumer non-durable goods based on existing patterns of demand.

However, it failed to extend into the production of advanced resource-based goods and intermediate goods, leading to a dependency on the import of capital goods.

Therefore, a new strategy of export-oriented industrialization as the next milestone in industrial promotion and growth was initiated in the newly industrializing economies and, later, in the South-East Asian economies. A wide range of investment incentive acts was passed to provide financial incentives and spell out priority projects. Increased domestic value added in manufacturing and the greater use of local raw materials were made possible by enlisting investment support from the private sector. Export processing platforms or free trade zones were set up to encourage transnational corporations to transfer their semi-skilled, labour-intensive operations to these countries. This open-door policy resulted in faster growth. The period from the 1960s to the 1970s was one of buoyancy for export-oriented industries such as textiles, clothing, footwear, other consumer goods (such as toys), electronics, wood, rubber, oil palm and resource-based industries. It has enabled these economies to work out a strategy for meeting the needs of external markets by importing modern and appropriate technology as well.

While the newly industrializing economies and other developing economies achieved a significant industrial performance, the least developed and island developing countries were unable to sustain their industrial growth rates.

2. Subregional trends

a. The newly industrializing economies (NIEs)

The NIEs faced slow economic growth in the early eighties because of global economic stagnation and in particular the recession in the United States of America. They reported higher growth rates in 1986. However, benefiting from brisk export demand combined with a low oil price, low value of the United States dollar and low interest rates, and declining Japanese exports owing to the higher value of the Japanese currency, they have recorded higher growth rates in 1987 and 1988.

The NIEs have also received increasing flows of foreign direct investment (FDI) in return, especially from Japan. This pattern of FDI-flows has led to an increase in the flow of intra-firm trade, which in turn has increased interdependence and contributed to the diversification of industrial output.

There has also been a surge in the supply of manufactured products to Japan. Manufactures accounted for 66.3 per cent of total exports of NIEs to Japan in 1987, as compared to 39 per cent in 1970. Increasing demand from China is likely to reduce dependence on the markets of the western countries.

Hong Kong experienced a slowdown in growth in 1988. However, manufacturing output grew by some 13 per cent in 1989, despite a fall in manufacturing employment. As labour-intensive manufacturing activities become less profitable, Hong Kong has been relocating those in other low-cost neighbouring economies, mainly in

China, the Philippines and Thailand. In recent years, it has succeeded in introducing greater automation in its textile and garments sector which has helped retain the sector's international competitiveness. Although competitiveness of electrical goods (other than radios), watches and electronic components are strong, clothing and textiles are still relatively weak. There is a gradual shift from manufacturing to the service sector, but as yet manufacturing remains the most important contributor to GDP with a 22 per cent share. Hong Kong is still a world leader in toy manufacture. There is also a substantial heavy industrial sector, supplying steel and steel products, ship construction and repair, and chemical manufacture. There are many small and medium-sized manufacturing establishments producing electronic and electrical goods, toys, plastics, aircraft components, textiles, clothing, clocks and watches. The Hong Kong Industrial Estates Corporation is responsible for providing new land for industrial development and is currently operating two industrial estates. Wage pressure has compelled many manufacturers to shift their production to China, especially in the case of the watches and clocks industry.

In Singapore, several developments – severe and increasing excess capacity in oil refining and ship building, temporary saturation of demand for residential and office construction, and over investment in hotels coinciding with a drop in tourist trade – came together to produce a sharp down-turn in the economy in the early 1980s. In 1986, exports rose in real terms by 25 per cent, imports by 9.2 per cent and the

negative trend was reverted. The export performance was sustained by a rapid growth in output of electronics equipment, apparel, fabricated metal products, transport equipment, electrical machinery, and petroleum products with rates over 10 per cent per annum. Electronics gained 32 per cent in output in 1987, with manufacturing as a whole growing by 14 per cent. There has been a surge of FDI since 1986, with Japan accounting for 34 per cent of total FDI in 1987, followed by the United States with 31 per cent. Nevertheless, manufacturing is showing signs of flagging, after leading the recent boom. The sector's growth on an annual basis has slowed down from 18.4 per cent in 1988 to 11.1 per cent in the first quarter of 1989 and to 8.6 per cent in the second quarter.

In the Republic of Korea, there has been a shift from labour-intensive to high technology industries over the 1980s, which was disrupted by recessions and certain domestic problems. Moreover, the declining number of construction contracts with West Asian countries contributed to a slow-down of economic growth in the early 1980s. The manufacturing sector of the Republic of Korea is rapidly becoming high technology-intensive and undergoing major restructuring in response to domestic and international pressures. After the recession years of the early 1980s, industry in the Republic of Korea surged ahead, growing by around 13.5 per cent during the period 1986-1988 with the manufacturing sector growing by an annual average of 17 per cent. Among the fastest growing manufacturing activities are fabricated metal products,

machinery and equipment, electric and electronic machinery and transport equipment.

In the past 17 years investment has focused on heavy industry, ship building, construction, chemicals, machinery, auto production and electronics. In 1988, 58 per cent of investments were to be placed in heavy and chemical manufacturing, compared to 12 per cent for light industry and 29 per cent for non-manufacturing. The Republic of Korea is now one of the world's largest producers of electronic goods with the output rising to 45 per cent in 1986. Future growth industries are computers, semiconductors, biotechnology, aerospace and advanced metallurgy. Exports in dollar terms were expected to increase less than 10 per cent in 1989, which is a sharp decline from the previous three years. The slow down in exports has forced companies to focus on the domestic market.

b. ASEAN-4

The ASEAN countries experienced substantial growth of manufacturing in 1983 and 1984, with the exception of the Philippines, but 1985 saw a substantial slow down in this growth. The year 1986 continued the bad trend. The region was hard hit by the deterioration of the price of primary products.

Industrial progress in ASEAN continued to follow a pattern that was established at around the mid-1980s. Spurred by significant inflows of foreign direct investment and a re-orientation of the manufacturing production toward export markets, the economies of South-East Asia, especially that of Malaysia and Thailand, have

achieved spectacular progress in broadening their industrial base. Protectionism from the advanced nations has been partly compensated by the growing flow of intra-regional trade with NIEs and Japan. Growth leading industrial branches have been electrical and non-electrical machinery, fabricated metal products, transport equipment, professional and scientific equipment, non-ferrous metals, plastics, and footwear. Between 1980 and 1987 their output more than doubled. The recent growth leading role of engineering-intensive branches since 1985 is due to Japanese FDI, mainly in the form of joint ventures.

Indonesia was especially hard hit by the falling oil price. GDP only grew by 1.9 per cent in 1986. Manufacturing, however, grew at 10.6 per cent in 1985 and 6.2 per cent in 1986. Trade liberalization measures and a more export-oriented approach have been launched since 1987. These measures have emphasized a shift away from resource-based activities to a broad-based industrial structure which could use external demand in fostering the development of non-oil exports. In recent years, consumer goods like processed food and beverages, textiles, garments and electrical appliances have shown strong growth. This has been accompanied by a rapid expansion in the production of intermediate goods like machinery, basic metal products, chemicals, cement, fertilizers and ceramics. As a consequence, manufacturing value added grew by a record 8.0 per cent in 1988 and was expected to continue its high growth at 8.6 per cent in 1989 and 9.7 per cent in 1990. The dependence on oil has decreased and the export line has been

extended by previous import-substitutes such as low-grade steel, paper and automobile parts. However, the low-technology based industries, in which Indonesia has a comparative advantage, have been neglected in favour of high technology sectors, for example, aircraft, shipbuilding, computers, and telecommunications. There has been a large influx of FDI, especially from Japan. The Government has recently allowed private business to establish industrial estates, an activity previously limited to the Trade Ministry, to attract more FDI.

Malaysia suffered negative growth of GDP in 1985 (-1 per cent) and 1986 (-.8 per cent). Major exports including rubber, oil, palm-oil, and tin faced a decline in prices. Commodity-based exports, which account for more than 50 per cent of GNP, fell by 5.1 per cent in 1985 and 14.7 per cent in 1986. Recovery occurred in 1986, assisted by a rebound in overseas demand for manufactured products, particularly electronics, and processed agricultural goods. Local demand for steel and iron, and non-metallic minerals was down. The surge in electronics in Malaysia, as a result of growing FDI, led to the ranking of Malaysia as third on the list of semi-conductor exporters. Because of a number of new infrastructural projects, the construction sector is expected to become a growth leader. Manufacturing value added increased by 10.8 per cent in 1988 and was expected to grow by 10.2 per cent in 1989 as well as in 1990. In 1987 this sector contributed about 24 per cent of GDP, becoming the largest contributor to the economy for the first time. The Government has encouraged development of heavy industry

based on the country's natural resources. But some of the projects had to be cut back because of shortages of funds. The first Malaysian car plant started production in 1985 and steel and copper smelting projects have been under consideration since 1987.

The **Philippines** have performed poorly among all ASEAN-countries. In 1984 and 1985, it had a negative growth rate of GDP (-4.6 per cent and -3.8 per cent respectively), which stabilized somewhat in 1986 (0.2 per cent). After the contraction of the 1984-1986 period, the industrial performance of the Philippines bounced back, growing at 7.8 per cent in 1987 and 8.5 per cent in 1988. Manufacturing value added growth rate reached 10.4 per cent in 1988 and was projected to grow at 10.1 per cent in 1989 before moderating to 9.2 per cent in 1990. Most of the growth came from basic metals, machinery (except electrical) and transport equipment. The high price of copra boosted exports in 1986, but in manufacturing 40 to 60 per cent of capacity was under-utilized. The share of non-traditional products (garments, electronic products and semi-conductors) in total exports rose, but certain other domestic problems have dampened growth in certain years. Most recently, the Philippines has attracted FDI and liberalized imports.

In **Thailand**, domestic activity was dampened by fiscal constraint in the early 1980s. But in 1985, the country reported 4 per cent GDP growth and 3.8 per cent in 1986, rates that exceeded those in the other ASEAN countries. Manufacturing grew at 13.6 per cent in 1987 and 11.8 per cent in

1988 and edged up to 12.9 per cent in 1989. Export demand for Thai products has remained brisk, with leading items such as canned food, jewellery, leather goods and other non-traditional manufacturing products like textiles. The priority is given to agro-based and labour intensive industries. There has been a surge of FDI originating from Japan and the NIEs, especially in small and medium-sized industries, leading to a diversification of the industrial structure and exports.

c. South Asian economies

In South Asia, industrial growth was most pronounced in India and Pakistan. In India industry grew by 8.8 per cent in 1988, a more than two percentage point improvement on the performance in 1987. Although industry in Pakistan performed poorly in 1989, it grew by an annual average of 8.47 per cent during the period 1986-1988. The other South Asian countries of Bangladesh, Nepal and Sri Lanka encountered considerable difficulties in sustaining their industrial progress in 1989. However, the subregion as a whole appears to have entered a new phase of industrial progress and structural change.

Gradual economic liberalization, industrial deregulation and an increased willingness to accept foreign investment and technology have introduced a greater degree of domestic competition, and helped spur the growth of manufacturing activities geared to the production of capital goods and consumer durables, particularly in India and Pakistan. Production of automobiles, television sets, cassette tape recorders and personal computers have gone up with

the result that the manufacturing sector of the subregion was expected to grow at 10.2 per cent in 1989. Manufacturing value added of industrial chemicals, electrical machinery and professional and scientific equipment more than doubled during the 1980-1987 period. New growth areas included transport equipment, petroleum refining, other chemicals and non-metal mineral products.

Despite the devastating floods of 1987 and 1988, which saw manufacturing output fall by 3.2 per cent in that period, several manufacturing activities grew rapidly in **Bangladesh**. Among growth industries, production of chemical and fertilizer went up by 24.4 per cent and 43.7 per cent respectively in 1987 and 1988 as exploitation of natural gas gathered momentum. Manufactured exports, led by textiles and garments, has also registered significant growth in recent years. With the development of the electrical industry, a promising new line of activity has been added to Bangladesh's narrow manufacturing base. However, further gain in industrial progress depends on the country's ability to seek out new export markets, diversify its production base away from traditional manufacturing activity, improve public sector enterprise performance and raise domestic income.

In **Bhutan**, new export incentives were launched in 1988 including duty-free import of export-oriented machinery/equipment. The Government expects an increasing role from the private sector in the economy. Cement is the major industry in Bhutan. Most recently, in 1988, the first chemical industry was set up.

Manufacturing accounts for 14 per cent of GDP.

The industrial progress and subregional pattern in South Asia is dominated by **India** which has witnessed rapid changes in the composition of its manufacturing products in recent years. The manufacturing sector, accounting for some 77 per cent of industrial value added, grew by around 8.5 per cent in 1985-1988. Electronics and information-related manufacturing activities have progressed rapidly with growing export success. Aided by a plentiful supply of trained manpower and inflow of foreign capital and technology, the electronics and information-related industry is expected to continue its rapid growth well into the next decade. Chemicals have appeared as another potential growth industry in India, benefitting from an expanding domestic market for petrochemicals and fertilizers and an improved supply of critical raw materials like natural gas. The industrial sector had not been a growth leader until the mid-1980s; but changes were coming. The 1980s witnessed a government policy shift to liberalization. The rate of capacity utilization was still declining in 1983 to 67 per cent from 76 per cent in 1970 for 30 selected industries, but in 1984-1985 the trend was reversed.

In 1986, industrial licensing procedures were relaxed, and the private sector took over activities from the poorly performing public sector in telecommunications and large computers.

India has a well-developed capital goods sector, such as electrical machinery, chemical and plastics products. The

share of total exports in GDP is only 6 per cent as a result of the self-sufficiency policies. Exports have been promoted over recent years. India has exported plants for production of textiles, cement, metal products (to South-East Asia) and sugar, paper, steel, and machine tools (mainly to Africa).

FDI and joint ventures have been further stimulated, especially in machinery, large computers and chemicals. There has also been a rise of indigenous software production. In 1987, the economy was shaken by drought, dwindling remittances from repatriates in Western Asia, and to a certain extent, by domestic problems. A devaluation of the rupee, a recovery of world trade, and more liberal policies and incentives for exporters, (in particular in textiles and clothing) boosted exports. Public enterprises continued to be poor performers and received subsidies. Moderate privatization measures have been initiated from the beginning of 1990. The late 1980s have witnessed an ongoing deregulation of industry, however, along with diversification into more modern industrial branches. Industrial output grew by about 10 per cent in 1988-1989 and capacity utilization as a whole has risen from 73.3 per cent in 1980-1981 to about 80 per cent in 1987-1988.

Growth leading branches were of the high-technology variety, for example, industrial chemicals, electrical machinery and professional and scientific equipment. Other above average growth performers were paper products, printing, other chemicals, petroleum refining and related products, non-metal mineral products and transport equipment. Trade liberalization

and decontrolling investment have resulted in a spurt of production in non-traditional branches of industry, including television sets, personal computers, watches, cameras, paints, pharmaceuticals, and others. Most of the advanced parts used in each branch still rely on imported technology, but some came from indigenous sources. One notable exception to this favourable trend has been textiles (the State Mills) which have lagged behind despite the comparative advantage of India in this industry, because of inefficiencies in production and management.

The economy of **Myanmar** suffered from tight import controls and a drop in exports during the 1980s. Foreign debts have been rising and drought and other domestic problems have contributed to severe difficulties for the fledgling manufacturing sector, which mainly consists of textiles, fertilizers and cement. Although liberalization of trade and attempts to attract FDI were formalized in 1988, the downward trend of Myanmar's economy has continued. Manufacturing and processing provides 10 per cent of GDP and is dominated by small enterprises.

In **Nepal**, the fledgling manufacturing sector has been boosted by rising exports, an increasing influx of FDI and new industrial policies and trade liberalization measures. Export-oriented bonded warehouses, established with customs facilities, have smoothed the way for exporting garments and woollen carpets. Joint ventures are stimulated and an export processing zone was planned. Nepal is now seeking self-sufficiency and is promoting import-substitution, without

neglecting export-oriented industries. It plans to switch industries over to modern technology with imports from Japan of industrial machinery but funds are lacking. The problem of trade and transit faced by Nepal in 1989 restricted trade flow both in and out of the country, including provision of basic inputs, producing adverse effects on industry in Nepal to a considerable extent. Industry, mainly small-scale cottage enterprises, now accounts for 12 per cent of GDP. Jute and sugar processing are the main sectors, with recent growth of import-substitution industries such as cotton, synthetic textiles, cement and paper. The Government has offered various incentives to FDI and has established a number of industrial estates.

Pakistan has made important gains in its manufacturing sector which grew by an annual average of 7.7 per cent between 1982-1983 and 1987-1988. Manufacturing growth slowed down to 3.1 per cent in 1988-1989, mainly because of a lackluster performance of the large-scale sector brought about by a reduction in investment in fixed and working capital. A general paucity of investment capital and slow progress made in adopting new technology have appeared as critical constraints, holding back further industrial development in Pakistan. Leading industries have been non-electrical machinery, non-ferrous metal products, fertilizers and petroleum-related products, clothing and footwear.

Between 1982-1983 and 1987-1988 the manufacturing sector grew by an annual average rate of 7.7 per cent. In the late 1980s, this included motor cycles, scooters, air-conditioners,

refrigerators, freezers, and radios. There was a shortage of investment resources owing to a lack of adequate savings (11.5 per cent of GNP in 1987-1988). Although there was a 20 per cent jump in exports in 1987, remittances declined by 10 per cent and the drought hit Pakistan hard. To overcome some of these difficulties, FDI was stimulated and the private sector was further encouraged by deregulation and privatization measures. Nevertheless, large-scale manufacturing growth was only 1.2 per cent in 1989; against 10.6 per cent in the previous year. The savings rate has dropped to 10.2 per cent, one of the lowest in the world.

Industrial production in **Sri Lanka** increased by 6 per cent in 1988, against 8 per cent in 1987. Manufacturing accounts for about 15 per cent of GDP. About one-third of manufacturing output is based on raw materials from the agricultural sector. Growth leaders have been textiles, clothing and leather products, followed by food, beverages, and tobacco. Growing contributions were made by the Investment Promotion Zone, established in 1979 and followed by a second unit in 1986. Policy has concentrated on promotion of FDI to diversify the industrial structure away from tea, rubber, and coconut, and on privatization of loss-making public enterprises. Public sector industry declined 1 per cent in 1988, but the private sector grew by 11 per cent. Sri Lanka reported a 7.6 per cent growth in the state-owned manufacturing sector in 1986, 15 per cent in the private sector.

d. Centrally planned economies

The 1980s in **China** have been characterized by various reforms. However, inadequacy of infrastructure, input materials and energy to a large extent are the major challenges for China. This has led to underutilized capacity and, along with expanding demand, to inflation. The growth rate of industry decreased as a result from 18 per cent in 1985 to 9.2 per cent in 1986. Machinery was the leading sector in manufacturing. Also iron and steel, electricity, and watches grew at the same time. A booming demand for consumer durables had to be curtailed, particularly since most intermediate outputs had to be imported, thus adding to balance of payment difficulties. The Government introduced measures to ease these difficulties, encouraged joint ventures, and improved efficiency and financial borrowing.

In 1987, industry grew by 14 per cent. Because of a sudden fall in FDI, laws were reverted to its favour as FDI is considered to be the main impetus for upgrading the industrial structure. Attempts were also made to achieve efficiency through competition; there was a continuation of decentralization and liberalization of trade. Domestic production in consumer goods like electrical appliances and automobiles replaced imports, the latter declined from 40 per cent in 1985 to 5 per cent in 1987. Colour television sets were beginning to be exported. Emphasis was placed on domestic production of automobiles, steel, iron, wood, copper, lead, zinc, rubber, fertilizer, pulp, fibres, and artificial silk through joint

ventures, which also contributed to upgrading technology.

Total industrial output grew by 20.7 per cent in 1988. There was a shift from heavy to light industry (for example, television, tape recorders, cameras, washing machines, refrigerators and motor vehicles). Growth in the output of energy goods, such as coal, oil, steel and locomotives has lagged, because of an energy crisis in 1989. There was also a shortage in intermediate inputs, only to be compensated by imports of iron, steel, plastic materials, textile yarn, fabrics and fibres, organic chemicals, cork and wood, and non-ferrous metals.

Other imports consisted of high-technology products like electrical machinery, industrial machinery, telecommunication equipment, and power generating machinery, products in which import-substitution was sought through joint ventures.

The **Lao People's Democratic Republic** has followed its neighbours by taking decentralization measures and reducing government subsidies to inefficient enterprises since 1986. In 1988, a new foreign investment law was passed to attract FDI. The granting of "autonomy" to many state enterprises has produced mixed results. There is still a long way to go to upgrade equipment and capacity utilization by eliminating the shortage of raw materials, spare parts and trained staff. Currently, industry provides 7 per cent of GDP. The main industrial activity is the production of tin concentrates. Small-scale manufacturing industries produce beer, cigarettes, detergents, rubber footwear, bricks, plywood, matches, salt, animal feed,

veterinary products, handicrafts, alcoholic beverages and soft drinks.

Mongolia has launched several reform measures of economic management over the past years. Food industry plants were separated from other light industry enterprises and incorporated in a new Ministry of Agriculture and Food Industry. Furthermore, there have been intentions to liberalize the private sector because enterprises, especially in the food industry, were not able to meet their targets owing to waste and certain management problems. Industrial output increased by 4.4 per cent in the late 1980s but overall industrial performance is yet to pick up speed.

Viet Nam has faced severe shortages of raw materials, spare parts, electricity, and periods of famine over recent years. Despite certain economic setbacks, the Government has continued liberalization of the private sector and adopted a new foreign investment law in 1987. Under this law, foreign companies can set up wholly owned companies or establish joint ventures with a minimum of 30 per cent foreign capital. The law rules out nationalization, but limits contracts to 20 years. Companies have been reluctant to invest, even when tax incentives were offered in priority areas like electronics, because of continuing inflation. The country's GNP seems to have risen by 5.4 per cent in 1988 because of measures granting more liberal incentives. There has been encouraging growth since 1985 and output grew by 6.7 per cent in 1987. Main industries are state owned, and include food processing, synthetic yarns and fabrics,

textiles, engineering, cement, fertilizers, glass, rubber products, chemicals, paper and steel. Consumer goods have grown less rapidly than basic products.

e. Island developing economies

In **Fiji**, periods of drought did harm to the economy, the manufacturing sector being the worst hit. The Government offered tax benefits and other incentives to restore growth in the manufacturing sector, especially in the garment factories sector. Of increasing importance are Japanese investments in Fiji which have promoted manufacturing and tourism. Furthermore, the Government has launched a policy of deregulation and the removal of protection for a number of small local manufacturing industries. Of all industries, construction is still suffering. Manufacturing (excluding sugar milling) currently accounts for 13 per cent of GDP and sugar accounts for one-third of industrial output.

Industrial activity in **Maldives** is hampered by the lack of proper infrastructure linking the numerous islands that make up the country, the lack of skilled and semi-skilled labour and raw materials, and the small size of the domestic market. Apart from the traditional industries, such as boat-building, mat-weaving, rope-making, blacksmithing, and handicrafts, which together account for 25 per cent of the total work-force, new industries are limited to garment-making and the production of PVC-pipes, washing powder and bottling aerated water.

Papua New Guinea has always had a natural resource based economy, with coffee and cocoa being the most important com-

modities, and copper and gold mining being the most important industrial activity. Regulations for FDI have so far constrained non-mining industrial investment. As a result, manufacturing activity is extremely low. Most recently, in early 1990, the Government announced its intention to attract new industrial investment by establishing an industrial zone.

The manufacturing sector's share of GDP in **Samoa** was 13.2 per cent in 1988 and has not significantly increased since. The Government has encouraged the private sector and FDI by granting tax incentives. Local entrepreneurs are supported by a Small Industries Centre. The Government is increasing investment to improve efficiency of industrial enterprises and has for the same purpose privatized some public sector undertakings.

Manufacturing in **Tonga** has gradually increased its share over the last decade and in 1987 it accounted for 8 per cent of GDP. It includes shoes, footballs, knitwear, wooden toys, corrugated iron, plastic piping, bicycle assembly, wire netting, paper, paint, biscuits and processed milk, pulp and passion-fruit processing, and mini-excavators. Coconut products provide most export revenue.

In **Tuvalu**, small industry (baking, construction, boat building, coconut oil mill, soap making) serves local needs, with some handicrafts exported.

In **Vanuatu**, main industries include copra processing, meat canning, fish processing, soft drinks bottling, furniture making, metal work and handicrafts for the growing tourist

market. Manufacturing provides about 10 per cent of GDP.

The Pacific islands are characterized by heavy dependence

on some basic commodities and tourism and have a negligible manufacturing sector. □

Pakistan's New Industrial Policy Package

The "Industrial Policy Package 1989" of Pakistan has been formulated with a view to overcoming inadequacies of the industrial development programme of past years and to removing the bottle-necks faced during the implementation of the 1988 industrial policy. Thus the Industrial Policy Package 1989 aims at attaining the following objectives:

- (a) Creation of employment opportunities by encouraging labour intensive projects;
- (b) Balanced regional growth through dispersal of industries to the less developed areas;
- (c) Giving a pivotal role to small-scale industries;
- (d) Development of key industries to acquire higher value and sophisticated technology:
 - (i) Biotechnology.
 - (ii) Fibre optics.
 - (iii) Solar energy equipment.
 - (iv) Computers and software.
 - (v) Electronic equipment.
 - (vi) Fertilizers.

Measures for promoting specific foreign private investment

Foreign private investment shall be defined as repatriable foreign investment by a person who is not a citizen of Pakistan or holds two nationalities including Pakistani. In

other words only repatriable investment made by a foreigner or a Pakistani holding dual nationality, will be termed foreign investment.

The Government attaches great importance to the inflow of direct foreign investment, particularly in areas where it brings advanced technology, managerial and technical skills and marketing expertise. An adequate legal framework for foreign investment has been provided in the form of Foreign Private Investment (Promotion and Protection) Act, 1976. The act provides for security against expropriation and adequate compensation in case of acquisitions. The Act also guarantees the following:

- (i) Remittances of profit and capital;
- (ii) Remittances of appreciation of capital investment;
- (iii) Foreign private investment shall not be subjected to more burden of taxes on income than those applicable to investment made in similar circumstances by citizens of Pakistan;
- (iv) Relief from double taxation in cases of those countries with which Pakistan has an agreement for avoidance of Double Taxation.

Foreign investment is also entitled to the following facilities:

- (a) Foreign nationals employed in Pakistan are permitted to send monthly remittances to the country of their domicile of up to 50 per cent of net income; and

- (b) Foreign nationals on returning from Pakistan are permitted to transfer their savings.

To facilitate foreign investment in the country, standard guidelines for payment of technical know-how, royalty fees and terms of suppliers credit/foreign loans have been prescribed. Agreements falling within these prescribed limits do not need formal Government permission but have merely to be registered with the State Bank of Pakistan. It is only in cases involving payments in excess of the prescribed ceilings, that permission of the State Bank/Ministry of Finance is required.

The Government, prefers investment in industries which are capital intensive, involve sophisticated technology or strengthen the balance of payments position. Package deals with foreign firms for the provision of capital, manufacturing technology, management and marketing know-how, backed by their own international sales network will also be encouraged. All incentives and concessions, as available to local investors, in the form of duty concessions, tax holiday, liberal depreciation allowance etc., are also available to foreign investors. In short, Pakistan offers a very safe, liberal and smooth economic base with an attractive package of concessions and incentives for foreign investors.

Foreign private investment shall be classified as either prohibited or allowed subject to normal restrictions. The following two lists describe the sectors belonging to either of the two categories respectively:

Prohibited List		Positive List	
(i)	Agricultural land.	(i)	Livestock farming.
(ii)	Forestry.	(ii)	Seed farming.
(iii)	Irrigation.	(iii)	Dairy farming.
(iv)	Real estate including land, housing and commercial and office buildings.	(iv)	Poultry farming.
(v)	Radioactive minerals.	(v)	Deep sea fishing.
(vi)	Insurance.	(vi)	Coastal fishing.
(vii)	Health.	(vii)	Inland fishing.
		(viii)	Manufacturing (other than specified list).
		(ix)	Construction.
		(x)	Power generation.
		(xi)	Oil, gas and coal exploration and mining.
		(xii)	Metals and minerals (other than radioactive).
		(xiii)	Tourist and hotel services.
		(xiv)	Nuclear energy.
		(xv)	Export-related trading and commerce.
		(xvi)	Transport and communications.
		(xvii)	Gas transmission and distribution.
		(xviii)	LPG import and marketing.
		(xix)	Power transmission and distribution.
		(xx)	Banks and financial services.
		(xxi)	Oil distribution.

Source: Ministry of Industry, Government of Pakistan, *Industrial Policy Package* (July 1989) p. 3 and 13-15.

B. Public Sector Industries and Privatization Issues in the Developing Asian and Pacific region

1. Changing perception towards public sector industries

The Asian and the Pacific economies have witnessed varying degrees of the public sector's involvement in their socio-economic progress over time. The extent of government intervention varied, according to the economic circumstances and development objectives. In most of the other developing economies, the development strategy pursued was of a mixed type, where both the public and private sectors played complementary roles in the economic development process, including industrialization.

Although public sector involvement in industrialization has been the result of various political, social and economic considerations, one of the most important factors was the need to fill the gap in industrial investment owing to the inadequacies of the private sector's initiatives and capabilities. However, with accumulated experience of the past five decades, the perception towards the role of the public sector in industrial development is undergoing significant changes. As the developing countries of Asia and the Pacific are now confronted with the challenge of reorienting industrial development policies and strategies to respond effectively to external and internal constraints in order to improve competitiveness and to exploit new industrial development prospects in both the short and long term, national institutional arrangements and policies require new approaches.

As explained earlier, the complementarity of government intervention and private enterprise had played a crucial role in the past. However, the new trend is towards greater liberalization of the economy, with a larger role for the private sector, including joint ventures between domestic private and public sectors and also local and foreign industrial firms.

There are many examples of policy-produced distortions that have had an adverse effect on the dynamic industrial sectors of developing economies. In particular, small-scale industries have become technologically inefficient and have therefore suffered in terms of competitiveness when industrialization strategies emphasized a public sector-based capital-intensive production process. Government tariff rates, licensing procedures, controls on imports and other regulatory measures have made it almost impossible for them to adopt improved technology. Similarly, many of the price and exchange rate controls and tariff walls that have been erected have been justified in the name of protecting the poor, but these have succeeded in either protecting a limited number of groups or creating inefficient public sector monopolies with continued inefficient utilization of scarce resources.

In the past, many arguments were put forward for expanding the overall role of government in the management of economic and industrial activities in developing countries. Because of the continuing poor performance and the prevalence of many

different types of distortions in these economies, the role of government is in need of fresh assessment. There are many industrial activities that the private sector can carry out much better. In most circumstances, the market tends to allocate resources more efficiently than the government does, although there are cases of market imperfections and these should not be overlooked. In the context of effective industrial restructuring in developed and newly industrializing economies, what is beginning to emerge strongly is the need for the Government to concentrate on creating and maintaining a stable macro-economic situation, promoting environmentally sound and sustainable industrial development, and fostering the improved collection, processing and dissemination of industrial statistics in order to assist the private sector and markets in operating more efficiently.

Despite the relatively poor performance of public sector industrial enterprises, it must, however, be recognized that they have played a vital role in initiating and providing momentum to industrial development in most of the developing countries of the region. Even now, the public sector is playing a significant role, especially in low-income, least developed and island developing economies. A brief review of the changing role of public sector industrial enterprises is presented below.

The Government of Afghanistan has been following a mixed economic system. However, the public sector plays a very im-

portant role in the industrial development of the country. The public sector has a monopoly over the mining and heavy industries. Its output consists of products such as cement, sugar, textiles, chemical fertilizer, metal products and coal. In the fiscal year 1988/89, the relative share of the public industrial sector in the total industrial output of the country was 48.6 per cent, and that of the private sector, 12.3 per cent. The estimated contribution of the handicrafts sector was expected to be 39.1 per cent. The share of the public and mixed sectors in industrial manufactured output for the year 1988/89 was 80 per cent, and that of the private sector, 20 per cent.

Bangladesh had a predominantly private enterprise industrial economy before its independence in 1971. However, after 1971, the Government changed the framework of industrial policy and ownership. It nationalized some 85 per cent of large-scale industry in the country, including jute mills, cotton textiles and sugar mills. Sectoral corporations were established for jute, textiles, sugar, steel, engineering and shipbuilding, fertilizers, chemicals and pharmaceuticals and food and allied products. Nearly 250 enterprises, with 89 per cent of all industrial fixed assets, were brought under public ownership. In 1979, the public sector enterprises accounted for 65 per cent of manufacturing value added, 85 per cent of exports and 80 per cent of industrial investment outlets. Since 1982, the Government, while retaining some industries under public sector control, started following a policy of divestment, selling some nationalized plants to their original

owners or to other private entrepreneurs. The new industrial policy, as revised in 1986, further expanded the divestment facilities and limited the role of the public sector to only a few areas. Under the new policy, certain measures were initiated to improve the performance of manufacturing public sector enterprises. These basically included: (a) denationalization, (b) financial restructuring and physical rehabilitation of the public enterprises to be retained, and (c) introduction of a performance monitoring system. Under this programme, a substantial number of large-scale industries in jute, textiles, chemicals, food and steel and engineering were sold to the private sector. Approximately 38 per cent of the industrial capacity in jute, 70 per cent of fixed assets in textile, 12 per cent in sugar and food industries, 10 per cent in chemical industries and 4 per cent of fixed assets in the steel and engineering were privatized.

India has consistently followed a policy of mixed economy which places primary responsibility on the Government for planned development of industries. Industrial policies in recent decades, in line with the Government's stated principle of pursuing a "Socialistic pattern of society" as a national objective, have followed the line that the Government has the right to acquire other industrial enterprises and provide for complementary delineation of the public and private sectors. The objectives of the policy were to ensure that industrial development serves to fulfil basic socio-economic objectives, particularly employment generation, surplus generation for investment, direction of structural changes to achieve greater self-sufficiency in

meeting the basic needs of the people, and the attainment of technical competence in industries. The public sector exercises control over the principal industries, such as minerals and metals, steel, chemicals and pharmaceuticals and petroleum. The share of public sector industrial enterprises in transport equipment, consumer goods and agro-based enterprises is lower when compared with basic industries. In 1982-1983, public sector industrial enterprises in India accounted for one third of total investment in manufacturing and about 15 per cent of the manufacturing value added. However, both value added and employment in the public sector have grown faster than in the private sector. The relative growth rates of the public and private sector industries reflect, to some extent, the types of manufactured products. Public sector output consists of industrial items such as capital goods, for which demand has been comparatively higher. The larger firms in the private sector which specialize in capital goods and consumer durables have also grown, but the rest of the private sector industry, catering mostly for the demand for non-durable consumption goods, has experienced faster growth.

In recent years, the Government of India, in recognition of the various problems faced by the industrial sector, and especially by public sector industries, has made a number of important changes in the domestic regulatory environment, with the objective of increasing competition and enabling firms to enter operations with more flexibility. Among such changes are: (a) de-licensing of various product groups, including pharmaceutical products; (b) easing

of licensing requirements for additional capacity and re-endorsement of licensed capacity; (c) higher minimum asset sizes; (d) expansion of the list of industries open to entry by large, dominant private firms; (e) relaxation of controls over foreign collaboration; and (f) a more efficient tax system. In addition, the administration of controls has been streamlined and greater emphasis has been placed on competition and efficiency in granting licenses. Owing to these moves, industrial performance in general, and the performance of the public sector industries in particular have improved in recent years.

The industrial sector of India now seems to have progressed to the point where the further loosening of regulatory constraints and the infusion of competitive incentives would give the impetus for strong industrial growth and be a driving force for future economic progress. The Government has effectively proceeded to draw up a strategy towards liberalization, and the modernization of the manufacturing sector. In a major effort towards liberalization, the Government has already de-licensed 25 industries, and others are expected to follow. The main thrust of the present industrial policy is the phasing out and dismantling of the structure of direct controls and the encouragement of an inflow of foreign technology for the modernization of Indian industry. Private sector manufacturers are encouraged to establish joint ventures in the computer and telecommunications industries, thus breaking the important public sector monopolies of the earlier period. Physical controls on industrial investments and production are replaced by fiscal ones. The decision to restrict

production by large manufacturers in order to limit monopolistic tendencies has been revoked and higher production capacity has been sanctioned in several cases, with the objective of reaping economies of scale.

Public enterprise, in general, has expanded rapidly in **Indonesia** over the last two decades, and now comprises about 222 units, of which 20 per cent are public sector industrial enterprises. The public sector not only controls strategic industries and services but, in addition, is charged with implementing some national policies such as price stability and pioneering economic activities where private initiative is lacking. They are also considered as vehicles for developing entrepreneurship and generating employment. Public enterprises are important in the food processing industry, especially sugar, as well as in textiles, paper, industrial chemicals, fertilizer, cement, iron and steel and transport equipment. The Government has recently accorded great priority to the private sector in promoting industrialization, exports and employment. In consideration of the need to meet technological requirements and generate managerial innovation, the private sector is now given a leading role in the process of industrialization. The Government has taken various measures, such as the improvement of investment incentives and the simplification and streamlining of regulations, with the objective of improving internal efficiency and the international competitiveness of its manufacturing output.

As in the case of the other developing countries, the public sector has been instrumental in the establishment and acceleration of growth in the strategic

heavy industrial subsectors in **Malaysia**. This was due to the inherent potential of these industries to contribute to the creation of more domestic-based activities, to supply skills and modern technology, to meet the foreign exchange shortage and to reduce the over-dependence on imported inputs as well as to create more extensive linkages. It has been strongly felt recently by policy makers that the public sector had been allowed to grow too large, resulting in bureaucratization, an excessive financial burden of taxes and a stifling of private initiative and competition in developing the industrial sector. Therefore, the new thrust of the industrial policy has been, on the one hand, a stronger focus on industrial development which would take greater advantage of available natural resources and, on the other hand, privatization in order to reduce the relative size of the public sector and to promote a new relationship between the Government and the private industrial sector.

Pakistan had followed a shifting pattern of emphasizing the public and private sectors alternately in its industrialization process. From the late 1940s to the end of the 1960s, the Government had emphasized the role of the private sector in overall economic growth and industrialization. During that period, public sector industrial enterprises were viewed as supplementary to the activities of the private sector by filling the gap left by private entrepreneurs. Later on, especially after 1972, a strategy was followed whereby the public sector was given a prominent role in the industrialization process. By the year 1984, the number of public enterprises had reached a figure of 214, of which

123 were in the manufacturing sector. However, since 1984, the Government has started several deregulatory measures with greater emphasis on promoting the private sector's role in industrial investment and production activities. In June 1984, the Government announced a new industrial policy, reaffirming its commitment to a mixed economy with a leading role for the private sector, and introduced important changes in investment sanctioning. It expressed its clear intention of providing an incentive system more conducive to private sector efficiency.

Public sector manufacturing is important to Pakistan not so much because of its size, since it only accounts for 15 per cent of manufacturing value added, but because of the dominant role it plays in a number of key sectors such as cement, fertilizer, basic chemicals, petroleum refining, steel, motor vehicles and heavy engineering. The Government of Pakistan is currently limiting the access of the public manufacturing sector to budgetary resources. Public units are expected to act more like private sector firms, and their investments are to be financed through retained and commercial earnings. In addition to measures aimed at improving the profitability of public manufacturing enterprises, the Government has announced denationalization of a number of firms and their sale to the private sector.

The **Philippines** is unusual among the group of developing countries owing to the almost complete absence of public enterprises in manufacturing. This does not, however, mean that government involvement does not exist. The Government

has, through financing in large-scale industry and budget outlays to ailing firms, supported the efforts of the private sector in the overall industrialization process. The industrial development policies and programmes of the Government of the Philippines are basically focused on the revitalization of existing industries that are economically viable and on the development of internationally competitive industries which are capable of complementing growth in agricultural output and rural income through the pursuance of a policy aimed at maximum private sector participation. Concomitant with revitalization and rationalization programmes for the industries, trade liberalization and improved investment promotion measures are now being actively pursued.

The **Republic of Korea** has used the instrument of the public sector extensively, despite commitment to the development of private enterprises from the outset. During the period of rapid growth in the 1960s, public enterprises constituted a leading sector in the sense that they grew more substantially and rapidly than the economy as a whole. Public enterprises were characterized by high output, market concentration, extensive forward linkages, great capital intensity and large-scale production of various goods for import substitution purposes.

In recent years, the Republic of Korea has been quite cautious in creating new public sector industrial enterprises, and indeed, since 1968, has favoured the privatization of many such enterprises. Various policy measures have been formulated, with emphasis on greater economic liberalization and enhancement of the market mechanism.

It is not only in the developing countries which have pursued mixed economy patterns that the role of public sector industries is changing, but in centrally planned economies also, where certain reform measures have been enacted with the objective of promoting efficiency in the industrial sector. Since 1979, industrial development in **China** has been promoted through a strategy of industrial decentralization. The basic objective of economic readjustment and reforms is to overcome imbalances and to ensure a fairly steady tempo of advance aimed at quadrupling gross industrial output by the year 2000. Furthermore, with the adoption of a more open policy and flexible measures, new avenues have opened up for the inflow of foreign capital and technology into China. Manufacturing activities in two selected provinces, four special economic zones and 14 open coastal areas are enjoying special rights and privileges regarding foreign trade and investments aimed at promoting industrial development.^{1/}

The above brief review points out that public sector enterprises have come to play a key role in the industrialization process of developing countries of Asia and the Pacific. However, since the late 1970s, there have been perceptible attempts in almost all the developing countries to limit the scope and involvement of the public sector in setting up or maintaining industrial enterprises, and efforts have been made to encourage private ownership and management in industrialization. Most of the Governments of the

^{1/} UNIDO, *Industrial Development Review Series, The People's Republic of China* (UNIDO/IS.582), p. 16.

developing countries have defined more adequately the respective roles of the private and public sectors, and have enacted measures to develop organizational efficiency and an entrepreneurial class. Thus, the comparative roles of public and private industrial sectors in developing countries have undergone significant changes over time, reflecting the changes in development approaches and strategies, as well as the requirements of different levels of development.

The comparative industrial performance of the different countries, as presented above, suggests that countries placing greater emphasis on private initiatives and outward-oriented industrial development strategy have been more successful in achieving higher economic and industrial growth rates. Therefore, the decade of the 1980s has demonstrated that industrial policy and strategy reorientation was intended to limit the direct role of public sector industries and to enhance private sector participation in the industrial development process. However, the supportive role of the Government was always emphasized.

2. Measures for the improvement of efficiency in public sector industries

The performance of public sector industries has been of major concern to all developing countries in recent years. Despite considerable positive contributions in their initial stages, they were unable to meet most of their economic objectives. In almost all the countries, the unsatisfactory performance of these industries resulted from high production costs because of the non-

commercial objectives pursued, price controls on inputs and outputs, poor financial structure, and unsuitable location. In many cases, owing to poor management, they continued to employ unsuitable production patterns and outdated technology, resulting in low labour productivity and poor marketing. Managers of public firms often lacked adequate experience in the management of commercially viable units, and appointments were frequently based on political considerations. They were also usually hampered by a tight network of government controls that regulated all types of managerial decisions and did not foster risk-taking and innovation. Public managers also frequently lacked clear objectives and were not given incentives for improved performance. They were seldom rewarded for the good performance, or penalized for the poor performance, of their enterprises.

The Governments of the developing countries of Asia and the Pacific have implemented various measures aimed at improving the managerial and technical efficiency of public sector industries. Most of the countries have set up machinery to co-ordinate and monitor the performance and accountability of public sector industrial enterprises. Some have also created advisory-cum-supervisory bodies to provide various services in order to achieve better policy formulation and co-ordination to enhance overall efficiency. Institutional arrangements have also been worked out for the training of employees of public sector industrial enterprises.

Such institutional mechanisms have solved the problems of co-ordination in the public industrial sector with varying

degrees of success. It is clear, however, that much remains to be done by many developing countries to rationalize the fragmentary approach to the co-ordination and control that now exists in this sector.

Perhaps of equal or greater importance is the lack, in several developing countries, of a concrete strategy for the long-term development of the public industrial sector. An overriding need, if the sector is to become an effective instrument of economic development, is the formulation of such a comprehensive strategy with objectives (both economic and social), priorities, targets and implementation measures clearly defined at the national, sectoral and enterprise levels. This is a prerequisite not only for increasing the effectiveness of the sector but also for establishing a basis for measuring its performance in terms of capacity to produce industrial goods at an economic cost within clearly defined economic and social objectives.

An increasing number of developing countries are concerned with the problem of measuring the performance of public sector industrial enterprises. Obviously, such measurement reflects whatever criteria of performance are chosen and that choice, in turn, is conditioned by whatever goals have been set for the sector.

A dilemma that faces developing countries in the selection of appropriate indicators for measuring the performance of public sector industrial enterprises is the need to reconcile social considerations with a commercial orientation. For the private industrial sector, profitability is a ready indicator of

performance. For the public industrial sector, however, there is a clear need to adopt a multidimensional approach of evaluating performance, since a single indicator, or even a set of purely economic indicators, would not take into account the social objectives that form part of the rationale for the sector.

A review of experience in developing countries of Asia and the Pacific reveals that, in most instances, financial criteria are stressed in the measurement of performance of public industrial enterprises. This may reflect the concern of Governments that the public industrial sector should largely finance its own expansion. In both the developed market economies and the centrally planned economies, self-financing out of reinvested surpluses has largely accounted for the high rates of capital formation that have made accelerated industrialization possible. Another reason for emphasizing financial criteria may be that the concept of commercial profitability is firmly embodied in conventional accounting practices, which are widely understood and limited to simple statements of actual cost and revenue. As may be expected, a quick review of the performance of individual public industrial enterprises in developing countries, in terms of financial criteria, gives a mixed picture of profits and losses from country to country and from one enterprise to another within one country. In view of the limited criteria used for measurement, it would be unrealistic to make a generalization on the performance of the sector in developing countries of the region.

What is required is a multidimensional national system of performance measurement that would take economic as well as non-economic factors into account. The establishment of such a system would need to be preceded by a strategy for the long-term development of the public industrial sector, which would identify concrete goals and targets. At the enterprise level it would involve: (a) specifying in operational terms the national goals of targets expected of each enterprise; (b) devising indicators for the assessment of the attainment of these targets; and (c) measuring the actual performance against the targets set. While this would not be an easy task for developing countries, the performance of the sector could be improved substantially by the use of this more effective system of measurement.

3. Major issues in privatization

Apart from the above measures, the concept of privatization has also been embraced by various countries seeking to streamline the role of public sector enterprises in their industrial and economic development. Interpretations of what precisely constitutes "privatization" have, however, varied considerably, and no uniform definition has yet been adopted. A narrow definition of the term appears to be the complete divestment of public sector firms to the private sector, that is, the sale of state-owned assets to private persons, companies and/or shareholders. In a broader sense, privatization can refer to the process of deregulating the state enterprise system by granting it a large degree of autonomy, without necessarily effecting a complete transfer of ownership to the private sector. Some even define privatization

in broader terms as "the act of reducing the role of the government, or increasing the role of the private sector in an activity or in the ownership of assets".^{2/}

The various country studies prepared for the Interregional Workshop on Privatization sponsored by the United Nations Development Programme (UN DP), held in 1988, brought out the following major objectives of privatization:^{3/}

1. To relieve the budgetary strains on the Government:
 - (a) because of the losses of public enterprises;
 - (b) because of their investment requirements; and
 - (c) so as to permit the release of government funds for "other uses".
2. To improve the efficiency of enterprise performance:
 - (a) through market disciplines and competition; and
 - (b) by eliminating governmental interventions.
3. To improve the allocational efficiency of investments:
 - (a) by improving the rates of savings and growth; and
 - (b) by developing money markets.

^{2/} E.S. Savas, *Privatization, The Key to Better Government*, New Jersey, Chatham House Publishers, 1987, p. 3.

^{3/} As Summarized in Ramanadhan, (Ed), *Privatisation in Developing Countries*, London, Routledge, 1989, pp. 419-420.

4. To withdraw from activities more suited to private enterprise, and where the original objectives of a public enterprise are fully achieved or are no longer valid; to eliminate unfair competition with private enterprises.
5. To relieve the administrative burdens of the Government.
6. To widen indigenous ownership:
 - (a) by encouraging a shareholding democracy;
 - (b) by making workers share-owners; and
 - (c) by raising productivity through stock-owning incentives.

Privatization can be attempted through several types of

measures, the most important of which are: (a) entering into a management contract with a domestic or foreign private sector party, for a specified period of time; (b) privatizing government, while retaining government ownership, as and when managerial and entrepreneurial skills develop in the private sector; (c) partially transferring ownership, in enterprises that are financially viable, to the private sector; (d) transferring both ownership and management, in financially viable firms of no strategic development importance to the private sector; and (e) privatizing if possible, or liquidating if necessary, unsuccessful enterprises which cannot be made profitable through "rehabilitation" efforts.

Developing countries in the Asian and Pacific region have pursued a variety of approaches to their privatizing programmes. Many have followed the broader

definition of privatization, attempting to combine the divestment of selected public enterprises with sustained efforts at improving the efficiency and performance evaluation of those retained in the public sector. Countries which embarked on privatization programmes at a relatively early stage are, in fact, now focusing on the latter mechanism. Some countries choosing to adopt privatization policies have established special committees to design, implement and oversee their privatization programmes. Guidelines explaining adopted privatization policies were published by some Governments in order to avoid confusion regarding the objectives and procedures to be followed in implementing such policies. The principal means of transferring ownership from the public to the private sectors have been through stock offerings, denationalization of nationalized firms by selling them back to their original owners or to other businessmen and companies, and through joint-venture arrangements with private firms. Airlines are a particularly popular target for privatization.

In implementing privatization schemes, various problems are encountered. Experience to date indicates that the complexity and difficulty of managing privatization programmes are often seriously underestimated. Detailed analysis and classification of existing public enterprises to determine which need to be divested, which can immediately be divested with success, which need "rehabilitation" prior to divestment, which must be retained (owing to strategic or social importance), and which must be liquidated; proper valuation of these enterprises; establishment of clear guidelines

Table 4. The Forces Behind Privatization

<i>Force</i>	<i>Goal</i>	<i>Reasoning</i>
Pragmatic	Better government	Prudent privatization leads to more cost-effective public services.
Ideological	Less government	Government is too big, too powerful, too intrusive in people's lives and therefore is a danger to democracy. Government's decisions are political, thus are inherently less trustworthy than free-market decisions.
Commercial	More business	Government spending is a large part of the economy; more of it can and should be directed toward private firms. State-owned enterprises and assets can be put to better use by the private sector.
Populist	Better society	People should have more choice in public services. They should be empowered to define and address common needs, and to establish a sense of community by relying more on family, neighbourhood, church, and ethnic and voluntary associations and less on distant bureaucratic structures.

Source: E.S. Savas, *Privatization: The Key to Better Government*, (New Jersey, Chatham House Publishers, 1987), p. 5.

and administrative responsibility for programme implementation; resolution of policy and administrative conflicts; and assembly of the specialized technical expertise needed to prepare for and negotiate the divestment, are key components of the necessary groundwork.^{4/}

The lack of sufficient, trained human resources to carry out the technical work at the preparatory stage can be a major hindrance. Valuation of public sector assets and enterprises is hampered by the relatively underdeveloped capital markets in the Asian and Pacific region. The concomitant shortage of investment bankers, enterprise valuation experts, and similar personnel, makes the process more difficult in these countries.

Another major problem is the difficulty of finding domestic investors and buyers in the developing countries of this region. The limited private sector in some countries, and the relatively underdeveloped capital markets in most of the region, make both potential buyers and investment capital (domestic) scarce. This is particularly true because of the fact that most public enterprises are large-scale and highly capitalized. The usually low domestic savings rates in these countries make the mobilization of domestic capital for investment in privatization programmes either unlikely or extremely expensive.

Relying on foreign capital to finance privatization efforts then raises the issue of the degree of foreign control of its industrial sector that a govern-

4/ S. Paul, "Privatisation: a review of international experience", *Economic and Political Weekly* (India), vol. XXIII, No. 6, 6 February 1988.

ment is willing to permit. Furthermore, in order to attract foreign investors' participation in privatization projects, developing countries often find it necessary to either sell at substantial discounts or offer special tax, and other, similar concessions (unless the enterprises are successful, going concerns or have great potential for future profit generation). Least developed countries, because of the nature of their economies and markets, often have difficulty in attracting foreign capital, even when they offer such concessions. Thus, the question of the availability of potential investors, and the suitability of those that may be available, often has to be dealt with in the early stages of planning for privatization.

The employment impact of privatization and, thus, the invariable resistance to such plans by state enterprise labour unions (and often, also, by affected management, politicians and bureaucrats), poses a sensitive and serious constraint as well. The ASEAN Tripartite Symposium on the impact of privatization on labour relations in ASEAN countries^{5/} identified several issues as being particularly worrying to employees facing the possibility of their firms being privatized – loss of jobs, loss of benefits already acquired, and the impact of foreign ownership or capitalization on their wages and working conditions.^{6/} These fears often translate into vocal opposition to attempts at privatization.

5/ ILO, *Privatisation – Its Impact on Labour Relations in ASEAN*, published under the auspices of the joint ILO/UNDP/ASEAN Programme of Industrial Relations for Development, 1987.

Other issues that have come to light from recent privatization efforts in the region include the observation that unsuccessful state enterprises rarely find buyers, whereas successful and potentially profitable ones usually do. The argument runs that the public sector will eventually be left with only the losing firms and thereby perpetuate its image of inefficiency in the eyes of critics. The employees and management of successful state enterprises, in turn, use the same argument to oppose or delay the privatization of their firms, explaining that there is no need to divest profitable companies from the public sector.

It has also been argued that privatization of state enterprises, by itself, is likely to yield only marginal gains in efficiency unless such privatized firms are subjected to competitive pressures and improved incentive and control mechanisms.^{7/} Since many public enterprises are monopolies, this aspect is of particular importance.

Thus, successful privatization requires an appropriate review of and adjustments (where necessary) in the accompanying legal and institutional framework. Such institutional arrangements must provide a surrogate for market forces in the case of privatized monopolies, to ensure continued provision of crucial

6/ UNDP, "Private sector development for promoting economic growth in developing countries of Asia", report prepared by Dr. Seiji Naya, East-West Center, Hawaii for the UNDP Regional Bureau for Asia and the Pacific, 1987.

7/ R. Hemming, and Ali M. Mansoor, "Privatisation and efficiency", *Economic Impact*, No. 60, 1987/4 Washington, D.C., United States Information Agency, pp. 74-77.

C. Regional Co-operation for Industrial and Social Progress: ESCAP's Major Concern



*Mr. S.A.M.S. Kibria,
Executive Secretary of ESCAP.*

At the second regular (summer) session of the Economic and Social Council, July 1990, the Executive Secretary of ESCAP made a statement on regional co-operation for industrial and social progress, extracts of which follow.

“Moving into the final decade of this century, it seems appropriate to offer some reflections on the region’s development experience in the 1980s, its advances and shortcomings as well as new challenges likely to loom in the 1990s. The breathtaking developments that have taken place in various regions, particularly in Europe, pose new challenges for the Asian and Pacific region as well, including the apprehension of a reduced flow of resources. At the same time, along with easing East-West tensions, a few hopeful developments have occurred.”

“The 1980s have been judged by many developing countries to have been a lost decade for

development, as asserted in the Declaration adopted at the recent special session of the General Assembly. Not surprisingly, the past decade is generally viewed in far less negative terms in the Asian and Pacific region, where average economic growth was the most robust in the world economy. Even so, contrary to popular perceptions of our region’s growing affluence and resilience, it has to be recognized that the countries of Asia and the Pacific continue to stagnate, with well over half a billion human beings still mired in poverty, illiteracy and disease. Indeed, though more than a few Asian countries achieved dynamic growth and progress in the 1980s, a harsh and widening divide separates these advancing countries from a similar number of low-income, disadvantaged countries still struggling to cast off the shackles of backwardness. The growing gap between the dynamism and deprivation that characterize these two groups of developing countries is the most worrisome aspect of the Asian and Pacific region’s recent development experience. That and the grim reality of massive poverty constitute the most obstinate impediments to the region’s further advancement.”

“It is in this perspective that one has to take stock of the Asian and Pacific region’s rather remarkable overall performance in the 1980s amid noticeably slower growth of the world economy. By contrast, average economic growth in ESCAP’s developing member countries accelerated from 5.3 per cent in

public services at competitive prices.

Similarly, foreign investment regulations must also be reviewed to ensure conformity with the requirements, if any, of the privatization programme and its envisaged financing sources. Moreover, some countries have a confusing array of laws and regulations that discourage increased private sector participation. The simplification, amalgamation and classification of the various rules and regulations affecting private sector participation in industries, particularly in relation to privatized firms, is also needed.

The various problems and issues relating to privatization programmes for developing countries in the region, as discussed above, highlight some of the points that must be considered by Governments in planning and implementing such programmes. The most difficult problem in privatization is the vigorous opposition from the employees to be affected. It is, therefore, desirable that the employment effects of privatization programmes be considered well in advance and policy measures be worked out to retrain the employees so that the potential adverse effects on employment, because of implementation of privatization measures, are fully neutralized. Adverse effects on weaker sections of society should also be considered in devising and implementing privatization measures. □

the 1970s to nearly 7 per cent in the 1980s. At least in many large Asian cities, where economic power is concentrated, such expansion has produced more tall buildings and signs of increasing prosperity among a growing middle class. The headlong drive in many countries to register impressive growth figures, usually with low priority for such areas as rural development and urban infrastructure, has often seen urban services all but overwhelmed, an ongoing rural exodus, proliferating city slums and worsening hardships for the poor. In many cases, a largely single-minded rush for growth has also caused the rapid depletion of natural resources, a loss of soil fertility and large-scale destruction of forests. These in turn have contributed to the growing frequency of such disasters as landslides and floods in our region and worked to help widen inequalities in income distribution, which tends to fuel civil unrest. Indeed, the social and economic costs of development – to the partial extent it has been attained – have certainly been high.”

“In contrast to their impressive performance earlier, the near-term economic prospects of most developing Asian and Pacific countries have lately shown signs of a weakening growth impulse. It is notable that after our developing countries’ remarkable average growth of about 8 per cent over the six years between 1983 and 1988, their average growth sustained a slowdown in the closing years of the decade. This does raise some questions about the durability of the region’s strong growth momentum of the past decade, unless commensurate policy measures are taken at various

levels – including in particular the strengthening of multilateral trading arrangements. Average export growth in developing Asian and Pacific countries recorded a sharp drop from 24.5 per cent in 1988 to 14.3 per cent in 1989. Amid rising imports, this worked to widen trade deficits in many member countries and significantly reduce surpluses in others. The recent forty-sixth session of our Commission noted that many Asian and Pacific countries have become more exposed to the potential uncertainties and instability in the global trading environment. It therefore viewed the Uruguay Round of trade negotiations as a means of halting the retreat from multilateralism and of establishing a free multilateral trading system with transparent and enforceable rules.”

“There is also another important dimension of the consequences of the adjustment process that many developing Asian and Pacific countries undertook to safeguard their growth momentum. This is evident in the fact that their physical and social infrastructures have been stretched to the limit and are in need of substantial replenishment. Not only are heavy investments necessary for better bridges, roads, and rail and air transport facilities and in telecommunications, there is also a crying need for schools, hospitals, housing and other social infrastructures to meet the needs of growing populations. In the past, many such necessities have been financed with public funds, typically depending on foreign assistance. With pressures to reduce both budget and balance-of-payments deficits, the squeeze has been increasingly borne by those important sectors that

ensure the continued growth and buoyancy of an economy.”

“The Asian and Pacific countries are being prompted to rediscover the potential that exists for fostering closer co-operation among themselves. As one sees in Europe and elsewhere, regionalism is becoming a potent stimulus to growth in the world economy. The Declaration unanimously adopted by the eighteenth special session of the United Nations General Assembly last April amply recognized its importance. For the Asian and Pacific region, strengthened regional co-operation could also be a powerful catalyst for national efforts to hasten economic restructuring. Such co-operation would provide the means of consolidating and furthering the region’s growing interdependence, especially since Japan and the Asian NIEs have already begun playing key roles in spreading the growth impulse in the region, though its impact has yet to be felt by the region’s weaker economies. There is no doubt that today’s growing intraregional trade and investment in the Asian and Pacific region will propel the forces of economic restructuring and regional co-operation on a much wider scale and in a mutually reinforcing spiral.”

“As regionalism gains strength elsewhere, it is natural that the Asian and Pacific countries would show a greater interest in increasing mutually beneficial interactions among themselves. Indeed, regional co-operation was the chief focus of discussions throughout the recent ESCAP Commission session. It will likely remain so when the Commission meets next year in Seoul at the kind invitation of

the Government of the Republic of Korea. The Governments mandated the secretariat to take steps to elaborate the objectives and terms of reference of the proposed ESCAP council for regional economic co-operation in the light of related discussions at the forty-sixth session. The Commission also adopted, as its theme for the 1991 session, the subject of industrial restructuring in Asia and the Pacific, in particular with a view to strengthening regional co-operation. The study on the theme topic next year will partly serve as a curtain raiser for the Meeting of Ministers of Industry and Technology, which the Commission decided to hold later next year."

"Standing at the threshold of this transitional decade into the twenty-first century, the Asian and Pacific region can view the future with a great deal of optimism and confidence. Major reasons include the growing economic dynamism and industrial strength of many of our developing member countries, together with the spreading of a fermentative process of modernizing huge segments if not entire societies. Stirring from slumbrous centuries, our ancient cultures and civilizations are imbued with a new spirit, a fresh determination to achieve. Self-improvement has become a widely palpable urge, opportunities are seized, initiatives braved, and misfortunes much less often taken lying down. Entrepreneurial pioneers are also emerging in some of our least developed countries. These are clear signs that the new millennium will dawn on an Asian and Pacific region with conditions vastly different from those even three decades ago

when the development process began."

"This dramatic transformation can become more balanced and broad-based if urgently needed attention is given to the social dimensions of development. These are reflected in various stresses and strains on our societies brought on by fast-paced industrialization, similarly rapid urbanization and other changes. Unless the important social issues are addressed on a priority basis, many parts of our region may face not only unbalanced situations but potentially unstable ones as well. Alleviating poverty, investing more in social infrastructure such as schools and hospitals, and reducing wasteful expenditures, including large military budgets, would prepare the developing Asian and Pacific countries for the 1990s and well beyond. The future looks bright for our region, but its brightness would be much enhanced and more secure if hundreds of millions of citizens existing on the fringe of progress can be helped to join the mainstream. After all, development is, and should be universally regarded as an undeniable human right of all our peoples." □

D. Strategic Choice of Technology Transfer Policy

1. Introduction

To date, the majority of technology transfers have taken place between private organizations based in developed economies. In this context, the major difficulties have resulted from differences between the internal and external economic contexts of the source and receiver of technology. Variances across national boundaries between the legal and social contexts tend to aggravate further such difficulties. Although most international technology transfers involve a similar set of mechanisms and actors, the effectiveness of transfers to or between organizations based in developing nations may also be inhibited by higher individual, organizational and institutional barriers to change. The effect of these inhibiting factors could be somewhat reduced by public policy. Therefore, this article attempts to focus on the interactions between public and private decisions which directly or indirectly initiate, influence, or tend to limit such transfers. To begin, the key terms are defined, and a strategic framework is proposed to explain the choice of a specific technology transfer mode. The relevant features and limitations of single-disciplinary perspectives of technology transfer are explored, and the policy issues which emerge are portrayed through a simple model.

2. Technology and the technology transfer process

Technology is both a complex and a dynamic concept ^{1/}. Because knowledge is imbedded in its creation and use, it cannot

be viewed simply as an object. Technology has been defined as a "package" ^{2/} which includes the physical object and the knowledge which it represents, plus arrangements for their use. When the flint arrowhead used by tribal hunters is examined from this perspective, attention is focused not only on the process of producing the tool, but on effects from its use on the overall economics of hunting and defence activities. However, because it is part of the context in which it is created and used, technology cannot be treated merely as a static economic factor of production. Further, as technology transforms the value (not only economic, but social) of labour and other inputs to production, the social consequences of its use cannot be considered to be neutral. From a strategic perspective, technology must be defined in terms of the resulting transformations in the relationships between individual or collective users and their economic, social and physical environment. This focuses attention on structural effects of the use of bow-and-arrow technology on hunters, warriors and others within the tribe, on shifts in power between tribes which adopt bow-and-arrow technology versus those using spears or other technologies, and on the primary effects on the wildlife population and secondary effects on habitat resulting from widespread use.

Technology transfer is a human activity related to the

innovation process, which depends for its success largely on communication flows between the actors ^{3/}: receiver, source, and government organizations. The receiver's objective is to bypass delay, mitigate risk, or reduce other costs inherent in the generation of new technology from internal resources. The motivation of a source to engage in a technology transfer ranges from social development to commercial gain. However, transfer may take place without assistance from a source, or even despite its best efforts to block the diffusion of its technological secrets. Governments may create incentives or barriers to technology transfer, such as direct or indirect subsidies, the laws creating industrial property rights or otherwise limiting competition, and the tax regulations which differentially treat expenses for each of the elements in the transfer process. International transfers may involve foreign investment, movements of foreign exchange, flows of humans providing technical expertise, and various other factors regulated or influenced by national governments.

A comprehensive model of technological transformation links four process elements: technique, knowledge, the organization of production, and the product ^{4/}. Each process element may reflect physical artifacts (devices or products) and/or "know-how" (data or

^{1/} L. Tornatzky, *Technology and Innovation* Washington, D.C., OTA, 1983.

^{2/} I. Illich, *Deschooling Society* New York, Harper & Row, 1971.

^{3/} E. Rogers and F. Shoemaker, *Communication of Innovations*, New York, Free Press, 1983.

^{4/} J. Muller, *Liquidation or Consolidation of Indigenous Technology*, Aalborg University Press, 1981.

information). *Technique* refers to the pattern of interaction between production factors (raw material, capital facilities such as machinery or tools, and human abilities or labour) at a process level. *Knowledge* consists of the applied science, skills, and even intuition inherent in the creation and use of a specific process. *Organization* of these two elements is structured by technique and knowledge, but also reflects the economic and social structure of the environment. The resulting *product* mediates between the elements which determine its production and the legal, economic, and social context in which the product is distributed and consumed. These four elements (technique, knowledge, organization, and products) form a system, in that change in any one element must be reflected by corresponding changes in other elements^{5/}

The Technology Transfer Cycle

Technology transfer changes the technological process of a *receiver* organization through the introduction of one or more of these four technology elements from a *source* organization. A complete cycle of technology transfer may be modelled in five phases:

Selection : Identification and selection of technology which may provide advantages to an organization is a difficult task not only because of the wide range of choice, but also because of imperfect information about the availability, performance, adaptability and

life cycle costs for alternative technologies. Success in this phase will require intelligence (high-level *knowledge* from external sources) regarding the long-term product and organizational implications of alternatives. Study tours may be an effective means to transfer detailed knowledge about the technique elements. Consultants may be engaged to recommend technology choices. But as a higher final level of transfer is often enabled by the knowledge acquired by staff members during this phase, such consultants should play supporting roles.

Acquisition : Access to the desired technology may be gained via a variety of mechanisms, usually some type of transaction. These various mechanisms are later discussed in greater detail. This phase is primarily directed toward the transfer of *technique* plus tacit *knowledge* which will be required for its installation and subsequent utilization. Staff training during this phase provides a base for the success of later phases.

Utilization: The installation and efficient operation of technology within the design parameters established by a source requires the development of an *organization* capable of simulating the source environment at the receiver site. A transfer ending at this phase rarely attains its full performance potential.

Mutual Adaptation results

when adjustments to the *technique* and the receiver *organization* are made to optimize performance. This period of learning is focused not only on adapting the technique to accept local inputs, but on adapting the receiver's managerial structure and processes to master the new technique.

Technology-based **Initiatives** mark the completion of the full transfer cycle. Cumulative gains in technique, knowledge, and organization enable improvements to installed technology, generation of new technology packages based on the abilities gained during transfer, transfer of such packages to similar sites, and new or improved *products*.

The level of technology transfer is reflected in increased individual and collective abilities which follow the end of a specific transfer cycle. At the lowest level is the know-how used to operate and maintain a technology, at the next level is the know-how required to adapt and improve technologies, and at the highest level is the know-how needed to internally generate new technologies to surpass those previously transferred^{6/}. While the potential extrinsic rewards increase at higher levels, so do the inherent risks. Also, substantial resources may be required to migrate from one level to another, so the level to be pursued in a given case should balance the present circumstances and future goals of both the source and receiver organizations.

^{5/} A. Lorentzen, "Division of labour and infrastructure in technology transfer", in Chatterji, *Technology Transfer in the Developing Countries*, London, MacMillan, 1990.

^{6/} D. Teece, "Technology transfer by multinational firms", *The Economic Journal* vol. 87 (1977), pp. 242-261.

3. Modes of technology transfer

Conflicts between the needs of the sources and receivers of technology are resolved by the mode selected for transfer. Sources of a technology may demand varying levels of reward for and control over its use. Receivers vary in their willingness to meet such terms and conditions in exchange for the legitimization for and ongoing support of such use. The interaction between these factors determines the way in which parties are motivated to resolve these conflicts, and the resulting patterns can be labeled as the four archetypal modes of technology transfer: *Public domain mode*, in which a desired technology is freely available (and is thus not traded); *Normative mode*, in which receiver needs can be met via acceptance of standardized terms and conditions provided by the source; *Co-operative mode*, in which a relationship between source and receiver is established through negotiation; and *Anti-competitive mode*, in which costs for creating new technology or competing with the use of new technology are avoided by mechanisms which defeat market forces.

4. Mechanisms for technology acquisition

Based on the pattern of interaction between the source and the receiver, a mechanism for technology acquisition can be assigned to one of the technology transfer modes above.

Mode I :Public domain

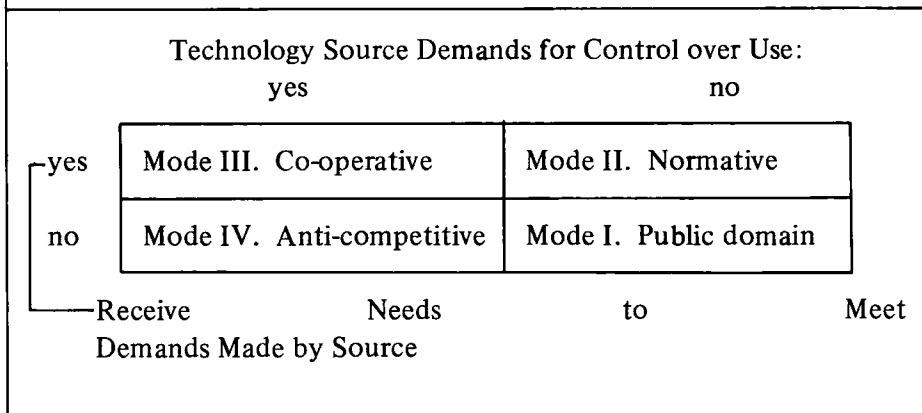
Public domain activity is defined as technology which is volunteered and not traded. Acquisition takes place with the express or implied consent of the source, but without consideration passing between the receiver and the source. It can take any of the following forms:

- (a) **Disclosure** is the voluntary transfer of technical information to the public domain, for example, the diffusion by the Digital Equipment Corporation of its proprietary technology for solvent-free production of microelectronic components.
- (b) **Recruitment** of individuals who have acquired knowledge of the technology, but who are not restricted by the

source from conveying this knowledge to the receiver, is an important transfer mechanism. In the international context, these individuals may be either expatriates or receiver nationals who have worked abroad. Several Asian NIEs, including Japan and the Republic of Korea, have selectively repatriated nationals with high-technology know-how.

- (c) **Training and education** of foreign students is a long-term mechanism for technology transfer, which may benefit those technology sources which are closely linked to the providers. A receiver organization may benefit from active monitoring of overseas training by its national government, in that flows of needed know-how may be co-ordinated with plans for technology acquisition.
- (d) **Free copying** of documentation and of technology (as in the case of "shareware") which is in the public domain is a form of technology transfer favoured by non-commercial agencies. The minimal capital required for this approach partly determines its popularity.
- (e) **Study tours** by key technicians and managers incur relatively low expenditures of foreign exchange, and when properly organized, are an effective means to acquire know-how.

FOUR MODES OF TECHNOLOGY TRANSFER



Mode II : Normative

The normative mode is one-way, in that receivers passively accept available terms and conditions. These may take a one-to-many form, or an entire industry may adopt an agreement in a many-to-many pattern. This approach is practical when bargaining power favours the source, or when the costs for negotiation and adaptation are high relative to the value of the technology. For example:

- (a) **Commodity purchases** : standard "black box" products (including documentation and end-user training) enable transfer only of operational functions, even when a high level of technology is imbedded. The ability to optimize or improve the performance of such a device requires additional know-how. Such know-how, for example, documentation provided on a one-time basis, is a commodity.
- (b) **Standard licences** : The licence accompanying retail computer software is a simple agreement which spells out the terms under which the product may be used, including the limits to the liability of the source. Again, only operational functions are transferred.
- (c) **Franchises** are a variation of standard licences, the terms of which may cover the transfer of know-how about a product or a process, and may also provide

for the utilization of a brand name and the provision of basic inputs. Franchise agreements covering ongoing services, such as managerial expertise and technical support, are a type of co-operative agreement, as discussed below.

Mode III : Co-operative

The co-operative mode implies an ongoing relationship between source and receiver, each of which will play an active role in effecting the transfer.

- (a) **Bundled purchases** : The dominant mechanism used for commercial technology transfer has been the purchase of equipment along with the know-how required for its use. Know-how (in the form of consulting services) may be acquired separately in some cases. However, when the technology gap between source and receiver is great and the purchase does not provide for joint operation as a means of transfer, the knowledge required to upgrade technology may be difficult for a receiver to capture.
- (b) **Negotiated licences** may cover the transfer of know-how about a product or a process, plus essential services, such as managerial expertise and technical support, and may also provide for the utilization of a brand name or specify the provision of basic inputs.

- (c) **Equity investments** in another organization may provide access to technology. This approach takes several forms: the receiver may make an investment in the source to gain access to knowledge, or a source may make an investment in the receiver to gain access to production factors or markets. As the extent of ownership partly determines the control over the technology gained through this approach, bargaining tends to be based on financial power.
- (d) **Joint ventures** are created for investing in and transferring technology to a new organization. A specific form of equity investment, they have the advantage of focusing the investment and the organizational effort on the success of the transfer. While organizations based in newly industrialized economies are increasingly willing to take an equity stake in a technology, source based in a developed economy to gain access to its technology, joint ventures may be a more viable alternative.
- (e) **Mergers** are rarely used solely for technology transfer. In practice, mergers also represent difficult legal, financial and managerial implementation problems.

Mode IV : Anti-competitive

Gaining access to technology without meeting the demands

of the source is anti-competitive, in that such activity defeats the operation of the technology market, and diverts resources which would otherwise be channelled to legal owners of technology.

(a) **Defensive legal action** attempts to protect current investments by blocking the use of alternative technologies. Such actions include the practice of building a thicket of patents which will never be used around key discoveries to prevent imitation, and the purchase of patents to prevent use by competitors.

(b) **Raiding key staff** is not only used to fill technology gaps in the technique and knowledge elements of the technological transformation process, but may also be an effective short-term tactic to fill gaps in the organization or product elements.

(c) **Imitation** by reverse engineering is effective if receiver skills are sufficiently evolved to produce a copy which will be accepted in its market, and is sustainable only if the industrial property laws in the receiver nation are weak.

(d) **Misappropriation** includes clearly illegal forms of imitation such as direct copying. Copying may be a rational economic decision for certain receivers, when access to technology is denied,

when the cost of meeting the terms set by sources exceeds the expected value to be gained, or when the expected costs of legal sanctions for misappropriation are very low.

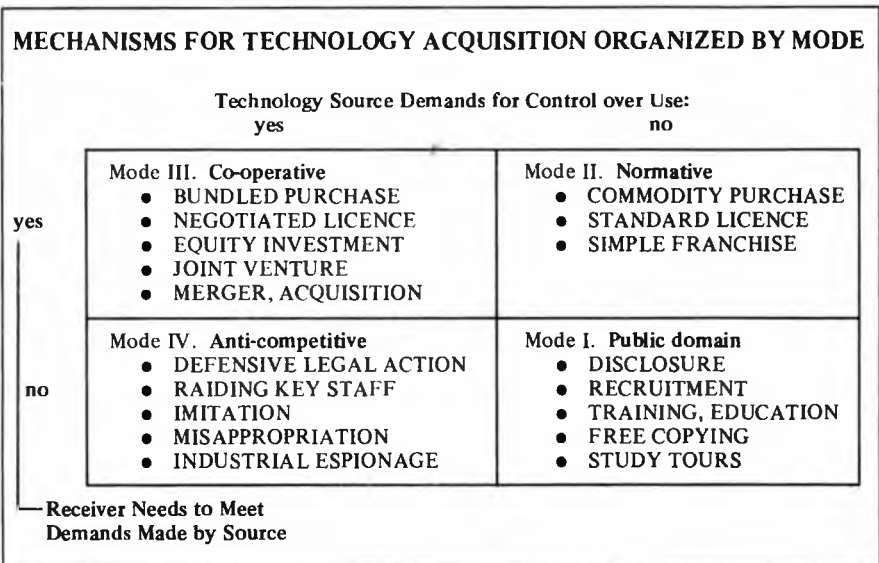
(e) **Industrial espionage**, despite its moral content, may also be a rational decision from a purely utilitarian perspective. In high-technology industries, such as mainframe computers, huge investments and long product lead times make access to leading-edge technology critical. The survival of a firm may depend on its ability to gain access to technology.

The various mechanisms for technology acquisition are arrayed by mode in the following figure:

a firm may choose not to engage in industrial espionage as long as it is able to recruit expertise on the international market. Internal preference may also shift, as when a firm which has engaged in the use of pirated software later becomes dependent on this misappropriated technology and makes the decision to purchase it through legitimate channels in order to continue use without further risk of legal sanctions.

5. Limitations of current technology transfer perspectives

Debate regarding technology transfer policies crystallizes around one of the following three disciplinary perspectives: (a) the effects on *economic* efficiency, (b) the interaction between the introduction and use of technology and national *legal* institutions, and (c) the effect on human *development*. Because very different assumptions are used by each of these



Both source and receiver mode preferences are determined partly by external factors such as government policy, which may change over time. Thus,

disciplines to assess the role of technology, they tend to produce divergent models. As a consequence, the results are often of limited utility for

defining links between public policy decisions and technology transfer in the private sector.

(a) Economic perspectives on technology transfer

The neoclassical model of economic behavior assumes that technology is a fully appropriable input, that it exists as property owned by producers whose use is protected by proprietary rights, that perfect competition between technologies takes place in a single commodity market, and that efficiency will be optimized when innovators are able to capture all consumer surplus^{7/}. The model seeks a stable state at which the most valued outputs can be produced by using the least expensive mix of inputs, so that allocative efficiency is optimized. Similarly, macro-economic policies based on the concept of national comparative advantage pursue the goal of static allocative efficiency across a group of interacting economies^{8/}.

In fact, few of these assumptions hold up under scrutiny. First, because technology transforms the economic relationships between inputs, it cannot itself be treated as a fully appropriable input. Second, only certain elements of technology can be treated as property whose ownership can be protected^{9/}. More importantly, competition in technology markets is inherently imperfect. Finally, substitute technologies

^{7/} *Competition Policy and Intellectual Property Rights*, Paris, Organisation for Economic Co-operation and Development, 1989.

^{8/} Michael Porter, *The Competitive Advantage of Nations*, New York, Free Press, 1990.

^{9/} Lorentzen 1990, *op cit*.

are highly differentiated to markets: by differential access to knowledge, by the patterns of alliances between sources and receivers, by the nature of end-use demand in a receiver's markets, and by value added to technology by intermediaries.

These flaws in the neoclassical model were noted by economists who studied industrial development. For example, while the diversion of surpluses into production innovations is inconsistent with neoclassical theory, innovations result from precisely such strategies. Joseph Schumpeter^{10/} first identified technological innovation as the seed of economic development: his early ideas have been extended, by Michael Porter and others, to models of industrial development treating innovation as a dynamic force for development.

Costs for negotiating, monitoring, and enforcing technology transactions are high: critical information is closely held, while price and other terms are determined by the relative bargaining positions of the buyer and seller^{11/}. Access to and the capacity to process information is a large element of transaction costs^{12/}, as portrayed below:

Analyses of economic organization based on this model show that firms vertically integrate (i.e., prefer merger or acquisition as choice of a technology transfer mechanism) when transaction costs are high^{13/}. Networks of co-operating firms are viable only when transaction costs are reduced for participants^{14/}. A network strategy is often appropriate to the market position and scale of locally owned third world enterprises. Reducing the costs of technology transactions within and between groups of co-operating organizations which include as full members enterprises based within its borders would thus seem to be an advantageous policy. However,

^{10/} J.A. Schumpeter, *The Theory of Economic Development*, Cambridge, Massachusetts, Harvard University Press, 1951.

^{11/} O. Firestone, *Economic Implications of Patents*, Ontario, California, University of Ottawa Press, 1971.

^{12/} G. Jones and Hill, "Transaction costs analysis of strategy-structure choice", *Strategic Management Journal*, vol. 9, 1988, pp. 159-172.

^{13/} O.E. Williamson, *The Economic Institutions of Capitalism*, New York, Free Press, 1985.

^{14/} J-C. Jarillo, "On strategic networks", *Strategic Management Journal*, vol. 9, 1988, pp. 31-41.

SOURCES OF TRANSACTION COSTS

- Bounded rationality:** individuals and organizations have only a limited capacity to process information;
- Opportunism:** is defined as self-seeking behaviour combined with guile;
- Uncertainty and Complexity:** which are inherent problems in most technology transfers;
- Small numbers:** inequalities in bargaining power which tend to distort not only markets, but relationships;
- Information impactedness:** asymmetries in the distribution of knowledge distribution;
- Asset specificity:** long-term commitments to a specific type of transaction.

it is also essential to encourage transfers which do not take the form of transactions, such as study tours, education, and the free dissemination of scientific information.

The economics of scientific and commercial knowledge differ, partly because of the different reward structures for accomplishment in each field. Scientists are rewarded for disclosing their discoveries by recognition from their peers and the public. Technologists pursue practical innovations, and are rewarded by the economic success of their products. Strong economies of scale and acute uncertainty characterize the production and use of scientific knowledge: as a public consumption good, it is most efficiently priced near its marginal cost of distribution. While scientific knowledge is necessary to technology, commercial success also demands technique, organization, and product information. These are less likely to yield economies of scale, because they tend to be highly differentiated to the context in which they are used. Thus, the assignment of proprietary rights encourages investment in technological development by those actors with access to the information required to bring the resulting innovation to market. Industrial property laws, as micro-economic devices for improving dynamic efficiency, have thus become an element of technology transfer policy.

As a consequence of these new tools, analytic technique has moved from static to dynamic models, the dominant industrial development paradigm is evolving from international comparative to competitive advantage, and the broad focus on macro-economics is giving

way to industrial restructuring policy based on micro-economic measures.

(b) Legal perspectives on technology transfer

The legal profession is involved in technology transfer in three modes: contractual matters, legislation and litigation. The primary role of the legal profession has been in the negotiation, monitoring, and enforcement of legal agreements governing technology transfer transactions between sources, receivers and other involved parties. It is not uncommon to find technology defined from the legal perspective as a marketable form of knowledge^{15/}, nor to find technology transfer defined as a commercial relationship between a buyer and a seller. As the earlier discussion of technology transfer modes demonstrates, such definitions hold only for technology which is traded.

Given this bias, legal discussion of technology transfer issues emphasizes the implementation of Mode II and III transfer mechanisms, and the protection of industrial property to inhibit Mode IV transfers when possible.

Intellectual property law is an attempt to balance individual and collective interests. Patent law is intended to give inventors economic incentives to disseminate their inventions, and typically protects only those inventions which represent a useful, novel, and non-obvious process, machine, manufacture or composition of matter. A patent gives its holder rights to

^{15/} D. Dichter and others, *Guide to Technology Transfer for Small and Medium-sized Enterprises*, Aldershot, United Kingdom, Gower, 1988.

control the use, manufacture and sale of the invention for a limited period of time, provided that the invention is fully disclosed so that others may learn. Copyright protects an individual piece of work as an original expression, but not its underlying concept. Thus, copyrighted software is vulnerable to reverse engineering. Trade secret law has its origins in common law. Courts in the United States have held that a trade secret must meet four criteria: appropriateness of the subject matter, secrecy, novelty and economic value^{16/}.

The protection offered by these laws varies greatly by country. For example, most developing countries do not now recognize the patentability of software, as do many industrialized nations including Canada, France and Germany. Although software has traditionally been defined in the United States as a mathematical algorithm, and thus unpatentable, recent decisions by the United States Patent Office have blurred this distinction. In Japan, the Ministry for International Trade and Industry (MITI) considers software as an industrial product, and has proposed a fifteen year term of protection subject to full disclosure of the program source code. International law in this area is still emerging, but it is clear that domestic laws can be drafted to provide an international advantage. The knowledge that Japan uses far more software than it develops reveals that the MITI proposal will provide Japanese software developers with free access to foreign techniques. In Canada, while computer programs receive

^{16/} J.T. Soma, *Computer Technology and the Law*, Colorado Springs, Colorado, Shepard's-McGraw, 1983.

protection as literary works, the term is limited to five years. Worldwide, as intellectual property laws were not originally written to deal with software, archaic language adds uncertainty. For example, Britain's 1956 Copyright Act states that "protection is provided for written compilations or notations made by hand printing, typewriting, or other similar processes". Efforts to develop modern international law have been initiated by the Organization for Economic Cooperation and Development (OECD) and by a United Nations agency, the World Intellectual Property Organization.

Since the Bhopal disaster, liabilities stemming from international technology transfers generate more concern. Depending on the loss, failures may be covered by product liability law, and in rare cases (such as the release of data) may also represent a tort. Western courts broadly expanded the rights of people injured by technology during the 1960s and 1970s, but these advances may be receding^{17/}.

(c) Development policy perspectives of technology transfer

Development administration practitioners and theorists have struggled to reach agreement on technology transfer issues. Stage theorists, led by Walter Rostow^{18/}, saw advanced technology as a strategic economic input which (along with non-economic factors) fuelled the accelerating development of an underdeveloped economy until it reached the "take-off" stage,

after which it would continue to develop on its own.

Others are more critical of the effects of advanced technologies. The appropriate technology movement hoped to optimize the fit between a technology, local production factors and current market preferences. The key to technology-based development is seen by others as the development of indigenous technologies as a step toward self-reliance. But trends toward global markets and shared technological standards may relegate these to the scrapbook.

Technology transfer policy is implemented through legislation, administrative regulation or in some nations as case law in the courts. The cycle is complete only when the implementation of the policy has been evaluated, both in terms of the original objectives (did the extension of patent protection to certain types of computer programs encourage the free exchange of information as predicted?), and relative to other dimensions of the problem which may not have been apparent at the time of the initial decision (are more computer science faculty now leaving university teaching posts to protect intellectual property rights?).

The analysis of technology transfer policies may be a complex task. The stakeholders may have conflicting needs, while the new technology may interact with society in unexpected ways. As a useful example of both problems, information technology policy alters (over the long term) the telecommunications infrastructure, the national supply of technological skills and other development factors^{19/}. In industrialized societies, informa-

tion has become a major factor of production, which now outstrips in value the traditional factors of land, labour and capital. Although more people are now engaged in information collection, processing and distribution than any other industrial activity, public policy has not kept pace.

The flexibility and pervasiveness of information technology makes it an interesting case. Privacy, accuracy, property, accessibility and vulnerability are the five policy issues of the information age^{20/}.

Privacy: Considered a legal right for less than a century, privacy is most simply defined as the right to be let alone. The threats to privacy resulting from the use of information technology include "hackers" with malicious intent, unexpected but accidental disclosure, and the use of information for purposes other than that for which it was collected. Access to personal data increases with mass conversion of data about individuals from paper to magnetic form, the degree of interconnection of the organizations holding this data, and the emergent potential for the use of computers to combine individual elements of this data to form patterns revealing new information. The personal consequences of these institutionalized leaks have been reported as dissemination of medical information without consent, reporting by credit bureaus of non-financial data and denial of employment opportunities to persons with unrelated criminal or political histories.

^{17/} *The New York Times* 27 November 1989 p. C.1.

^{18/} W.W. Rostow, *The Stages of Economic Growth*, New York, Cambridge University Press, 1960.

^{19/} Porter, *op. cit.*

^{20/} R. Mason, "Four Ethical Issues of the Information Age", *MIS Quarterly*, vol. 10, No. 1, 1986.

Accuracy: Authority and responsibility are linked: Who is responsible for the authenticity, fidelity and accuracy of information? Similarly, who is to be held accountable for errors in information and how is the injured party to be made whole?^{21/} While accuracy and privacy issues may be linked, there are cases in which privacy plays no part. The significance of data accuracy is determined by the consequences of its communication for a specific purpose. An inappropriate response may result either from erroneous data or from an erroneous program interacting with accurate data. Exhaustive testing is not possible for extremely complex programs, while data verification is essentially impractical for tightly coupled "real-time" activities such as air traffic control. The risks of failure are greatest when the factors of complexity and tight coupling interact. At the level of ordinary citizens, accuracy failures have resulted in denial of public services and mistaken arrests based on erroneous data.

Property: This issue concerns the following questions: Who owns information? What are the just and fair prices for its exchange? Who owns the channels, especially the airways, through which information is transmitted? How should access to this scarce resource be allocated?^{22/} The forms of ownership of intellectual property include patent, copyright and trade secrets law. To protect software meeting these criteria, great care must be taken to preserve its secrecy in the processes of hiring employees,

^{21/} Mason, *loc. cit.*

^{22/} Mason, *loc. cit.*

entering into joint ventures, maintaining program code and distributing it to buyers.

Accessibility: Access interacts with privacy: What information does a person or an organization have a right or a privilege to obtain, under what conditions, and with what safeguards?^{23/} The principles of access control are universal: the objective is to strike a balance between a collective need for the free flow of information and the rights to adequate safeguards of personal or proprietary data and protection of privacy. Transborder data flows, by definition, represent an international legal problem. This issue is technically interesting because of differences in national norms, and thus in the legal frameworks by which the relevant entities are governed. It became a highly visible issue only when international organizations adopted telecommunications networks as a message channel. From a practical perspective, most regulation to date has focused on the protection of individual privacy. The regulation of transborder data flows requires that two policy issues be addressed: first, legislation defining the objectives of regulation and the method of reporting data banks and flows, and second, a legal framework to ensure that policy can be enforced in a way that ensures the uninterrupted flow of data for legitimate purposes. Current differences in policy objectives have created two new types of national data entity: data vaults (countries with a legislative framework that represents a place to secure data files from potential inquiries) and data havens where laws are lax). The interaction between these

^{23/} Mason, *loc. cit.*

environments facilitates abuse: personal data can be acquired in one nation, exported to a data haven nation to be combined with other data to produce sensitive new information and stored in a data vault nation where it cannot be accessed by its subjects. Standards for control of data vary widely between nations. Abuse is impractical in most Scandinavian countries: in Sweden for example, personal data is licensed for a specific use, and a new licence is required if the owner of the data wishes to use it for another purpose. Swedish law is so strict that even the temporary machine-readable files created for transmitting data are subject to regulation^{24/}. This creates a barrier to the transmission of personnel data, even for multinational firms. In France, databanks must provide the public with an inventory of the data types, purposes, access rules, and recipient organizations. The West German public interest is represented by an ombudsman, or Data Commissioner. In Canada and the United States, ethical standards may be voluntarily adopted by industries, and are more often enforced through moral suasion than state action^{25/}.

Vulnerability: Another policy issue is the emerging vulnerability of individuals, groups, organizations, institutions and nations as a consequence not only of their increasing reliance on information technology, but of their structural reorganization in response to new uses of information technology. One effect of restructuring is to increase the vulnerability of

^{24/} J. Freese, *The Swedish Data Act*, Swedish Institute, 1982.

^{25/} Soma, *op. cit.*

some entities to others. The administrative policies of transnational organizations are often in basic conflict with national regulation of international dataflows. Also, the radiation from certain devices disrupt unshielded electrical telecommunications systems and computers, making vulnerable any nation without a emergency telecommunications infrastructure based on fiber-optics. At the other end of the spectrum, technical workers may acquire specialized skills which are relevant only in organizations who use products from a specific vendor: if that vendor maintains a "magnetic dossier" and uses its telecommunications network to pass advice to its customers regarding the availability and attributes of technical staff, these workers, now vulnerable to the vendor, will be unlikely to comment publicly on flaws in the vendor technology. Parallel shifts in power result even in voluntary networks, because the sales records of travel agencies are recorded in a computerized reservation system (CRS). The productivity increase offered by the CRS is so great an incentive that the travel agency must reorganize its tasks around the CRS program. In this new form, they are not only less able than before to provide highly personalized services to their clients, but they have become more vulnerable to monitoring by airlines.

6. A synthesis of the three perspectives

Industrial development policy seeks to reconfigure the economic flows and bargaining relationships in industries which are critical for economic performance at the national level. The goal is not only to allocate scarce resources to those activi-

ties which generate employment or support other development objectives, but to develop the human and other resources available to the nation to advance its economy over the long run. Harvard Business School Professor Michael Porter's recently published model of national competitive advantage portrays industrial restructuring as a process of identification and reconfiguration of strategic value systems so as to make selected industries competitive at the international level.

The unit of analysis for the model is the enterprise in the context of the industry, as viewed both from a domestic and an international perspective. For example, the relationships between Japanese industries in fibers and fabrics reveals that their pattern of strength in long-fiber weaves is derived from a

with the identification of critical industries, and then focus on industry segments (product: customer sets) in which opportunities are present. Within an industry segment, economic linkages, geographic location and market structure are the key factors. Markets can be divided into three: factor markets (including capital), intermediate (supplier and related industry) markets, and end-user markets. External to the industry perspective, decisions are made with respect to the business climate, public investment, trade facilitation, and the climate in which technology is developed, transferred, and used^{26/}.

According to Porter, there are four primary determinants of national advantage, which are influenced by both chance events (external shocks) and government policy:

THE DETERMINANTS OF NATIONAL ADVANTAGE:		
FIRM	STRATEGY	STRUCTURE RIVALRY
FACTOR CONDITIONS skilled labour, infrastructure, etc.		DEMAND CONDITIONS home demand for industry outputs
RELATED INDUSTRIES strategic linkages	AND	SUPPORTING SERVICES

long tradition of success in silk, while the Japanese carbon fiber industry employs technology similar to that used to generate long-filament synthetic fibers. Note that industries may be linked either through supplier relationships, and also via common ownership, channels or technology.

From Porter's perspective, restructuring decisions begin

These are linked to form the "Diamond," which portrays dynamic factors as linkages between the four determinants. Factor creation, for example, may be stimulated by a cluster of domestic rivals, by a perceived national challenge (as in the case of computerization in Singapore), by market forces emanating from home demand, or by

^{26/} Porter, *op. cit.*

creation or stimulation of transferable factors by related and supporting industries. Within the Porter model, sustainable national competitive advantage cannot be derived from a static source such as wages or even other factor costs such as raw materials, but only from the ability to innovate and to reconfigure the value systems of the key enterprises in an industry through the mutual reinforcing development of all four determinants.

7. A policy model for technology transfer

Technology transfer interacts with several types of national policy decisions: economic policy, human resources policy, human settlements policy and environmental policy.

Private strategy and public policy decisions interact, and the intent of industrial restructuring is to reconcile these perspectives. It should not be assumed that policy of the United States for regulating the effects of technology represents the best current practice. Even if this were temporarily the case, researchers now find that other nations have adopted and implemented policies that are better suited to rapid technological advance, and which provide advantages for competing in the related global services and equipment markets^{27/}. The interaction between policy and strategy varies by industry and national context.

This is because technology is a moving target which affects each element in the national diamond

^{27/} R. Harris, "Telecommunications policy in Japan", *California Management Review*, Spring 1989, p. 127.

differently. Because new technologies enable changes to products, and to the way in which they are distributed and supported, they affect market preferences. For example, robots may improve quality to the extent that hand-finished products become less desirable. Technology also shifts the basis of factor advantages. Again using the example of robots, labour inputs to production may be reduced by this technology to the extent that average hourly labour costs are less significant than capital utilization factors. A new industry leader may emerge when new technologies are transferred from supporting and related industries as the basis for a substitute product. Despite a weak position in traditional X-ray technology, Japan emerged as a leader in medical imaging equipment, based on its strong electronics industry. Finally, widespread diffusion of a new technology may transform the strategy, structure, and basis for rivalry in an industry. Rapidly spreading adoption of low-cost data network technology has had a dramatic impact on the banking and air transportation industries: those without access to their own networks are now at a competitive disadvantage.

National policy, by altering the net value and risk of technology transfers, has both long – and short term effects on the linkages between the determinants. In some cases, barriers to a transfer, such as restrictions on FDI, the repatriation of profits, or technical support by foreign nationals, can be renegotiated and overcome in a relatively short period. Other barriers, such as the quality of technical training, the capacity of telephone, air, road, and port infrastructure, and the capacity for local research and develop-

ment, are more difficult to overcome. Because rapid economic growth absorbs capacity in precisely these latter factors, the allocation of limited resources to factor creation projects is a strategic decision for developing nations aspiring to industrialized status.

In large nations (such as the United States), the economic and social forces flowing from technological change may be seen from an internal perspective, so that policy makers may not focus on the interaction between domestic policies and those of other nations. For nations with smaller markets, less well-developed natural and human resources, or simply less wealth, national policy plays a larger role, as can be seen by comparing the interaction between national policy and computerization in Brazil and Singapore^{28/}. For industries based on long-distance networks, such as shipping, air transport, and telecommunications, technological forces are inherently transnational. Here national policy may either facilitate or hamper automated interconnections between cooperating enterprises, and determines the competitiveness of enterprises within its borders. Information technology also has a potential to provide coordination for and integration of monitoring and enforcement actions across political boundaries for environmental management, public health, and law enforcement activities^{29/}. Policy changes and their effects have been rapidly transmitted across national boundaries and

^{28/} D. McCarthy and others, *Business Policy and Strategy*, Homewood Illinois, Irwin, 1987.

^{29/} E. Hanley, "The Strategic Potential of I.T. in the Public Sector", *10th Annual APPM Proceedings*, 1988.

political jurisdictions, through imitation, market effects, and through the operation of international organizations (for example, the International Standards Organization) and social networks.

International trends toward increasing technological complexity, specialization, and differentiation favour large organizations, and unless these are offset by other factors such as comparative factor costs advantages (which are temporary at best), or reduced transaction costs, the gaps between firms based in industrialized and developing nations will tend to widen. However, global business activity is integrated across borders, where the bounded rationality and information asymmetry inherent in international transactions increases costs, while goods outputs are now differentiated to local markets, where culture is a key factor^{30/}.

This article has identified four modes and several mechanisms used for technology transfer. It has shown why an interdisciplinary model is needed to evaluate technology transfer efforts. The issue of implementation remains. While this is far too complex a topic for the available space, three general conclusions can be drawn.

First, co-operative technology transfers are often superior to one-shot transactions, particularly for high technologies and when the gap between source and receiver is wide. A technology consists of a complex of elements, whose communication and subsequent adaptation

requires ongoing interaction. This means that the transfer mechanism must be structured so as to balance the interests of the source and receiver over the duration of the relationship.

Second, the inherent risks to the interests of the actors in technology transfers can often be identified. In general, these risks fall into three types: (a) unilateral cancellation of the agreement for extraneous reasons (for example, following a change in administration, a government agency may rapidly lose interest in a project); (b) decline in the intrinsic utility of the agreement to one actor to the extent that the prospective benefits no longer equal the costs (for example, an increase in the price of feedstocks, increased pressure on environmental issues or more vigorous rivalry may lower the returns from a planned petrochemical complex); and (c) an actor may not perform as promised (for example, the technology source may not provide the abilities needed by a receiver to perform research and development independently as promised). Each case represents a potential loss to a participant in a technology transfer. These risks can be entirely avoided only by refusing to participate, at the opportunity cost of the loss of all potential benefits.

Third, risks *can* often be managed: (a) they may be temporarily ignored, in the hope that the anticipated problem will not arise (or can safely be negotiated if it does), a practical tactic when the risk is not substantial; (b) either from a rational process of information gathering and analysis, or through a psychological shift, actors often change their perceptions of the inherent risks involved in a transfer; (c) an

actor may also overcome its concern simply by trusting its partner to behave in a way that will avoid subjecting it to loss; (d) the substantive terms of the agreement may be adjusted to mitigate risks to actors; or (e) actors may actively manage the risks inherent in technology transfer by selecting a mode which minimizes risk, and incorporate in the implementation mechanisms specific provisions for risk-management which alter (or reduce its perceptions of) risk. □

^{30/} C. Bartlett and Ghoshal, "Managing Across Borders", *Sloan Management Review*, vol. 29, No. 4, 1987.

News: Selected ESCAP Activities

A. Regional Seminar on Transfer of Technology for Small and Medium Industries

The secretariat organized the Regional Seminar on Transfer of Technology for Small and Medium Industries in July 1989 with the financial assistance and host facilities provided by the Government of the Republic of Korea. Representatives from Bangladesh, Bhutan, China, India, Indonesia, Malaysia, Nepal, Pakistan, the Philippines, the Republic of Korea, Sri Lanka and Thailand participated.

While recognizing that small and medium scale industries (SMIs) continue to play a vital role in the socio-economic development in developing economies of the region and emphasizing the potential for co-operative measures in technological upgrading of the SMIs, the Seminar *inter alia* recommended the following actions to be undertaken at national, regional and international levels:

1. National level

(a) A comprehensive policy framework should be developed for technology transfer to SMIs and should be effectively integrated with national policy. Governments may formally recognize the complementarity between technology transfer and technology generation efforts, specify the level of priority of technology transfer, and

reflect it suitably in promotional and regulatory measures.

(b) Each developing economy should clearly delineate the roles of SMIs vis-a-vis large industries.

(c) The range and mix of products or the provision of services solely meant for the domain of SMIs should be clearly specified.

(d) In case of such products manufactured by SMIs, which cannot stand competition with similar products manufactured for large industries, protection should be given to SMIs for limited periods through market delineation, tax concessions or other preferential treatment. Proper analysis should be made whether cost differential is due to economies of scale or due to obsolete technologies.

(e) Technology watch groups should be set up in each country for periodically providing the following information to government policy planners, research and development institutions and SMIs:

- (i) Estimates of the nature and quantum of likely demand of goods and services in various sectors of the economy against 10-year and 25-year time frames;
- (ii) Direction and extent of technological changes

that might be considered necessary in order to fulfill the estimated demands.

(f) The policy for importation of technology, in each country, should receive consideration, *inter alia*, of the following aspects, while selecting technologies:

- (i) Sociological, cultural and technological environments;
- (ii) Receptivity of the work force and likely effects;
- (iii) Training and development of the work force;
- (iv) Life cycle of the new technology;
- (v) Linkage with domestic research and development;
- (vi) Infrastructural facilities available;
- (vii) Energy requirements and effects on energy conservation;
- (viii) Industrial safety;
- (ix) Other environmental effects.

(g) The policy on importation of technology should lay emphasis on the use of indigenous resources – local materials and local expertise – in combination with those components of technology which have necessarily to be imported.

(h) A desired/preferred scenario of modernization of SMIs should be evolved by each country on the basis of systematic analysis of the current situation and anticipated economic industrial and technological development within and outside the country. Relevant time-bound plans for systematic and orderly modernization of SMIs should be drawn up comprising technology acquisition / adaptation/improvement/absorption components.

(i) Countries should pursue objective policies and legislation dealing with technology transfer. Such policy should, *inter alia*, encompass:

- (i) Criteria for selection of technology;
- (ii) Aspects of importance in technology transfer agreements:
 - a. likely use of indigenous materials and expertise,
 - b. reducing dependence on supplier over a time frame,
 - c. transfer of the knowledge base, local manpower training, and
 - d. development, patents and other restrictive clauses related to export market sharing.
- (iii) Single window and early response mechanisms for the benefit of small entrepreneurs;
- (iv) Financial/tax incentives;
- (v) Research and development facilities (in-house as well as shared);
- (vi) Human resources development within the country;
- (vii) Development of infrastructure support.

(j) Developing countries may, as a measure of assisting SMIs in technology transfer, create and develop infrastructure in support of research and development, human resources development, product design, technology acquisition and transfer, diffusion of information, and integration of the technology import with related local technology.

(k) Manpower planning systems at the national level may be evolved/strengthened/suitably backed by a system for manpower forecasting and manpower information.

(l) Governments may provide policy support to "continuing education" for industry, lay-down and enforce minimum norms for periodic continuing education for every employee, and support development of human resources development infrastructure.

(m) Governments may consider the creation of a manpower development fund for SMIs with contributions from SMIs, exempt from taxation. The fund should be utilized for continually updating knowledge and the skill base of SMI staff in their areas of work.

(n) Entrepreneurship development may be recognized as an important strategy for the development of the SMI sector and the upgrading of its technology. Human resources development for entrepreneurship development should be undertaken on a planned basis, integrating it with formal degree/diploma programmes of initial education and subsequent programmes of continuing education. Establishment of entrepreneurship parks with linkage and support from educational

and research and development establishments may be supported.

(o) Governments may consider developing a system of incentives to facilitate recruitment and retention of technical personnel by SMIs.

(p) With a view to optimizing the process of technology acquisition, adoption, adaptation and absorption by SMIs, research and development institutions should be involved at all stages of technology transfer right from the negotiation stage, particular emphasis may be put on monitoring the technology absorption process. Research and development institutions should be encouraged and supported to give greater priority to SMI needs for applied research and innovations in products and processes.

(q) National standards organizations should be encouraged to periodically formulate standards for technologies/products/processes of relevance to the SMIs; assist adoption of standards by SMIs through programmes of awareness – generation, training and technical advice; and provide services for testing and quality certification.

(r) Infrastructure should be created for product/process design, prototype development and testing and so located as to ensure easy accessibility to SMIs.

(s) Level of resource allocation to SMIs by financial institutions should be raised and the access of SMIs to institutional credit improved through suitable modification of financial conditions and approval procedures.

(t) Financing of support in-

infrastructure for technology transfer may be undertaken jointly by the Government and SMIs. Venture capital loans at concessional rates of interest and seed money grants may be considered by the Government.

(u) Government policies should be reviewed where necessary to encourage, promote and strengthen linkages between large industries and SMIs and between SMIs themselves belonging to the same industrial sector, with a view to information sharing, technical co-operation and technology upgradation. Industrial research associations can play a vital role in strengthening and providing technical guidance to such linkages.

(v) Information systems may be restructured to provide adequate focus on the specific technology needs of the SMIs and to provide co-ordination/networking among different information sources, systems and services. Information systems should be oriented to:

- (i) Compilation of transferable technology profiles and technology requirement specifications for use by SMIs willing to buy/sell technologies;
- (ii) Collection, classification and dissemination of information on technological and commercial aspects and sources for raw materials, marketing potential and technology;
- (iii) Arranging studies and surveys to determine technology needs and perceptions;
- (iv) Providing information on foreign and domestic patents, and technology climate, investment

climate, rules and procedures, and available incentives;

- (v) Supporting the efforts of foreign trade delegations, trade exhibitions and exchange of information.

2. Regional level

(a) To establish a regional centre for technology information, ESCAP may invite representatives of member countries to a workshop to discuss modalities, structure, information flow arrangements and networking with country nodes.

(b) ESCAP may support surveys/studies of various aspects of the SMIs in the region.

(c) Member countries may be supported in planning SMI development through formulation of methodologies for planning, testing and assisting their application in specific national contexts. Implementation of workshops and projects may be taken up by ESCAP.

(d) Identification of lead institutions in the region for training and skill development of SMI personnel. Provision/negotiation of funds by ESCAP.

(e) ESCAP may arrange a forum for discussion on the promotion of technology co-operation among the countries of the region, particularly with a view to increased technology transfer among them, and the development of technological and human resources capability.

(f) To set up a group of experts to monitor the implementation of recommendations and to suggest various measures to be taken by ESCAP and regional countries from time to time

to overcome any difficulties/bottlenecks experienced during implementation.

(g) ESCAP may arrange to document case studies of particularly successful instances of technology transfer to the SMIs and organize a workshop to discuss them with a view to promoting effective transfer of technology.

(h) Regional organizations such as ESCAP should set up a regional advisory group on technology transfer for SMIs to monitor and suggest guidelines for technology transfer on a regular basis.

(i) ESCAP should take a lead in designing methodologies for standardized information collection on technology importation, skill requirements and other research and development programmes.

(j) ESCAP should organize an evaluation meeting of the Seminar to assess its usefulness and to design follow-up activities.

3. International level

(a) National policies for technology transfer may be examined and revised as necessary to provide a stimulus for regional/international co-operation and to be integrated with the country's general industrial and economic policies. National policies may be harmonized with each other to arrive at a broad regional policy in support of technology transfer among the regional countries.

(b) The policy should aim at strengthening the negotiating capacity of the regional countries, joint ventures and projects; joint efforts in technology assessment, technology development,

technology information systems, human resource development and consultancy services; and at facilitating the flow of expertise and technology.

(c) Existing mechanisms for ECDC/TCDC (economic co-operation among developing countries/technical co-operation among developing countries) should be strengthened and expanded in support of technology transfer.

(d) International agencies and organizations, such as ESCAP, UNDP, International Labour Organisation (ILO), United

Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Industrial Development Organization (UNIDO) and Asian and Pacific Centre for Transfer of Technology (APCTT) should provide for assistance and advice towards establishing regional co-operation in technology transfer.

(e) International organizations may facilitate documentation and exchange of regional experiences, consultation among policy makers and planners, harmonization of regional policies on technology transfer, establishment of a regional

information system, development of human resources, and networking of national organizations.

(f) International organizations may develop and test methodologies, and assist adoption by regional countries in policy making and planning for technology transfer; support development of premier national institutions for education and training as instruments for regional human resources development co-operation and provide assistance towards the development of national infrastructure for SMIs. □

Singapore's efforts to develop biotechnology

Singapore's ongoing efforts to develop its biotechnology sector focuses on four key areas: building up adequate human resources, strengthening the research and development infrastructure, fostering industrial growth, and promoting collaboration and partnerships between academic institutes and the industry.

These efforts are being spear-headed and co-ordinated under a National Biotechnology Programme by a Strategic Business Unit set up within the Economic Development Board last year.

The Unit is approaching the building up of human resource mainly at two levels, i.e., the scientist level and the technician level. At

the first level, the Institute of Molecular and Cell Biology (IMCB), set up in 1987, and the National University of Singapore (NUS) are training post-graduate students in biotechnology and biomedical fields at the Masters and Doctorate levels.

At the technician level, both Ngee Ann Polytechnic and Singapore Polytechnic will be implementing a three-year diploma course in biotechnology this year.

The strengthening of the research and development infrastructure, which now comprises the IMCB, the NUS and private sector laboratories, dovetails with the Unit's efforts to foster industrial growth and promote partnerships between industry and the NUS and/or the IMCB.

American and British companies,

among others, are collaborating, or have expressed keen interest in collaborating with the IMCB, the National University Hospital and other Singapore entities in basic research and clinical trails.

Multinational and local companies in Singapore are also collaborating or working on their own to utilize biotechnological processes in such areas as the production of animal vaccines, diagnostic kits and plantlets, and development of food flavours.

A National Biotechnology Committee has also been formed to assist and advise the Economic Development Board in formulating a strategic framework for Biotechnology Promotion and Development.^{1/}

^{1/} Source: Singapore Investment News, January 1989.

B. Workshop on Transfer of Technology for Entrepreneurial Development in Bangladesh

At the request of the Government of Bangladesh, a Workshop on Transfer of Technology for Entrepreneurial Development in Bangladesh was jointly organized by the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Centre on Transnational Corporation (UNCTC) and the United Nations Industrial Development Organization (UNIDO) in March 1990 at Dhaka.

The Workshop, at which thirty-one prominent entrepreneurs and industrialists as well as senior government officials of Bangladesh participated, extensively deliberated on five major manufacturing sub-sectors such as (1) textiles and garments, (2) leather and leather-based goods, (3) electronics, (4) agricultural implements and machineries, and (5) fish and shrimp processing. Thirteen persons, including officials of the three sponsoring United Nations organizations and senior consultants, presented various

technical papers as well as functioned as resource persons.

The Workshop not only reviewed the status of the five manufacturing sub-sectors in Bangladesh, but discussed in detail the status of existing technologies, the modalities and mechanisms for technology transfer, and other issues related to promoting entrepreneurial development in those sectors in Bangladesh. The proceedings of the Workshop including the technical papers have been published by ESCAP. □

C. Business Collaboration Meeting between Entrepreneurs from Developed and Developing Countries

In line with the high priority accorded to the promotion and development of small and medium industries in the developing economies of Asia and the Pacific, the secretariat with financial assistance provided by the Government of the Federal Republic of Germany, has been organizing business collaboration meetings between entrepreneurs from developing economies and the Federal Republic of Germany. The first of such meetings, was organized in 1986 and was attended by twenty-one persons from both the private and government

sector from seven developing countries, India, Indonesia, Malaysia, Philippines, Republic of Korea, Sri Lanka and Thailand. In 1987 a meeting on the Promotion of Business Collaboration in the Metal Working and Agro-industries between Thailand and the Federal Republic of Germany, was organized exclusively for the entrepreneurs and government officials of Thailand. In 1990 a similar programme was organized for Nepal. The secretariat is planning programmes for Bangladesh to be held in 1991.

This programme has been highly appreciated not only by participating countries, but by others as well, as it provides an unique opportunity to enter into joint ventures, technical and managerial collaboration through enterprise to enterprise contacts. Furthermore, the participating entrepreneurs greatly benefit from exposure to the latest technologies available in specific sectors, as such programmes are organized at a time when major exhibitions on latest technologies are held. □

D. Promoting International Competitiveness and Efficient Resource Utilization in Manufacturing

The Industry Section of the ESCAP Division of Industry, Human Settlements and Environment is currently implementing a comprehensive project on "promoting international competitiveness and efficient resource utilization in manufacturing" with the funding support provided by the United Nations Development Programme (UNDP) RAS/89/021.

The major objective of the project is to examine systematically major trends of industrialization in the developing economies of Asia and the Pacific and identify and promote promising industries to accelerate overall socio-economic progress and penetrate more vigorously into international markets through improvement of manufacturing competitiveness. The outcome of the project will not only lead to critical assessment of industrial growth and performance at subregional levels, such as South Asia, ASEAN, Newly Industrializing Economies (NIEs) and centrally planned economies, but also evolve measures to enable the developing economies to meet new challenges and opportunities, such as protectionist measures, emergence of new regional trade blocs and developments in Eastern Europe. It is expected that the project will recommend measures for the sharing of experience among developing economies, especially with newly industrializing ones, and design ways and means for further promotion of and strengthening of technical and economic co-operation among developing countries (TCDC/ECDC) for industrial complementa-

tion, human resources development, technology acquisition, transfer and adaptation as well as promotion of inter- and intra-regional investment.

The project, which is expected to be completed by the end of 1991, has several activities. At present, twelve country studies on China, Bangladesh, India, Indonesia, Malaysia, Nepal, Pakistan, the Philippines, Republic of Korea, Singapore, Sri Lanka and Thailand have been completed. The first drafts of the subregional studies on South Asia, South-East Asia, China and least developed and island developing economies have also been completed and are under review within the Division. These country studies and the subregional studies will be printed shortly and will be distributed to ESCAP member and associate members. A comprehensive regional study on promoting international competitiveness of manufacturing in the Asian and Pacific economies will be prepared in 1991. Subregional and regional workshops are planned to discuss the studies.

Other activities include advisory missions to assist members in incorporating the recommendations of the regional and subregional studies in national industrial policy changes and re-orientations.

Special studies analyzing the technological implications for improvement of competitiveness of manufactured products and issues and prospects for greater linkages between small, medium

and large industries in the Asian and Pacific region are being prepared. Another study dealing with specific problems of industrialization in least developed and island developing countries is also being prepared.

Two training programmes, one for least developed economies and the other for island developing ones in the field of industrial project preparation and management will be organized in 1991. □

E. Human Resources Development for Industrial Growth

The Industry Section of the Division of Industry, Human Settlements and Environment has accorded high priority for activities related to human resources development for industrial growth and structural transformation in the ESCAP region. As mandated by the forty-second session of the Commission under the ESCAP Plan of Action on National and Regional Initiatives for Human Resources Development: Its Technological Dimensions, important activities such as the Workshop on Human Resources Development Policy and Planning for Technology and Development, 1987, followed by an Evaluation Meeting of that Workshop in 1988, and the Regional Seminar on Forecasting, Planning and Development of Human Resources for Technology, 1987 were implemented.

ESCAP is currently implementing several inter-disciplinary human resources development projects under the Jakarta Plan of Action on human resources development. Among these, the following two important activities are being implemented by the Section:

1. Workshop on human resources development policy and planning

Bearing in mind that proper and adequate development of the vast human resources of the ESCAP region, is a basic prerequisite for technology-based industrialization, the main objective of the Workshop is to show policy makers that existing arrangements for skill develop-

ment planning and programming need to be critically examined, especially in the light of the fast changing technological situation. Methods of industrial manpower planning need to be revised so that proper linkages between academic institutions and the production sector can be further strengthened. The workshop, funded by the Governments of Japan and the Republic of Korea, will bring together high-level policy makers and planners from selected developing countries and expose them not only to the experience of Japan and the Republic of Korea in technical manpower planning, but also give them the opportunity to share experience and devise measures for the promotion of regional and subregional co-operation for human resources development related activities. The workshop is planned for mid-1991.

2. Diversified skill development for women in industry

While realizing that women's participation in industrial activities has increased, their involvement, however, has been limited to a few manufacturing sub-sectors with low levels of technology. The objective of the project on diversified skill development for women in industry is to assist the developing economies of the ESCAP region in strengthening and improving women's involvement and contribution in industrial activities, especially in the context of rapidly changing industrial structures and technological situations and options. The project will specifically attempt to prepare the policy

makers in planning and implementing skill diversification measures to enable the female industrial workers to acquire new skills emanating from the requirements for adopting modern technologies. Guidelines for a multi-sectoral approach in integrating the female labour force into manufacturing activities and in improving and diversifying their technical and managerial skills will also be developed.

The project, funded by UNDP and to be completed by the end of 1991, includes extensive surveys of female industrial workers in four metropolitan cities of South-East Asia for identification of new skills required, and aims to develop a prototype training programme for implementation at national levels. □

F. Investment Promotion and the Role of the Private Sector

ESCAP has always accorded high priority for activities related to investment promotion. In the past, the secretariat organized various investment promotion meetings which were seen as highly beneficial to developing countries of the region. Such meetings were organized in Bangladesh and Nepal, 1984 and 1989. The secretariat also co-operated with UNIDO in the organization of solidarity ministerial meetings in the developing countries of the region.

Currently, the secretariat is co-operating with UNIDO in the organization of an investment promotion forum in Viet Nam. Activities in this area relate to provisions of expertise in training of persons for preparation of project profiles, screening and assistance in sound industrial project preparations and in the organization of an investment forum.

The secretariat is also collaborating with UNDP and the Government of Nepal in the organization of another investment promotion meeting in Nepal. A project document has been prepared and is under consideration of the Government of Nepal. It is expected that this meeting will be held in 1991.

The secretariat is undertaking a comprehensive study on overall investment promotion measures and enhancement of the role of the private sector in accelerating the pace of industrialization in the developing economies of the region. Currently, country studies are being prepared. The secretariat will shortly

commence a regional study dealing with issues, challenges and prospects for industrial investment promotion. The study will dwell on critical assessments of national policies and strategies currently underway in developing economies of the region, and will suggest concrete measures for promotion of inter- and intra-regional co-operation in this respect. A regional seminar will be organized in 1991 to deliberate on the regional study. The project is funded by the Government of the Netherlands.

The secretariat is preparing a comprehensive programme for investment promotion, especially taking into account the needs and requirements of the least developed economies of the region. In this context, the Commission at its forty-sixth session, held in 1990, adopted the following resolution on the promotion of foreign investment in least developed countries of Asia and the Pacific:

The Economic and Social Commission for Asia and the Pacific,

Recalling the Substantial New Programme of Action for the 1980s for the Least Developed Countries, in which it was recommended that the least developed countries should aim at increasing their growth of manufacturing output to an overall annual rate of 9 per cent or more,

Recalling also its resolution 235 (XL) of 27 April 1984 on the Tokyo Programme on Technology for Development in

Asia and the Pacific, in which the Executive Secretary was requested, *inter alia*, to initiate measures for the technological development of the least developed, land-locked and island developing countries,

Recalling further the recommendation of the Meeting of Ministers of Industry and Technology of ESCAP members and associate members held in 1986, which emphasized that increased external resource transfers to the least developed countries could greatly facilitate their industrial and technological development,

Bearing in mind that inadequate finance and investment funds have hampered industrial development in the least developed countries,

1. *Requests* the Executive Secretary to assist the least developed countries in their overall investment promotion activities, including joint ventures and technical and other forms of collaboration, specifically through:

(a) Provision of assistance in the preparation of country profiles dealing with information on investment opportunities in least developed countries for prospective foreign investors;

(b) Assistance in identification of projects and preparation of project profiles;

(c) Organization of entrepreneurial, managerial and other skill development programmes, including negotiation techniques and technology transfer;

(d) Organization of investment promotion meetings in the developed countries between entrepreneurs from least developed countries and potential investors from developed countries and newly industrializing ESCAP members and associate members;

2. *Calls upon* the Executive Secretary to undertake activities, within available resources, aimed at strengthening the public sector and enhancing the role of the private sector in the least developed countries;

3. *Further calls upon* the Executive Secretary to seek cooperation from relevant international organizations, especially the United Nations Industrial Development Organization, the United Nations Centre on Transnational Corporations, the International Trade Centre UNCTAD/GATT and the General Agreement on Tariffs and Trade, to implement the present resolution;

4. *Invites* donors to provide the necessary extrabudgetary resources to the secretariat to enable it to carry out the above activities;

5. *Requests* the Executive Secretary to report to the Commission at its forty-eighth session on the implementation of the present resolution. □

**Forthcoming Important Events:
Highlights**

3

Forthcoming Important Events: Highlights

A. Industrial Restructuring in Asia and the Pacific: Theme Topic for forty-seventh session of ESCAP

The Commission of the Economic and Social Commission for Asia and the Pacific (ESCAP) at its session held in 1989 deliberated on the theme "Restructuring the Developing Economies of Asia and the Pacific in 1990s", focusing on broad macro-economic issues. The forty-sixth session of the Commission held in 1990 pursued further the same theme, dealing with challenges and opportunities of restructuring the developing ESCAP economies in the 1990s with special reference to regional co-operation measures. After deliberating two consecutive years on overall economic restructuring and regional co-operation measures, the Commission at its forty-sixth session decided that industrial restructuring in Asia and the Pacific was the most appropriate theme for its forty-seventh session to be held in 1991.

1. Rationale

Despite the region's remarkable economic and industrial dynamism evident during the last decades, the developing economies of the region have now begun to face new challenges and opportunities in their efforts towards sustaining and enhancing industrial growth. The instabilities and recurring

shocks in the international economic environment, slow growth in world trade, virtually collapsing commodity prices with adverse effects on commodity trade, reduced access to foreign financing, and secular increases in real interest rates have compounded the structural weaknesses of several developing economies of the region. It is well established that a healthy international trading environment is imperative for strong economic growth for the successful industrialization of the developing economies of Asia and the Pacific, as most of them have small domestic markets which make them highly dependent on trade. Furthermore, trade-oriented economies and industrial growth patterns are highly sensitive to international economic conditions. This has been well demonstrated by the events of the past 28 years.

However, the economies of the region, especially those of East and South-East Asia, showed a remarkable ability to make appropriate policy adjustments. Their ability to make the necessary adjustments and retain growth was facilitated by their continuing forward movement in the world trading system (especially for manufactured goods), the availability of international capital and ready access to foreign technologies. The other economies of the region were

slower in implementing such adjustment measures and achieved lower rates of economic and industrial growth.

At present, the urgency of the problems in industrial development faced by the developing economies lies in higher capital ratios, the complex growth process owing to modern techniques and the unfavourable impact on them as a result of the prevailing international division of labour. These disadvantages more than offset the possible benefits reserved for latecomers who supposedly can omit some stages of technological development. As matters now stand, even after a considerable leap forward in industrialization, most Asian and Pacific developing countries can expect difficulties in penetrating world markets for industrial goods further, without improvement in their overall competitiveness.

It was, therefore, felt that in consideration of recent developments in the international economic situation and taking into account both the short- and long-term prospects for industrialization, Asian and Pacific developing economies should examine new ways and means of further penetrating the world market. Increasingly, they are expected and required to improve the competitiveness of their manufactured products by

moving into new products as well as seeking new means of increasing productivity for existing manufactured goods. Unless they are able to do so, these economies may lose their acquired competitive advantage and fail to capitalize the potential advantages in the manufacturing sector. It is, therefore, highly opportune that the economies of Asia and the Pacific examine their potential and opportunities for meeting both the external and internal demand for manufactured outputs through rationalization of their existing industrial and investment structures and by upgrading the technology levels for increased productivity.

Furthermore, in view of the past and present dynamism of the developing economies of the region and the likelihood of the continuation of such trends in the future, it would appear that in formulating industrial strategies and policies for the coming decades, high priority should be assigned to increasing trade not only with the industrialized countries but among developing countries themselves, especially within the region.

2. Objective of the Study

With this rationale in perspective, the secretariat is currently involved in the preparation of a comprehensive study on industrial restructuring. The main objective of the study is to assess critically and analyze the ongoing industrial structuring process in the Asian and the Pacific economies focusing on structural changes within the manufacturing sub-sector and to devise and recommend measures for strengthening regional co-operation, in order to achieve a desired course of industrial

restructuring in Asian and the Pacific economies.

The study will deal with the following issues of critical relevance to the economies of the region:

1. Global Industrial Trends and the Macro-Economic Framework for Industrial Restructuring;
2. Industrial Growth and Structural Changes in Manufacturing in ESCAP Economies;
3. The Role of Government and the Private Sector in Facilitating Industrial Restructuring;
4. Human Resources and Technological Requirements for Industrial Restructuring;
5. Trade and Investment: Their Inter-Linkages and Impulses for Industrial Restructuring;
6. Promotion of Linkages Between Small, Medium and Large Industries for Structural Changes in the Industrial Sector.

The study will recommend concrete measures for promotion and strengthening of inter- and intra-regional co-operation in the areas of trade, investment, technology flows and development including recommendations for national level actions for trade and industrial policy re-orientations.

The draft study is expected to be completed by the end of 1990 and will be reviewed by a high-level expert group meeting in January 1991 and will be

presented to the forty-seventh session of the Commission to be held at Seoul, the Republic of Korea. □

B. Asian and the Pacific Ministerial Meeting of Industry and Technology

The Economic and Social Commission for Asia and the Pacific (ESCAP), as the main arm of the United Nations system in the region, organized the first meeting of Ministers of Industry of the Asian and Pacific region in November 1977. The meeting comprehensively reviewed industrial progress in the region, including the policies and strategies pursued by different countries. It also decided to establish an *ad hoc* group of ministers of industry with the principal objective of undertaking and providing guidelines for the re-orientation of industrial policies and strategies through periodic reviews of the progress and developments in industrialization in the light of changing industrial and technological environments.

The ministers, at a subsequent meeting in 1979, recommended that meetings of the Ministers of Industry be organized at more regular intervals. It was felt that such meetings provided a unique forum for discussing the possibilities of enhancing regional co-operation and sharing the experiences of their countries in industrialization, particularly regarding the process of re-orientating policies and strategies to achieve complementarity in national industrial development efforts towards effective acceleration of regional industrial development. In 1986, the areas of coverage were extended and the first Meeting of Ministers of Industry and Technology of the Asian and Pacific Region was held.

The proposed meeting of

ministers of industry and technology to be held in September 1991 would appropriately review the current industrial policies and strategies pursued in the Asian and Pacific region, examine the ongoing industrial restructuring process and, in the face of foreseen challenges resulting from current events on the global economic front, devise guidelines to maintain and improve the competitive position of the developing countries of the region. The countries should explore the potential for increased internal and external demand for manufactured goods and endeavour to improve the competitiveness, in terms of price and quality, of their products.

The issues to be deliberated include: How should the economies of the region expand domestic markets for manufactured products? How should the developing countries of the region improve manpower skills, indigenous technology and the application of advanced technologies in their industrial production processes in order to compete effectively in international markets? How should the financing system be established in order to make it more efficient in attracting additional finance and industrial investment in these Asian economies? How can economic relationships between the countries and economies of the region be enhanced to expand opportunities for intraregional trade and to encourage complementarity in their production and trade structures? How can the developing economies of Asia and the

Pacific encourage more foreign direct investment to contribute to national industrialization efforts while minimizing the possible negative effects? What kind of technology climate should be established at the national level which would favour rapid industrial growth? Are the linkages between research and development activities in academic research institutions and the industrial enterprises strong enough to promote such growth? How can developing countries follow a steady path of environmentally sound and sustainable industrial development? These are the major challenges that require fresh responses by policy makers if accelerated industrialization and further penetration of international markets is to be achieved by Asian and Pacific developing countries in the 1990s and beyond.

The two-day ministerial meeting, preceded by a three-day meeting of the senior officials, is expected to deliberate extensively on the following issues and evolve a collective strategy for accelerating the pace of industrialization in the Asian and the Pacific region:

- (a) Policies and strategies for promoting competitiveness of manufactured products;
- (b) Creation of an appropriate climate for technological capability enhancement for industrial development;
- (c) Development of industrial and technological

skills: prospects for regional co-operation in industrial training and skills development;

- (d) Investment promotion and industrial financing in developing countries of the region;
- (e) Co-operative measures for industrial development and upgrading of technology in the least developed and island developing countries of Asia and the Pacific;
- (f) Environmentally sound and sustainable industrial and technological development.
- (g) Regional strategy and action plan for industrial and technological development.

These issues were suggested by the first session of the Committee on Industry, Technology and Human Settlements held in September 1989 and later endorsed by the Commission at the forty-sixth session in June 1990.

The Commission at its forty-sixth session urged potential donors to provide extrabudgetary resources for the preparation and successful organization of the Meeting of Ministers of Industry and Technology. It also emphasized the need for extrabudgetary assistance to facilitate the participation of the least developed and island developing countries in such an important forum. □

**ESCAP's Advisory Services to
Members and Associate Members
in the Areas of Technology
Transfer, Environmental
Management and Industrial
Development**

4

ESCAP's Advisory Services to Members and Associate Members in the Areas of Technology Transfer, Environmental Management and Industrial Development

The ESCAP Division of Industry, Human Settlements and Environment provides advisory services to ESCAP members and associate members in the fields of (a) technology transfer and development, (2) environmental management, and (3) industrial development, upon request. These services are provided free of charge. The costs of travel and stay of the advisers in requesting countries are borne by ESCAP. The duration of such services would depend on the requirements of the Governments but do not exceeding a period of six weeks at a time.

1. Regional Adviser on Technology Transfer and Development

The type of advisory services to be provided by the adviser relates to: (1) promotion and strengthening of agencies engaged in technology transfer and industrial investment promotion measures, (2) organization of national training courses for the upgrading of capabilities for negotiation, drafting and execution of technology acquisition contracts and preparation of relevant training materials, (3) *ad hoc* advisory assistance to

the private and public sectors on contractual and legal questions in connection with technology acquisition contracts, (4) setting up and modification of laws and regulations on technology transfer and other necessary infrastructure, (5) co-operation and co-ordination activities in the field of technological development and national and international agencies, and (6) identification of suppliers of technology.

2. Regional Adviser on Environmental Management

The adviser provides services to the developing economies of ESCAP in the field of environmental protection and management, through: (1) assistance in the review of national policies and related legal and institutional frameworks for environmentally sound and sustainable development, (2) assistance in the preparation of environmental guidelines and technical inputs for implementation of environmental management projects, and (3) assistance in development and implementation of training programmes for environmental protection and management.

3. Regional Adviser on Industrial Development^{1/}

The adviser provides assistance to requesting countries in the areas of: (1) industrial policy and strategies formulation and re-orientation, (2) development of specific sectoral industries, (3) promotion of industrial investment and joint ventures, and (4) industrial skills development and promotion.

Interested countries could request these services by writing to:

Chief
Division of Industry, Human Settlements and Environment,
Economic and Social Commission
for Asia and the Pacific
(ESCAP)
United Nations Building
Rajdamnern Avenue
Bangkok 10200, Thailand.

Request for such services could also be made to ESCAP through the country offices of United Nations Development Programme (UNDP). □

^{1/} This position is now vacant and is expected to be filled by early 1991.

Selected Data and Information

5

Selected Data and Information

Table 1. Developing Asia: Selected Indicators

	1988	1989	1990	1991
Gross Domestic Product^a	Annual percentage change			
Developing Asia	9.3	5.4	5.9	6.3
Newly Industrializing Economies	9.4	6.4	6.2	6.8
South-East Asia	8.0	7.8	7.2	7.3
South Asia	8.5	4.4	5.3	5.2
China	10.9	4.0	5.5	6.5
South Pacific	2.5	2.9	-0.8	2.6
Inflation^a	Percentage change in consumer price index			
Developing Asia	10.8	11.1	8.1	7.5
Newly Industrializing Economies	4.9	5.8	5.7	5.8
South-East Asia	6.1	6.6	7.7	6.6
South Asia	9.4	11.8	10.0	8.9
China	20.7	18.0	9.0	8.5
South Pacific	6.9	6.1	8.3	9.3
Resource Gap^a	Percentage of GDP			
Developing Asia	1.2	0.0	-0.6	-1.1
Newly Industrializing Economies	8.3	3.7	1.8	0.3
South-East Asia	2.7	1.3	1.1	0.5
South Asia	-3.6	-3.9	-3.6	-3.4
China	-2.0	-0.5	-1.0	-1.0
South Pacific	-3.6	-9.7	-13.0	-13.5
Current Account	Billions of US dollars			
Developing Asia	13.3	0.8	-0.6	-1.3
Newly Industrializing Economies	29.1	23.2	20.6	17.4
South-East Asia	-3.1	-7.4	-8.3	-7.7
South Asia	-8.7	-10.2	-10.3	-10.3
China	-3.9	-4.0	-1.3	0.4
South Pacific	-0.1	-0.7	-1.3	-1.1
Debt-Service Ratio^b	Percentage of goods and services exports			
Developing Asia	15.6	14.0	13.2	12.6
Newly Industrializing Economies	6.9	5.7	4.2	3.6
South-East Asia	30.1	25.1	24.3	23.3
South Asia	27.3	26.1	24.9	23.9
China	9.3	12.2	13.7	14.4
South Pacific	26.1	29.3	33.7	33.5

^a Computation of averages excludes Lao People's Democratic Republic and Viet Nam.

^b Computation of averages excludes Hong Kong, Singapore, Lao People's Democratic Republic and Viet Nam.

Source: ADB, *Asian Development Outlook 1990*, p. 6.

Table 2. Selected developing economies of the ESCAP region:
Growth and structure of gross domestic product,
1970-1989

(Percentage)

		GDP ^h	Growth rates			Shares		
			Agriculture	Industry	Services	Agriculture	Industry	Services
East Asia								
China ^{a,b}	1970	..	..	..	..	41.2	35.9	22.9
	1980	6.4	..	..	..	32.0	48.0	20.0
	1985	13.1	1.7	19.6 ^c	..	35.4	50.8	13.8
	1986	8.0	3.7	9.6 ^c	..	34.5	51.8	13.7
	1987	10.5	4.8	14.3 ^c	..	33.8	52.3	13.8
	1988	11.4	3.2 ^d	20.7 ^{c,d}	..	..	..	..
	1989	4.0	..	..	..	24.3	60.7	15.0
Hong Kong	1970	5.7	..	..	..	2.2	36.5	61.4
	1980	10.9	..	..	..	0.9	32.0	67.2
	1985	-0.1	..	..	..	0.5	29.8	69.7
	1986	11.9	..	..	..	0.5	30.2	69.3
	1987	13.8	..	..	..	0.4	29.3	70.3
	1988	7.3	..	..	..	..	..	..
	1989	2.5	..	..	..	0.4	28.8	70.9
Republic of Korea	1970	8.5	-0.4	15.9	11.3	28.0	22.4	49.6
	1980	-3.0	-19.9	-0.8	1.9	14.2	37.8	48.1
	1985	6.9	3.8	6.9	7.9	12.8	41.8	45.3
	1986	12.4	4.6	16.1	11.2	11.9	43.2	44.8
	1987	11.8	-6.8	16.5	12.3	9.9	45.0	45.0
	1988	11.3	9.0	11.7	11.4	9.7	45.2	45.0
	1989 ^e	6.5	..	..	..	9.0	45.2	45.8
South-East Asia								
Indonesia	1970	7.5	2.9	11.9	12.0	46.0	20.9	33.1
	1980	9.9	5.2	12.5	11.8	23.3	41.6	35.1
	1985	2.5	4.2	0.9	3.1	24.0	37.1	38.9
	1986	4.0	2.6	4.4	4.5	23.6	37.3	39.1
	1987	3.6	2.6	1.9	5.7	23.4	36.7	39.9
	1988	5.7	..	..	..	23.1	36.8	40.1
	1989	6.2	..	..	..	20.5	40.3	39.3
Malaysia	1970	..	5.5	11.3	9.1	32.0	24.7	43.3
	1980	7.4	1.3	6.7	11.9	22.9	35.8	41.3
	1985	-1.0	2.5	-3.4	-0.6	20.8	36.6	42.5
	1986	1.2	4.0	4.7	-3.1	21.4	37.9	40.7
	1987	5.2	7.4	6.2	3.0	21.9	38.3	39.8
	1988	8.7	4.4	11.8	5.7	21.2	39.7	39.1
	1989	7.6	3.4	10.4	6.3	20.2	41.0	38.7
Philippines	1970	4.6	2.2	6.2	4.6	28.8	29.4	41.8
	1980	5.2	4.7	4.7	6.2	25.6	36.1	38.3
	1985	-4.2	3.5	-10.2	-3.9	29.2	32.2	38.7
	1986	1.4	3.0	-2.1	1.4	29.7	31.1	39.0
	1987	4.7	-1.1	7.7	7.6	28.1	32.0	39.8
	1988	6.3	3.7	8.5	6.6	27.4	32.7	39.9
	1989 ^e	5.6	2.3	6.9	5.8	26.9	33.1	40.0

Table 2. (Continued)

		GDP ^h	Growth rates			Shares		
			Agriculture	Industry	Services	Agriculture	Industry	Services
Singapore	1970	13.7	5.0	20.5	11.0	2.3	29.8	67.9
	1980	9.7	1.2	10.0	9.6	1.1	38.8	60.0
	1985	-1.6	-10.5	-9.3	3.4	0.8	36.6	62.2
	1986	1.8	-10.8	-0.9	3.6	0.6	35.6	63.7
	1987	8.8	-10.3	10.4	8.2	0.5	36.1	63.3
	1988	11.0	-11.7	13.3	10.0	0.4	36.9	62.7
	1989 ^f	9.1	-4.5	7.6	10.1	0.4	36.6	63.0
Thailand	1970	6.9	3.1	5.6	10.4	30.2	25.7	44.1
	1980	4.8	1.7	3.6	6.9	20.6	30.8	48.6
	1985	3.5	6.2	-0.1	4.7	19.9	29.9	50.1
	1986	4.5	0.2	7.1	4.6	19.1	30.7	50.2
	1987	8.4	-2.0	12.0	10.1	17.3	31.7	51.0
	1988	11.0	8.6	12.8	10.7	16.9	32.2	50.9
	1989	10.4	..	..	..	15.9	33.7	50.5
South Asia								
India	1970	..	8.1	..	4.9	44.5	24.0	31.5
	1980	6.5	12.5	3.2	4.3	38.0	25.9	36.1
	1985	6.6	0.3	8.2	7.3	33.9	28.6	37.5
	1986	4.6	-2.3	8.4	6.2	31.9	29.8	38.3
	1987	4.4	-1.0	6.5	5.1	30.5	30.7	38.9
	1988	10.0	..	..	..	30.3	30.2	39.5
	1989 ^g	4.5	..	..	..	30.9	30.8	40.3
Pakistan	1970	9.8	9.5	14.8	7.2	38.9	22.7	38.4
	1980	8.7	6.7	10.7	5.8	30.6	25.6	43.8
	1985	8.2	10.9	7.8	7.9	27.4	23.4	49.2
	1986	7.8	5.9	8.1	5.8	27.3	23.7	49.0
	1987	5.4	2.2	7.8	6.4	26.6	24.4	49.0
	1988	5.3	2.7	8.7	6.8	25.8	25.0	49.3
	1989	5.1	6.1	3.9	5.2	26.0	24.7	49.3
Sri Lanka	1970	..	4.0	8.5	2.7	31.8	16.0	52.2
	1980	5.7	3.1	4.0	8.0	26.5	27.4	46.1
	1985	5.0	8.6	3.5	3.8	25.9	25.6	48.5
	1986	4.3	2.6	6.1	4.2	25.5	26.0	48.5
	1987	1.4	-5.8	6.3	2.7	23.6	27.3	49.1
	1988	2.7	2.1	4.2	2.2	23.5	27.7	48.8
	1989	3.2	..	..	..	22.0	28.9	49.1
Least developed countries								
Bangladesh	1970	..	..	..	..	55.3	15.9	28.8
	1980	1.3	0.2	-4.9	5.8	42.0	15.3	42.4
	1985	3.7	0.9	6.2	6.3	41.7	15.8	42.3
	1986	4.2	3.3	2.6	5.7	41.4	15.7	42.9
	1987	4.5	0.4	8.1	7.1	39.8	16.3	44.0
	1988	2.5	-1.0	4.8	4.9	38.4	16.6	45.0
	1989	2.4	0.0	4.9	3.6	37.4	17.1	45.5
Bhutan	1970	..	..	..	..	..	..	..
	1980	..	..	..	..	..	..	..
	1985	3.7	3.4	0.5	4.3	54.9	17.3	29.5

Table 2. (Continued)

		GDP ^h	Growth rates			Shares		
			Agriculture	Industry	Services	Agriculture	Industry	Services
	1986	9.2	5.6	12.3	16.6	52.6	17.6	31.2
	1987	17.8	5.1	71.9	9.0	46.9	25.7	28.8
	1988 ^e	7.7	5.9	12.1	6.2	45.6	27.5	26.9
	1989 ^e	5.6	6.0	4.2	6.3	45.8	27.1	27.1
Maldives	1970	..	..	..	..	..	..	..
	1980	..	28.0	8.4	28.6	34.4	15.5	50.1
	1985	16.2	12.1	12.1	15.2	29.4	15.7	54.9
	1986	7.1	4.4	7.6	11.1	28.2	15.5	56.2
	1987	13.9	-1.3	33.9	12.8	27.4	15.6	57.0
	1988	8.7	4.9	9.5	10.3	26.4	15.7	57.8
	1989	9.3	5.4	10.0	10.9	25.5	15.8	58.7
Myanmar	1970	5.2	3.6	4.2	6.3	38.3	14.7	47.0
	1980	7.9	10.3	9.2	5.8	37.2	15.2	47.6
	1985	3.2	2.4	2.2	4.2	37.3	15.8	46.9
	1986	1.0	1.1	-1.2	1.6	37.3	15.5	47.2
	1987	2.2	1.3	2.8	2.7	37.0	15.6	47.4
	1988	2.3	3.1	3.2	1.4	37.3	15.7	47.0
	1989	3.2	..	..	..	51.1	12.2	36.7
Nepal	1970	2.6	3.2	2.6	0.7	67.5	11.4	21.0
	1980	-2.3	-4.8	..	..	61.8	11.9	26.3
	1985	9.8	2.4	--- 12.2 ---	---	59.2	--- 40.8 ---	---
	1986	3.9	5.1	--- 3.1 ---	---	59.7	--- 40.3 ---	---
	1987	2.4	1.0	--- 5.7 ---	---	58.4	--- 41.5 ---	---
	1988	7.1	8.6	--- 11.3 ---	---	57.9	--- 42.1 ---	---
	1989	1.5	6.8	--- -5.7 ---	---	58.6	15.0	26.4
Pacific island economies								
Fiji	1970	6.0 ⁱ	16.9	10.7	2.3	26.8	19.8	53.4
	1980	-1.3	-6.5	1.3	-0.8	22.5	21.7	53.4
	1985	-4.6	-13.7	-6.9	-4.5	22.1	18.4	59.6
	1986	-8.8	-18.5	-16.9	-2.6	24.0	19.8	56.2
	1987	-7.8	-5.8	-14.9	-6.2	24.6	18.2	57.2
	1988	-2.5	-0.2	-15.4	1.4	24.7	15.8	59.5
	1989	12.5	..	..	..	23.5	18.1	58.6
Papua New Guinea	1970	..	-0.3	12.7	17.4	40.1	17.4	42.5
	1980	-2.3	..	..	..	..	..	..
	1985	4.8	..	..	..	..	..	..
	1986	5.0	..	..	..	..	..	..
	1987	4.8	..	..	..	..	..	..
	1988	5.2	..	..	..	..	..	..
	1989	..	..	..	..	..	..	..
Solomon Islands	1970	4.9	..	..	..	..	..	..
	1980	-6.0	..	..	..	..	..	..
	1985	3.7	-0.7	20.5	7.2	52.6	9.2	38.3
	1986	-0.5	-4.5	8.0	2.8	50.5	10.0	39.6
	1987	-0.3	-8.1	-5.4	1.1	48.6	9.9	41.9
	1988	5.0	..	..	..	..	..	..
	1989	..	..	..	..	..	..	..

Table 2. (Continued)

	GDP ^h	Growth rates			Shares		
		Agriculture	Industry	Services	Agriculture	Industry	Services
Tonga	1970	..	..	..	..	..	..
	1980	15.9	29.9	-3.8	11.2	47.6	11.0
	1985	7.4	9.0	7.1	6.0	41.8	18.3
	1986	3.3	3.3	-1.9	5.6	41.8	17.4
	1987	3.5	3.6	2.9	3.3	41.8	17.3
	1988	-1.9	10.8	5.6	4.4	38.0	18.6
	1989	..	..	..	..	..	..

Sources: ADB, *Asian Development Outlook 1990, Key Indicators of Developing Member Countries of ADB*, vol. XX (July 1989), vol. XIV (April 1983) and vol. X (April 1979); Christopher Browne and Douglas A. Scott, *Economic Development in Seven Pacific Island Countries* (Washington, D.C., IMF, 1989); and national sources.

- a National income for China, 1989 is World Link Model forecast and services sector comprises transport and commerce only.
- b Sectoral shares were calculated on the current prices basis.
- c Excludes construction.
- d Output value.
- e Projections.
- f Actual for the first two quarters over the same period of previous year.
- g Unofficial estimate.
- h Varying base years from country to country.
- i 1971.

Table 3. Growth rate of value added in industry
(Percentage per annum)

	Average 1971-80	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Newly Industrializing Economies												
Hong Kong	..	..	..	..	..	..	..	..	..	..	..	..
Korea, Rep. of	14.2	6.7	8.2	16.9	15.0	6.9	16.1	16.5	11.7	5.9	6.5	6.7
Singapore	9.8	10.8	4.9	9.9	9.8	-9.3	-0.9	10.4	13.3	8.3	6.3	6.5
South-East Asia												
Indonesia	12.5	8.7	-1.4	3.0	9.4	-0.4	6.6	5.2	5.4	7.0	6.5	6.8
Lao People's Democratic Rep.	..	..	19.4	10.8	6.1	18.8	18.4	4.2	-1.0	2.5	3.5	3.5
Malaysia	9.1	3.5	6.7	10.4	11.5	-3.4	4.7	6.5	12.8	10.9	9.2	10.0
Philippines	8.3	4.8	2.1	0.7	-10.3	-10.2	-2.1	7.8	8.5	7.1	6.1	7.8
Thailand	12.0	5.8	3.1	8.1	8.5	-0.1	7.1	12.0	14.7	14.9	13.8	12.2
Viet Nam	..	..	..	..	..	12.0	4.1	10.9	8.5	10.6	11.0	11.0
South Asia												
Bangladesh	7.2	7.5	1.8	-0.4	9.9	8.8	2.7	8.1	5.3	4.9	8.2	8.0
India	4.0	7.9	4.7	9.7	6.5	8.2	8.4	6.5	8.8	6.0	8.0	7.7
Myanmar	4.7	7.3	6.7	4.0	9.4	2.3	-6.3	-6.1	-4.2	8.8	8.7	8.7
Nepal	..	..	..	..	..	..	..	..	..	..	..	..
Pakistan	6.1	6.6	10.7	4.9	7.1	7.8	8.1	8.6	8.7	3.9	5.0	6.0
Sri Lanka	5.0	5.8	-1.0	-1.0	14.0	4.9	8.1	5.3	4.6	1.9	4.6	5.0
China	8.9	4.3	7.8	11.2	16.3	21.4	11.7	17.7	20.8	6.8	8.0	10.0
South Pacific												
Fiji	4.9	6.4	-5.8	-7.4	2.1	-6.9	16.9	-12.5	-7.8	19.7	9.8	7.8
Papua New Guinea	..	..	..	..	..	..	..	..	..	..	..	..

Source: ADB, *Asian Development Outlook 1990*.

Table 4. Structure of manufacturing

	Value added in manufacturing (millions of US dollars)		Distribution of manufacturing value added (percentage; current prices)									
			Food, beverages, and tobacco		Textiles clothing		Machinery and transport equipment		Chemicals		Others	
	1970	1987	1970	1987	1970	1987	1970	1987	1970	1987	1970	1987
Newly Industrializing Economies												
Hong Kong	1,013	9,825	4	6	41	40	16	19	2	2	36	33
Korea, Rep. of	1,880	42,286	26	12	17	17	11	28	11	8	36	35
Singapore	379	5,741	12	5	5	4	28	52	4	12	51	27
South-East Asia												
Indonesia	994	12,876	..	22	..	13	..	8	..	9	..	48
Lao People's Democratic Rep.	..	47	..	..	..	..	..	..	..	..	..	..
Malaysia	500	..	26	21	3	6	8	22	9	15	54	37
Philippines	1,622	8,424	39	43	8	8	8	8	13	10	32	30
Thailand	1,130	11,543	43	29	13	18	9	13	6	7	29	33
Viet Nam	..	..	..	..	..	..	..	..	..	..	..	..
South Asia												
Bangladesh	387	1,313	30	26	47	32	3	5	11	16	10	21
Bhutan	..	16	..	..	..	..	..	..	..	..	..	..
India	7,928	43,331	13	12	21	15	20	26	14	15	32	32
Myanmar	..	..	..	..	..	..	..	..	..	..	..	..
Nepal	32	165	..	..	..	..	..	..	..	..	..	..
Pakistan	1,462	5,001	24	34	38	19	6	9	9	14	23	24
Sri Lanka	321	967	26	..	19	..	10	..	11	..	33	..
China	30,466	92,800	..	12	..	14	..	25	..	11	..	38
South Pacific												
Papua New Guinea	35	227	25	..	1	..	37	..	5	..	33	..
Developed Economies												
Australia	9,051	31,547	16	18	9	7	24	21	7	8	43	45
Japan	73,339	689,295	8	10	8	5	34	37	11	10	40	38
New Zealand	1,777	7,101	24	26	13	10	15	16	4	6	43	43

Source: World Bank, *World Development Report 1990*, (Oxford University Press), pp. 188-189.

Table 5. Growth of merchandise trade

	Merchandise trade (millions of US dollars)		Average annual growth rate (percentage)				Terms of trade (1980 = 100)	
	Exports	Imports	Exports		Imports		1985	1988
	1988	1988	1965-80	1980-88	1965-80	1980-88		
Newly Industrializing Economies								
Hong Kong	63,161	63,894	9.5	12.3	8.3	10.4	103	105
Korea, Rep. of	60,696	51,811	27.2	14.7	15.2	9.9	106	108
Singapore	39,205	43,765	4.7	7.3	7.0	4.9	101	101
South-East Asia								
Indonesia	19,677	15,732	9.6	2.9	14.2	-2.1	94	70
Lao People's Democratic Rep.	58	188	..	..	..	..	..	..
Malaysia	20,848	16,584	4.4	9.4	2.9	0.4	87	74
Philippines	7,074	8,159	4.7	0.4	2.9	-1.7	92	110
Thailand	15,806	17,876	8.5	11.3	4.1	6.2	74	82
Viet Nam	..	..	..	..	..	..	..	..
South Asia								
Bangladesh	1,231	2,987	..	6.1	..	3.3	124	111
Bhutan	..	..	..	..	..	..	..	..
India	14,600	22,500	3.7	4.7	1.6	5.4	114	119
Myanmar	..	..	..	..	..	..	..	..
Nepal	186	628	-2.3	5.5	3.0	7.0	91	93
Pakistan	4,362	7,521	4.3	8.4	0.4	3.8	88	106
Sri Lanka	1,472	2,241	0.5	5.8	-1.2	3.4	99	102
China	47,540	55,251	5.5	11.9	7.9	13.1	95	84
South Pacific								
Fiji	..	..	..	..	..	..	..	..
Papua New Guinea	..	..	..	..	..	..	..	..
Developed Economies								
Australia	25,283	29,318	5.5	5.8	0.9	3.0	89	74
Japan	264,722	183,252	11.4	5.3	4.9	5.0	112	157
New Zealand	8,785	7,304	4.2	3.9	1.1	3.5	97	110

Source: World Bank, *World Development Report 1990*, (Oxford University Press), pp. 204-205.

Table 6. Merchandise exports
(fob in millions of US dollars)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Newly Industrializing Economies	84,549	83,074	90,615	107,499	108,628	130,241	175,291	221,160	246,610	270,310	300,470
Hong Kong	21,808	20,984	21,954	28,317	30,184	35,440	48,475	63,200	74,600	81,700	94,000
Korea, Rep. of	20,671	20,879	23,204	26,335	26,442	33,913	46,244	59,648	61,100	66,900	74,600
Singapore	19,662	19,435	20,429	22,662	21,533	21,336	27,274	37,992	43,200	47,000	51,510
South-East Asia	47,670	43,609	44,314	50,599	46,152	42,430	53,200	64,224	76,637	87,442	101,748
Indonesia	23,348	19,747	18,689	20,754	18,527	14,396	17,206	19,382	21,880	24,840	27,940
Lao People's Democratic Rep.	23	40	41	44	54	53	60	60	55	69	86
Malaysia	11,675	11,966	13,683	16,407	15,133	13,547	17,754	20,848	25,300	28,020	33,200
Philippines	5,722	5,021	5,005	5,391	4,629	4,842	5,720	7,074	7,640	8,400	9,660
Thailand	6,902	6,835	6,308	7,338	7,059	8,803	11,595	15,781	20,260	24,150	28,310
Viet Nam	..	..	588	665	750	789	866	1,078	1,502	1,963	2,552
South Asia	13,697	13,860	14,909	15,560	14,900	16,001	18,732	21,428	24,060	26,703	29,815
Bangladesh	791	768	724	932	1,000	880	1,077	1,291	1,389	1,574	1,780
India	8,437	9,226	9,770	10,192	9,465	10,248	11,884	13,714	15,785	17,758	19,925
Myanmar	533	423	375	364	311	331	277	349	603	651	703
Nepal	144	88	102	130	161	143	162	196	170	161	150
Pakistan	2,730	2,341	2,877	2,480	2,648	3,191	3,938	4,405	4,638	4,917	5,408
Sri Lanka	1,063	1,014	1,061	1,462	1,316	1,209	1,394	1,473	1,475	1,641	1,848
China	22,027	21,125	20,707	23,905	25,108	25,756	34,734	41,054	46,000	50,600	56,700
South Pacific	1,116	1,021	1,037	1,142	1,129	1,277	1,513	1,782	1,590	1,530	1,582
Fiji	278	251	217	228	208	246	313	345	399	459	504
Papua New Guinea	838	770	819	914	921	1,031	1,200	1,437	1,191	1,071	1,078

Source: ADB, *Asian Development Outlook 1990*, p. 233.

Table 7. Growth rate of merchandise exports
(percentage per annum)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Newly Industrializing Economies	12.9	-1.7	9.1	18.6	1.1	19.9	34.6	26.2	11.5	9.6	11.2
Hong Kong	10.5	-3.8	4.6	29.0	6.6	17.4	36.8	30.4	18.0	9.5	15.1
Korea, Rep. of	20.1	1.0	11.1	13.5	0.4	28.3	36.4	29.0	2.4	9.5	11.5
Singapore	8.0	-1.2	5.1	10.9	-5.0	-0.9	27.8	39.3	13.7	8.8	9.6
South-East Asia	1.6	-8.5	1.6	14.2	-8.8	8.1	25.4	20.7	19.3	14.1	16.4
Indonesia	7.1	-15.4	-5.4	11.0	-10.7	-22.3	19.5	12.6	12.9	13.5	12.5
Lao People's Democratic Rep.	..	73.2	2.0	7.6	22.1	-1.1	12.7	1.1	-9.2	26.0	25.0
Malaysia	-9.3	2.5	14.3	19.9	-7.8	10.5	31.1	17.4	21.4	10.7	18.5
Philippines	-1.1	-12.3	-0.3	7.7	-14.1	4.6	18.1	23.7	8.0	9.9	15.0
Thailand	7.0	-1.0	-7.7	16.3	-3.8	24.7	31.7	36.1	28.4	19.2	17.2
Viet Nam	..	..	..	13.1	12.8	5.2	9.7	24.6	40.0	30.0	30.0
South Asia	3.3	1.2	7.6	4.4	-4.2	7.4	17.1	14.4	12.3	11.0	11.7
Bangladesh	-0.3	-2.8	-5.8	28.7	7.3	-12.0	22.4	19.9	7.6	13.3	13.1
India	1.6	9.4	5.9	4.3	-7.1	8.3	16.0	15.4	15.1	12.5	12.2
Myanmar	24.4	-20.7	-11.3	-3.0	-14.6	6.4	-16.2	26.0	72.7	8.0	8.0
Nepal	41.2	-39.3	15.9	28.2	24.0	-11.6	13.7	20.5	-13.1	-5.0	-7.0
Pakistan	6.3	-14.2	22.9	-13.8	6.8	20.5	23.4	11.9	5.3	6.0	10.0
Sri Lanka	0.1	-4.6	4.7	37.7	-10.0	-8.2	15.3	5.7	0.1	11.3	12.6
China	19.1	-4.1	-2.0	15.4	5.0	2.6	34.9	18.2	12.0	10.0	12.1
South Pacific	-18.8	-8.5	1.5	10.2	-1.1	13.0	18.3	17.8	10.8	-3.8	3.4
Fiji	-18.9	-9.7	-13.6	5.0	-8.8	18.3	26.2	10.2	15.6	15.0	9.8
Papua New Guinea	-18.7	-8.1	6.4	11.6	0.8	11.9	16.4	19.8	17.1	10.1	0.7

Source: ADB, *Asian Development Outlook 1990*, p. 234.

Table 8. Structure of merchandise exports

	Percentage share of merchandise exports									
	Fuels minerals, and metals		Other primary commodities		Machinery and transport equipment		Other manufactures		Textiles and clothing	
	1965	1988	1965	1988	1965	1988	1965	1988	1965	1988
Newly Industrializing Economies										
Hong Kong	2	2	11	6	6	25	81	66	43	29
Korea, Rep. of	15	2	25	5	3	39	56	54	27	22
Singapore	21	15	44	11	11	47	24	28	6	5
South-East Asia										
Indonesia	43	49	53	22	3	1	1	28	0	8
Lao People's Democratic Rep.	..	25	..	65	..	0	..	10	..	..
Malaysia	35	18	59	37	2	26	4	19	0	4
Philippines	11	12	84	26	0	10	6	52	1	7
Thailand	11	3	84	45	0	11	4	41	0	17
Viet Nam	..	..	..	..	..	..	..	..	..	..
South Asia										
Bangladesh	..	2	..	29	..	0	..	69	..	67
Bhutan	..	..	..	..	..	..	..	..	..	..
India	10	9	41	18	1	11	48	62	36	25
Myanmar	5	3	94	86	0	7	0	3	0	..
Nepal	0	4	78	29	0	2	22	65	..	27
Pakistan	2	1	62	30	1	2	35	67	29	54
Sri Lanka	..	..	..	..	..	..	..	..	..	..
China	6	10	48	17	3	4	43	69	..	24
South Pacific										
Fiji	..	..	..	..	..	..	..	..	..	..
Papua New Guinea	..	..	..	..	..	..	..	..	..	..
Developed Economies										
Australia	13	37	73	38	5	8	10	17	1	1
Japan	2	1	7	1	31	65	60	33	17	2
New Zealand	1	8	94	68	0	6	5	19	0	2

Source: World Bank, *World Development Report 1990*, (Oxford University Press), pp. 208-209.

Table 9. Merchandise imports
(fob in millions of US dollars)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Newly Industrializing Economies	95,432	91,352	93,992	103,624	99,824	111,109	149,976	198,931	229,270	255,450	288,720
Hong Kong	24,765	23,553	24,013	28,567	29,705	35,365	48,469	63,900	75,100	82,300	95,100
Korea, Rep. of	24,299	23,473	24,967	27,371	26,461	29,707	38,585	48,203	56,700	64,000	72,460
Singapore	25,785	26,196	26,252	26,734	24,362	23,402	29,910	40,338	45,990	50,350	55,790
South-East Asia	45,309	45,937	49,095	45,501	39,546	38,039	45,614	57,695	76,795	89,636	104,211
Indonesia	16,542	17,854	17,726	15,047	12,705	11,938	12,532	13,656	16,580	19,070	21,940
Lao People's Democratic Rep.	110	132	150	162	193	186	216	188	219	256	306
Malaysia	11,780	12,719	13,251	13,426	11,556	10,301	11,918	15,289	20,980	24,800	28,940
Philippines	7,946	7,667	7,489	6,070	5,111	5,044	6,737	8,159	10,800	11,900	13,700
Thailand	8,931	7,565	9,169	9,235	8,391	8,415	12,019	17,856	25,160	29,790	34,550
Viet Nam	..	..	1,310	1,560	1,590	2,155	2,192	2,547	3,056	3,820	4,775
South Asia	25,160	25,125	24,313	25,456	26,041	26,779	29,357	33,405	36,563	39,318	42,470
Bangladesh	2,435	2,221	1,931	2,340	2,286	2,301	2,446	2,735	3,102	3,407	3,748
India	14,149	14,046	13,868	14,216	15,081	15,686	17,661	20,310	22,808	24,850	27,099
Myanmar	863	913	728	565	513	621	618	657	633	684	738
Nepal	362	406	468	403	444	437	512	673	679	754	829
Pakistan	5,656	5,744	5,592	6,234	5,878	5,971	6,254	7,012	7,299	7,520	7,820
Sri Lanka	1,695	1,794	1,726	1,699	1,839	1,764	1,866	2,018	2,042	2,103	2,235
China	20,292	16,876	18,717	23,891	38,231	34,896	36,395	46,369	51,500	54,100	57,900
South Pacific	1,641	1,458	1,396	1,354	1,257	1,297	1,534	1,598	2,037	2,382	2,484
Fiji	545	440	421	391	383	368	325	399	525	593	652
Papua New Guinea	1,096	1,018	975	963	875	929	1,209	1,199	1,512	1,789	1,832

Source: ADB, *Asian Development Outlook 1990*, p. 238.

Table 10. Growth rate of merchandise imports
(percentage per annum)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Newly Industrializing Economies	10.8	-4.3	2.9	10.2	-3.7	11.3	35.0	32.6	15.3	11.4	13.0
Hong Kong	10.5	-4.9	2.0	19.0	4.0	19.1	37.1	31.8	17.5	9.6	15.6
Korea, Rep. of	12.5	-3.4	6.4	9.6	-3.3	12.3	29.9	24.9	17.6	12.9	13.2
Singapore	15.1	1.6	0.2	1.8	-8.9	-3.9	27.8	34.9	14.0	9.5	10.8
South-East Asia	15.7	1.4	6.9	-7.3	-13.1	-3.8	19.9	26.5	33.1	16.7	16.3
Indonesia	31.0	7.9	-0.7	-15.1	-15.6	-6.0	5.0	9.0	21.4	15.0	15.0
Lao People's Democratic Rep.	..	8.2	8.2	8.2	19.3	6.6	16.4	-13.0	16.5	16.8	19.6
Malaysia	12.6	8.0	4.2	1.3	-13.9	-10.9	15.7	28.3	37.2	18.2	16.7
Philippines	2.8	-3.5	-2.3	-18.9	-15.8	-1.3	33.6	21.1	32.4	10.1	15.1
Thailand	6.9	-15.3	21.2	0.7	-9.1	0.3	42.8	48.6	40.9	18.4	16.0
Viet Nam	..	..	..	19.1	1.9	35.5	1.7	16.2	20.0	25.0	25.0
South Asia	1.8	-0.1	-3.2	4.7	2.3	2.8	9.6	13.8	9.5	7.5	8.0
Bangladesh	3.5	-8.8	-13.1	21.2	-2.3	0.6	6.3	11.8	13.4	9.8	10.0
India	1.4	-0.7	-1.3	2.5	6.1	4.0	12.6	15.0	12.3	9.0	9.0
Myanmar	9.5	5.8	-20.2	-22.5	-9.1	21.1	-0.5	6.3	-3.6	8.0	8.0
Nepal	10.5	12.1	15.3	-14.0	10.2	-1.7	17.4	31.3	0.9	11.0	10.0
Pakistan	3.9	1.6	-2.6	11.5	-5.7	1.6	4.7	12.1	4.1	3.0	4.0
Sri Lanka	-8.2	5.9	-3.8	-1.6	8.2	-4.0	5.8	8.1	1.2	3.0	6.3
China	-4.5	-16.8	10.9	27.6	60.0	-8.7	4.3	27.4	11.1	5.0	7.0
South Pacific	8.4	-11.2	-4.2	-3.0	-7.1	3.1	18.2	4.1	27.5	17.0	4.3
Fiji	10.5	-19.2	-4.3	-7.2	-2.1	-3.8	-11.9	22.8	31.5	13.0	10.0
Papua New Guinea	7.4	-7.2	-4.2	-1.2	-9.1	6.2	30.2	-0.9	26.1	18.3	2.4

Source: ADB, *Asian Development Outlook 1990*, p. 239.

Table 11. Structure of merchandise imports

	Percentage share of merchandise imports									
	Food		Fuels		Other primary commodities		Machinery and transport equipment		Other manufactures	
	1965	1988	1965	1988	1965	1988	1965	1988	1965	1988
Newly Industrializing Economies										
Hong Kong	25	7	3	2	13	6	13	27	46	58
Korea, Rep. of	15	6	7	12	26	17	13	35	38	30
Singapore	23	7	13	14	19	6	14	42	30	30
South-East Asia										
Indonesia	6	3	3	18	2	5	39	39	50	36
Lao People's Democratic Rep.	27	...	15	..	6	..	18	..	33	...
Malaysia	25	15	12	6	10	5	22	47	32	28
Philippines	20	10	10	13	7	7	33	20	30	50
Thailand	6	4	9	11	6	12	31	37	49	36
Viet Nam	..	...	...	...	...	..	...	...	..	...
South Asia										
Bangladesh	..	23	..	10	..	9	..	20	..	38
India	22	5	5	13	14	9	37	20	22	53
Myanmar	15	5	4	2	5	2	18	43	58	48
Nepal	22	6	5	8	14	6	37	22	22	57
Pakistan	20	14	3	19	5	13	38	28	34	25
Sri Lanka	41	17	8	17	4	3	12	27	34	37
China	36	2	0	2	25	6	12	41	27	49
South Pacific										
Fiji	..	..	..	..	..	..	..	..	..	..
Papua New Guinea	23	24	5	10	3	2	25	34	45	30
Developed Economies										
Australia	5	5	8	5	10	4	37	39	41	47
Japan	22	17	20	21	38	20	9	13	11	30
New Zealand	7	7	7	5	10	5	33	37	43	45

Source: World Bank, *World Development Report 1990*, (Oxford University Press), pp. 206-207.

Table 12. Organisation for Economic Co-operation and Development (OECD) imports of manufactured goods:
Selected ESCAP economies

	Value of imports of manufactures, by origin (millions of dollars)		Composition of 1988 imports of manufactures by high-income OECD Countries (percentage)				
	1968	1988	Textiles and Clothing	Chemicals	Electrical machinery and electronics	Transport equipment	Others
Newly Industrializing Economies							
Hong Kong	1,264	24,141	39	1	16	1	44
Korea, Rep. of	247	42,367	25	2	19	8	46
Singapore	36	13,858	6	5	33	2	54
South-East Asia							
Indonesia	10	3,339	33	3	1	0	62
Lao People's Democratic Rep.	0	2	77	5	4	1	13
Malaysia	28	6,047	16	3	58	0	23
Philippines	107	3,732	34	4	29	0	32
Thailand	25	5,892	28	2	14	1	55
Viet Nam	1	0	..	..	..	..	..
South Asia							
Bangladesh	0	774	84	0	0	0	16
India	553	7,069	41	4	1	0	54
Myanmar	3	22	37	8	0	2	52
Nepal	2	173	90	0	0	0	9
Pakistan	161	2,159	79	0	0	0	21
Sri Lanka	6	824	74	1	0	0	24
China	206	19,874	42	8	8	0	42
South Pacific							
Fiji	..	..	..	..	..	..	..
Papua New Guinea	3	20	5	0	1	11	82
Developed Economies							
Australia	368	4,989	3	36	4	6	51
Japan	5,760	164,334	1	3	19	30	46
New Zealand	79	1,447	11	25	6	3	54

Source: World Bank, *World Development Report 1990*, (Oxford University Press), pp. 210-211.

List of Selected Publications (Industrial Development)

- 1984 Technology for Development
- 1984 Technology for Development: Resolution – ESCAP Plan of Action
- 1986 Human Resources Development: Its Technological Dimensions (ST/ESCAP/422)
- 1986 Human Resources Development: Its Technological Dimensions – Resolution and ESCAP Plan of Action
- 1987 Human Resources Development Policy and Planning for Technology and Development
- 1989 Small Industry Bulletin for Asia and the Pacific, No. 24, 1989 (ST/ESCAP/SER.M/42)
- 1989 Promotion of Export-Oriented Small and Medium-Scale Industries (ST/ESCAP/706)
- 1989 Entrepreneurship Development for Small and Medium-Scale Industries in Selected Developing Countries (ST/ESCAP/705)
- 1989 Study on Investment Policies for the Development of the Private Sector in Selected Countries of the Region (ST/ESCAP/787)

Forthcoming Publications

- 1990 Transfer of Technology for Entrepreneurial Development in Bangladesh (ST/ESCAP/878)
- 1990 Regional Study on Transfer of Technology for Small and Medium Industries (ST/ESCAP/915)
- 1990 Proceeding of the Regional Seminar on Transfer of Technology for Small and Medium Industries (ST/ESCAP/908)
- 1990 ESCAP Training Manual on Technology Transfer (ST/ESCAP/862)
- 1991 Industrial restructuring in Asia and the Pacific
- 1991 Technological implications for industrial restructuring
- 1991 Promotion of linkages between small, medium and large industries
- 1991 Promoting international competitiveness and efficient resource utilization in manufacturing: Country studies on China, Bangladesh, India, Indonesia, Malaysia, Nepal, Pakistan, Philippines, Republic of Korea, Singapore, Sri Lanka and Thailand
- 1991 Regional study on competitiveness and efficient resource utilization in manufacturing in Asia and the Pacific
- 1991 Small Industry Bulletin for Asia and the Pacific, No. 25
- 1991 Industrial Development News for Asia and the Pacific, No. 20

* Enquiries on availability of these publications should be addressed to:

The Chief
 Division of Industry, Human Settlements and Environment
 Economic and Social Commission for Asia and the Pacific (ESCAP)
 United Nations Building
 Rajdamnern Avenue
 Bangkok 10200
 Thailand

كَيْفِيَّةُ الْحَصُولِ عَلَى مَشْتَرَاتِ الْاُمَمِ الْمُتَّحِدَةِ

يُكْفَى الْحَصُولُ عَلَى مَشْتَرَاتِ الْاُمَمِ الْمُتَّحِدَةِ مِنَ الْكُتُبَاتِ وَدَوْرِ التَّوْزِيعِ فِي سَائِرِ اَنْحَاءِ الْعَالَمِ . اسْتَلِمُ مِنْهَا مِنَ الْكُتْبَةِ الَّتِي تَتَمَلَّكُهَا
أَوْ اَكْتَبِ إِلَى : الْاُمَمِ الْمُتَّحِدَةِ ، نَسَمِ الْبَيْعِ فِي نِيُو يورْكِ أَوْ فِي جِنِيفِ .

如何获取联合国出版物

联合国出版物在全世界各地的书店和经售社均有发售。请向书店询问或写信到纽约或日内瓦的联合国销售组。

HOW TO OBTAIN UNITED NATIONS PUBLICATIONS

United Nations publications may be obtained from bookstores and distributors throughout the world. Consult your bookstore or write to: United Nations, Sales Section, New York or Geneva.

COMMENT SE PROCURER LES PUBLICATIONS DES NATIONS UNIES

Les publications des Nations Unies sont en vente dans les librairies et les agences dépositaires du monde entier. Informez-vous auprès de votre libraire ou adressez-vous à : Nations Unies, Section des ventes, New York ou Genève.

КАК ПОЛУЧИТЬ ИЗДАНИЯ ОРГАНИЗАЦИИ ОБЪЕДИНЕННЫХ НАЦИЙ

Издания Организации Объединенных Наций можно купить в книжных магазинах и агентствах во всех районах мира. Наводите справки об изданиях в вашем книжном магазине или пишите по адресу: Организация Объединенных Наций, Секция по продаже изданий, Нью-Йорк или Женева.

COMO CONSEGUIR PUBLICACIONES DE LAS NACIONES UNIDAS

Las publicaciones de las Naciones Unidas están en venta en librerías y casas distribuidoras en todas partes del mundo. Consulte a su librero o dirijase a: Naciones Unidas, Sección de Ventas, Nueva York o Ginebra.

Printed in Thailand
December 1990 - 2,400

01500

United Nations Publication
Sales No. : E.91.II.F.5
ISBN 92-1-119575-6
ISSN 0252-4481
ST/ESCAP/927