

HUMAN RESOURCE COMPETITIVENESS AND INFLOW OF FOREIGN DIRECT INVESTMENT TO THE ASEAN REGION

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Theoretically, foreign investors are likely to invest in countries where competitiveness indicators such as human resource capability, resource endowment, market opportunities and per capita incomes are high. This paper attempts to compare human resource competitiveness indicators such as labour costs and productivity, educational achievements, number of skilled workers, skill composition and technological progress in four selected ASEAN countries Malaysia, Thailand, Indonesia and the Philippines with developed countries in the region, such as Singapore, and to compare them to trends in FDI inflows. The analysis is based on data for the period 1985 to 2000.

The role and benefits of foreign direct investment (FDI) in developing economies have long been debated. The proponents of FDI have argued that FDI would bring prosperity in the recipient countries through technology transfer, higher exports, enhanced job opportunities and improved government revenues with these factors in combination generating strong externalities for the rest of the domestic economy and putting it on a higher growth path. On the other hand, opponents have argued that FDI would increase dependency and, hence, vulnerability of the recipient countries on the FDI-exporting developed countries on account of the footloose nature of FDI. The debate on the relative merits of FDI has not yielded a clear-cut consensus as for many developing countries FDI remains an academic curiosity with little in the way of benefits as most FDI has flown to a small number of countries. Nonetheless, for many developing countries such as those in ASEAN, notwithstanding the high saving rates, the high investment rates that have driven a rapid pace of output growth have necessitated major policy steps to attract FDI in certain critical areas. FDI in these countries has not only added to the stock of domestic capital to finance investment in new development projects but simultaneously provided access to new technology and managerial and marketing know-how.

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ASEAN economies such as Malaysia, Thailand, Indonesia and the Philippines are said to be moving towards achieving the status of newly industrialized countries, following the path of first tier economies of Singapore, Hong Kong, China, the Republic of Korea and Taiwan Province of China. In the pursuit of achieving this status, these countries must develop a competitive edge in terms of quality products, market efficiency, especially at the international level, and ability to develop and upgrade technology. In this regard, as developing countries, the level of local technology and skills in Malaysia, Thailand, Indonesia and the Philippines (subsequently referred to as the ASEAN 4) are relatively low. As an adjunct rather than as an alternative, these countries have to rely on FDI primarily as an important means for boosting technological capability.

In the past, the ASEAN 4 economies had prospered through export-led strategies based on intensive use of cheap, but relatively skilled labour. However, the competitive advantage of these countries in labour-intensive products has eroded as countries such as Bangladesh, India, China and Viet Nam can now make many products more cheaply. The open policy adopted by China, for example, has attracted a substantial flow of FDI to that country because of its abundant cheap labour and larger domestic market. In addition, the economic crisis engulfing the ASEAN 4 economies in the past few years has also focused attention on the fragility of their financial sectors. The ASEAN 4 economies thus risk being bypassed by FDI in the next few years unless steps are taken to move up the value chain. To move up the value chain, via the ladder of dynamic comparative advantage, these countries need to produce goods based on higher value added in terms of improved product design and development which, in turn, requires not only substantial inflows of foreign financial resources but the production of higher skilled professionals and workers in these economies.

In this paper it is argued that the key to improving competitiveness in the ASEAN 4 economies lies in raising human resource capabilities by making appropriate investments in human capital through higher education and professional training that could enhance their ability to generate and manage new technologies. In this era of intensified globalization and international competition, the ASEAN 4 can no longer rely on their cheap labour to gain competitiveness. They must continue to invest in their human resources since the high growth industries of the future, such as information technology and biotechnology, require an increasingly skilled labour force. Lessons learned from other successful countries in attracting FDI indicate that ability to create a skilled human resources base act as an important factor for transnational and multinational companies to relocate electronics firms and world class high-tech plants to host countries (UNCTAD 2000, p. 20). It is argued that not developing the human resources needed to undertake such activities, is likely to affect adversely these countries' competitiveness in attracting FDI. The purpose of this paper is to make

a preliminary examination of the extent of human resource competitiveness that may affect FDI inflow to the ASEAN 4 developing countries.

Apart from human resource competitiveness, there are several other factors that affect FDI inflows to a particular host country. Not to underestimate the importance of these factors, they need to be mentioned at the outset. Therefore, the first section of the paper will provide a brief discussion on the factors that determine overall FDI inflows. The purpose is to create awareness of the various factors affecting FDI inflows to the host country. Although there are many important factors, the paper will nonetheless focus only on the effect of human resource competitiveness on FDI, with special reference to the ASEAN 4 economies.

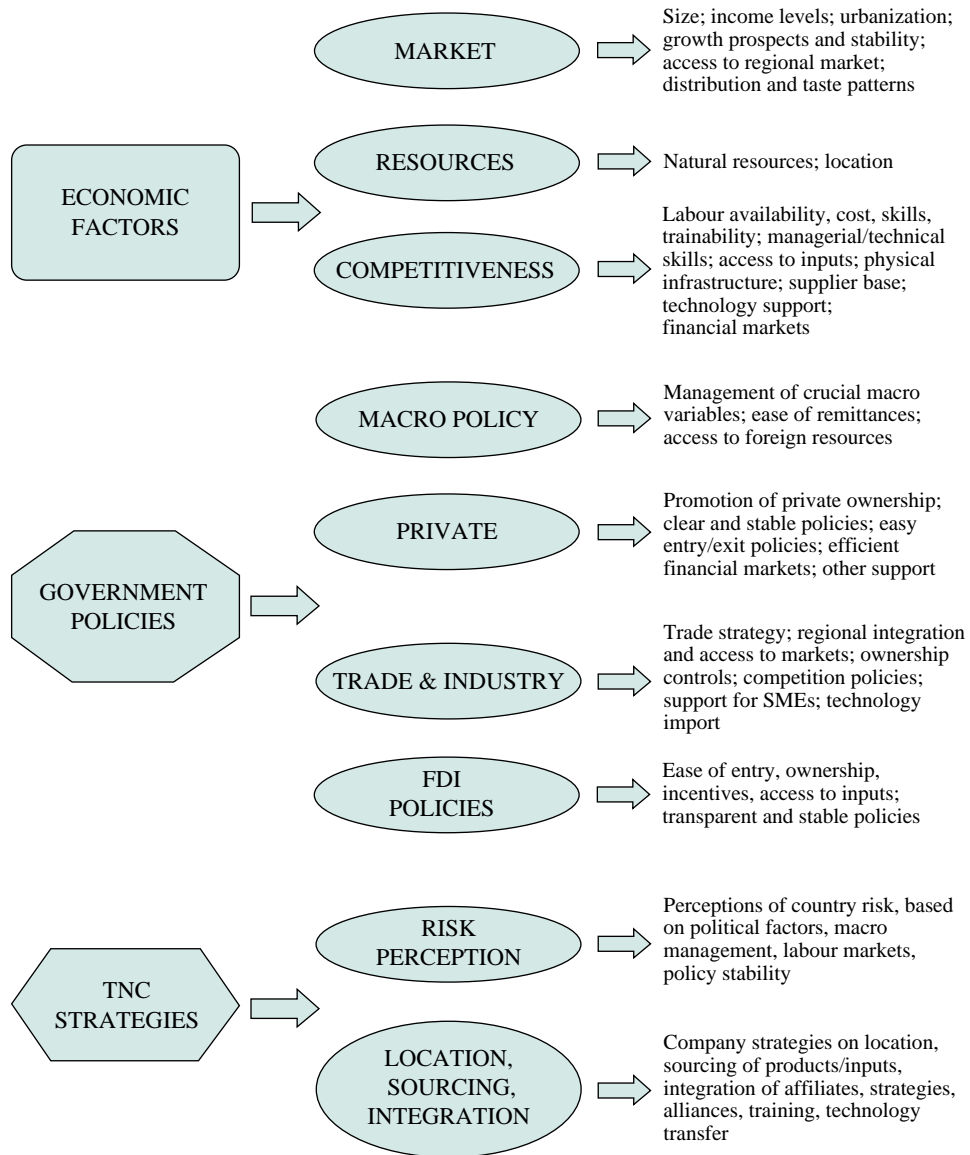
Since it was argued at the outset that FDI promotes the growth of recipient countries, it is crucial to review in what way this happens and why it is important. This is done in the first section. The second section provides a discussion of the importance of FDI to recipient countries. In the third section we will show the trend of FDI inflows to the ASEAN 4 economies and make some comparison with other countries. Section four, which is the focus of this paper, examines to what extent the inflows of FDI relate to human resource competitiveness in the host economies. In this section we will examine several indicators of human resource competitiveness. In the final section, we provide a summary and raise some policy issues regarding human resource competitiveness and FDI.

I. DETERMINANTS OF FDI

According to UNCTAD (2000, pp. 19-20), there are generally three categories of factors that may determine FDI inflow to a host country, namely economic factors, government policies and TNC strategies. Figure 1 shows that within these three main categories, there is a range of factors that may influence the flow of FDI to a host country. This paper will focus on the competitiveness factor which is closely related to various human resources issues such as the availability of labour, cost, skills, trainability, managerial and technical skills.

It should also be noted here that there is a two-way relationship between FDI and competitiveness. On the one hand, FDI can improve competitiveness of the host country, but, on the other, the competitiveness of the host country economy is also important to attract substantial amounts of FDI in the first place. For instance, UNCTAD (2000, p. 20) states that Ireland's success in attracting FDI in the electronics industry has been due largely to its ability to create a skilled human resource base to allow TNCs to set up efficient world-class plants and to target the world's leading electronics firms in that country. In this paper, we hypothesize that human resource competitiveness is likely to have a considerable influence on the flow of FDI to host nations.

Figure 1. Determinants of FDI in developing host countries



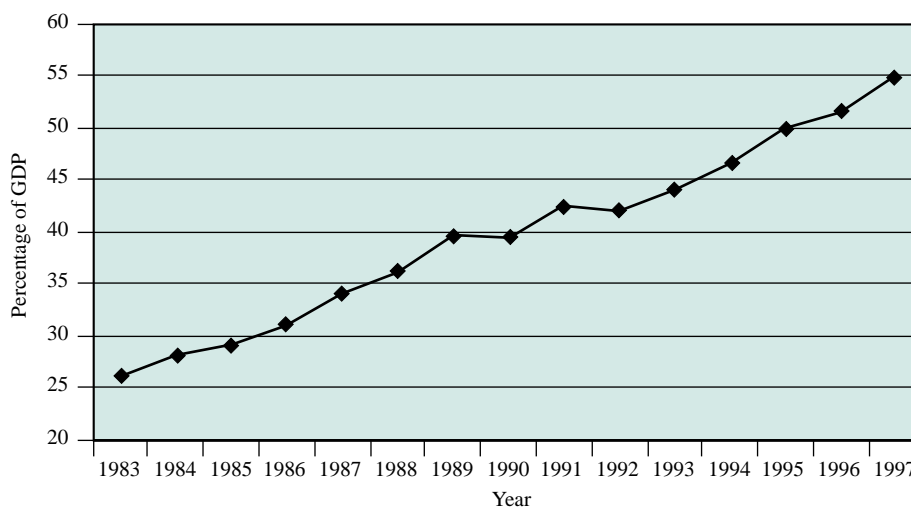
Source: UNCTAD (2000), p. 19.

II. THE IMPORTANCE OF FDI

FDI has played an important role in the economic development of many developing countries, but more particularly the ASEAN 4 economies. First, it has provided an additional source of capital and expanded host country production activities. The inflows of capital in the form of FDI allow host economies to invest in production activities beyond what could be achieved by investing domestic savings alone. FDI has proved remarkably resilient in these economies in spite of the recent economic crisis (Thomsen 1999, pp. 23-24). In fact, in some of the ASEAN 4 countries the inflows have actually increased during the period 1998-2000.

Second, it has promoted exports and trade, especially in the more open host nations. Since 1982 exports as a percentage of GDP as shown in figure 2 have doubled in all four countries. It is often argued that there is a strong correlation between export growth and FDI inflows. Without foreign capital the ASEAN 4 might not have experienced rapid increase in their exports.

Figure 2. ASEAN 4 exports as a percentage of GDP



Source: IMF, *International Financial Statistics* (various issues).

Exports have been the main engine of economic growth, especially for Thailand and Malaysia, the two moving from mainly primary goods exporters to major exporters of manufactured goods. The shift in exports reflects the structural transformation of the ASEAN 4 from being predominantly agriculture-based to predominantly industry-based. The ASEAN 4 countries were able to shift quickly

towards a manufacturing-based economy essentially through large inflows of export-oriented FDI.

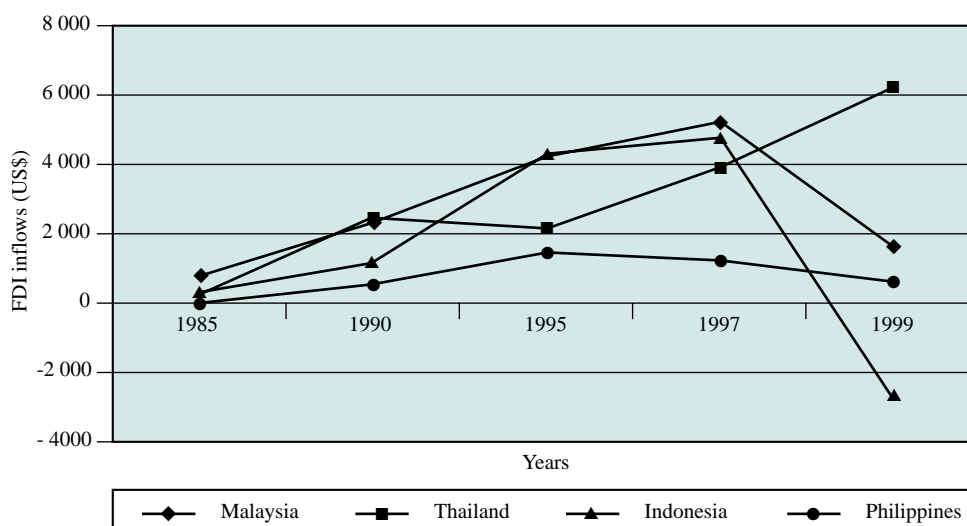
Third, FDI has crucially helped to transfer new technology to the host country. In general, FDI provides the fastest and most effective way to deploy new technologies in developing host countries (UNCTAD 2000). In the early 1970s for instance, low wages and openness in the newly industrialized economies (NIEs) such as Hong Kong, China, the Republic of Korea, Singapore and Taiwan Province of China attracted large volumes of FDI in labour-intensive industries. Transfer of technology from developed countries, particularly from Japan, has been substantial. However, Thomsen (1999, p. 28) has found that technology transfer from FDI to the ASEAN 4 countries has been moderate. The author states that technology transfer in Indonesia has taken place mainly through on-the-job training and has been limited to basic work-related capabilities. Similarly in Thailand, transfer mainly involved training of high-level staff rather than any general upgrading of skills. However according to a report by the Thailand Development Research Institute (TDRI 1999), technology transfer has improved recently to some extent through better and more strategic relations between foreign companies and local suppliers whereby the former have made long term commitments to their projects and have encouraged local suppliers to become partners in these commitments.

Finally, FDI also improves the international allocation of capital, particularly if the return on capital is higher in the host country than in the source country. In this case both countries benefit from the inflows.

III. FDI INFLOWS TO ASEAN 4

The ASEAN 4 countries rank amongst the most popular destinations for FDI. As a group, this area is the world's fifth most important in terms of FDI inflows in the 1990s. Prior to the economic crisis in Asia, the level of FDI inflows had increased sharply from a total of US\$ 1.7 billion in 1980-1984 to almost US\$ 20 billion in 1996. The share of the ASEAN 4 in global FDI inflows also increased from 3.4 per cent to 5.2 per cent over the same period. During the crisis period, the level of FDI inflows fell slightly from US\$ 19.2 billion in 1997 to US\$ 16.7 billion in 1998. It began to increase again in 1999, reaching US\$ 17.4 billion. It is argued, however, that the crisis did trigger significant changes in policy toward FDI in all of the affected countries. Most of the affected economies, in particular Malaysia and Thailand, have long had liberal FDI regimes, but the crisis pushed them to liberalize their FDI regimes further.

Figure 3 shows that the trend of FDI has been rising in all four countries since the 1980s, but started to fall when the economic crisis hit the region. Nonetheless, it is observed that Thailand's FDI inflows were not affected significantly during the crisis. In Thailand, the upturn in FDI inflows started about the second quarter of

Figure 3. FDI Inflows in ASEAN 4 economies, 1985-1999

Source: UNCTAD, *World Investment Report* (various years).

Table 1. FDI average annual growth rate in ASEAN 4, 1985-1999

| Year | 1986-1990 | 1991-1995 | 1996-1997 | 1998-1999 |
|-------------|-----------|-----------|-----------|-----------|
| Malaysia | 27.4 | 12.4 | 10.9 | -4.5 |
| Thailand | 72.1 | -9.9 | 37.2 | 26.3 |
| Indonesia | 28.7 | 31.8 | 3.7 | - |
| Philippines | 41.7 | 22.8 | -9.1 | -31.5 |

Source: UNCTAD, *World Investment Report* (various years).

1998 after the crisis. Compared with 1997, inflows doubled in 1998, after which a decline set in.

Table 1 shows that the average annual growth rate of FDI for Thailand was the highest through the period of 1996 and 1999, indicating its most favourable destination in the inflows among the four countries. However, recent Asian Development Bank (ADB) data on net direct investment shows a downward trend for the first nine months of 2000. The report also stated that this decline might simply be a reflection of investor weariness resulting from the slowdown in both the rate of asset disposals and the reform momentum (ADB 2000).

In Malaysia, FDI inflows increased in the 1980s until the beginning of the crisis in 1997. However, in a recent report there has been a small pickup again in

1999 (ADB 2000). Although the crisis had a negative impact, it has been argued that Malaysia's foreign investment regime has remained more liberal, and for a longer time, than other countries in the region. Moreover, in some sectors the presence of multinational enterprises had already reached high levels of investment and activity before the crisis began. These reasons suggest that the FDI slowdown in Malaysia as shown in figure 3 and table 1 may not reflect a reversal in attitudes of foreign investors toward the country as an investment site, but rather a temporary adjustment.

FDI inflows to Indonesia have been negative since 1998, with outflows currently on a rising trend owing to non-economic factors such as the volatile political and security situation in the country. Meanwhile, the volume of FDI inflows into the Philippines has remained relatively small and has hardly changed either before or after the crisis.

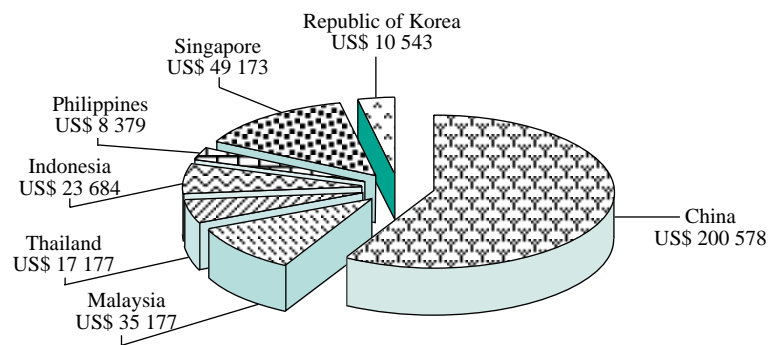
IV. HUMAN RESOURCE COMPETITIVENESS AFFECTING FDI INFLOWS

Enterprises in both developed and developing economies are faced with progressively more competitive environments in a fast moving technological world. To compete and prosper they need to restructure their activities, facilities and skills tailored to the changing technology. In the era of a globalized world economy and trade liberalization enterprises have to compete not only internally but also externally. There are numerous factors that determine the competitiveness of an economy, which include resource availability and cost, the openness of the economy, human capital capacity and technological advancement. The more competitive an economy, the more likely that it will gain through participation in market competition. For example, it is reported that the countries with the largest shares of world trade, and thus presumably enjoying economies of scale, lost ground in industrial exports to a series of challenges from the developing world, mainly from Asia, as they became less competitive (Mortimore and others, 1997 quoted in UNCTAD 2000).

In the case of FDI, the competitive environment is an essential prerequisite to ensure a substantial inflow of foreign capital to the host nation. Figure 4 shows comparisons in FDI inflows between ASEAN 4 countries and several competing economies such as China, Singapore and the Republic of Korea.

The figure shows that China and Singapore were the main recipients of FDI inflows in the period 1990-1997. This indicates that they have a clear comparative advantage in attracting foreign capital. Although there are various factors that affect FDI inflows, in this section we shall focus our discussion only on issues that relate to human resource capacity and competitiveness.

Figure 4. Total FDI inflows by country, 1990-1997
(billions of US dollars)



Source: Figures adapted from OECD International Direct Investment Statistics Yearbook, 1999.

Labour costs and productivity

One area of specific concern in this context is labour costs and productivity. It is inevitable that foreign investors will choose countries where labour is cheap. Table 2 clearly shows that China has a huge comparative advantage in terms of its low labour cost and has thus attracted large volumes of foreign capital to the country (see figure 4). It can also be conjectured, on this presumption, that as wages spiralled in the NIEs, flows of FDI in labour-intensive industries shifted to South-East Asia and later to China. FDI has led to the wholesale transfer of the production of labour-intensive products and exports from high-wage economies to lower-wage economies. Table 2 shows that the percentage increase in the labour costs in ASEAN 4 economies has been relatively small when compared with Singapore and the Republic of Korea. A substantial increase in labour costs in Singapore and the Republic of Korea is likely owing to the shift from labour-intensive activities to more sophisticated industries that require highly skilled professionals and workers at relatively higher salaries and wages.

Although there has been a substantial increase in labour costs in Singapore and the Republic of Korea, productivity in these countries has remained high, as indicated by the percentage increase of value added per worker. This shows that both countries have a competitive advantage in terms of skilled workers that attracts inflows of high-tech foreign capital into the country. For China, although it has managed to attract substantial amounts of foreign capital, there appears to be no increase in productivity, which may indicate the heavy reliance on labour-intensive activities. In Figure 4, we observed that Singapore and the Republic of Korea received substantially

Table 2. Labour costs and value added per worker in manufacturing
(US\$ per year)

| <i>Countries</i> | <i>Labour costs (wage)</i> | | | <i>Value added</i> | | |
|-------------------|----------------------------|------------------|----------------------------|--------------------|------------------|----------------------------|
| | <i>1980-1984</i> | <i>1995-1999</i> | <i>Percentage Increase</i> | <i>1980-1984</i> | <i>1995-1999</i> | <i>Percentage Increase</i> |
| Malaysia | 2 519 | 3 429 | 36.1 | 8 454 | 12 661 | 49.8 |
| Thailand | 2 305 | 2 705 | 17.4 | 11 072 | 19 946 | 80.1 |
| Indonesia | 898 | 1 008 | 12.2 | 3 807 | 5 139 | 35.0 |
| Philippines | 1 240 | 2 450 | 97.6 | 5 266 | 10 781 | 104.7 |
| Singapore | 5 576 | 21 534 | 286.2 | 16 442 | 40 674 | 147.4 |
| Republic of Korea | 3 153 | 10 743 | 240.7 | 11 617 | 40 916 | 252.2 |
| China | 472 | 729 | 54.4 | 3 061 | 2 885 | -5.7 |

Source: World Bank, *World Development Indicators*, 2000, pp. 58-60.

high inflows of FDI despite high labour costs. Since FDI inflows into China are also influenced by the potential of its huge domestic market and its progressively more open policies in trade, it could be argued that labour costs are not the most important element of competitiveness. Furthermore, controversies emerge on whether low wages can sustain high economic growth over the long term since low wages are associated with unskilled labour and low productivity. Therefore, in order to develop rapidly a country has to increase both its wage rate and productivity. Reinert (1995 quoted in UNCTAD 2000, p. 3) suggests that true competitiveness demands that an economy continue to produce more goods for international markets as wages rise and labour-intensive activities are upgraded to make higher-quality products that yield greater value-added industries. On this basis, it is crucial for the ASEAN 4 economies to upgrade their labour-intensive industries to skill-based industries that produce higher value-added products. As far as human resources are concerned, competitiveness will very much depend on the extent of existing human capital investment that would, in turn, provide a sufficient and appropriately skilled work force required by the economy.

Educational achievements

As far as skilled workers are concerned the level of education of a country is of critical importance to ensure the supply of manpower required by the economy. Table 3 shows several indicators that could be used to shed light upon and measure the country's educational achievements. In terms of educational expenditure, except for Indonesia, all ASEAN 4 economies have traditionally spent relatively high sums on the provision of education. It is self-evident that a sufficient allocation of public financial resources is required in order to ensure an adequate quality of education at different levels. In many developing countries educational institutions are often unable

to acquire modern laboratories and/or offer salaries that attract qualified teachers and keep them motivated due to lack of public funds. This problem is particularly prevalent at the secondary level and in rural areas.

Table 3 shows that the adult literacy rate in all ASEAN 4 countries is at a relatively high level. However, in terms of enrolment ratios, except for the Philippines, the combined enrolment ratios for the ASEAN countries is relatively low compared with other countries, including China. Moreover, literacy rates and enrolment ratios do not reflect the quality of education that is available. This is consistent with the ADB findings (ADB, 2000) that the enrolment rates in higher education in some of South-East Asia's economies are lower than expected, given their level of development and availability of public resources. In addition, there appears to be insufficient orientation of higher education toward scientific, technical and other applied fields such as business and management. As already mentioned, the proportion of students enrolled in science or technical subjects at the tertiary level in the ASEAN 4 countries is relatively low, especially when compared with China. Relatively high levels of enrolments in science and technology subjects are crucial for high-level technical manpower. To gain competitiveness in this area, it is necessary for the ASEAN 4 to devise means to increase their tertiary level enrolments in these subjects.

Table 3. Educational expenditure and performance

| <i>Country</i> | <i>Public expenditure on education as per cent of GNP (1998)</i> | <i>Adult literacy rate (1998)</i> | <i>Combined primary, secondary and tertiary gross enrolment ratio (1997)</i> | <i>Tertiary students in science as per cent of all tertiary students (1995-1997)</i> |
|-------------------|--|-----------------------------------|--|--|
| Malaysia | 4.9 | 86.4 | 65 | – |
| Thailand | 4.8 | 95.1 | 59 | 21 |
| Indonesia | 1.4 | 85.8 | 65 | 28 |
| Philippines | 3.4 | 94.9 | 83 | 31 |
| Singapore | 3.0 | 91.8 | 73 | – |
| Republic of Korea | 3.7 | 97.5 | 89 | 34 |
| China | 2.3 | 82.7 | 69 | 53 |

Source: UNDP, *Human Development Report 2000*.

The intensity of skilled and knowledge-based professionals

Table 4 shows that the intensity of skilled and knowledge-based professionals in the ASEAN 4 countries also remains relatively low. For instance, at present Malaysia's economy utilizes roughly only 10 per cent of its workforce at the professional and technical level, while less than 4 per cent is involved in administrative and managerial positions. This makes a total of only 15 per cent of the skilled and knowledge-based professionals, a proportion that is considered rather small for the operation of high-tech industries. This figure is behind that of Singapore and Hong Kong, China with 23 and 17 per cent respectively of their workforce in professional, technical, administrative and managerial positions. The figures are, of course, much lower in the Philippines. Figures in table 4 also show that there are still considerable percentages of the workforce at the operational level in Malaysia and the Philippines, which seems to reflect a characteristic of a relatively labour-intensive economy. Therefore, in order to gain competitiveness in the future it is crucial for these countries to increase the proportion of professional, technical and managerial sections of the workforce in these countries. To this end, the existing education and training institutions need to be geared towards producing the required mix of skills in the workforce with different levels of education and training.

Table 4. Percentage of employment by major occupational groups

| <i>Job category</i> | <i>Malaysia</i> | <i>Hong Kong, China</i> | <i>Singapore</i> | <i>Philippines</i> |
|---|-----------------|-----------------------------|------------------|--------------------|
| 1. Professional, technical and related workers | 10.6 | 10.5 | 12.8 | 6.1 |
| 2. Administrative and managerial workers | 3.9 | 7.2 | 10.3 | 2.3 |
| 3. Clerical and related workers | 11.1 | 23.2 | 18.6 | 4.5 |
| 4. Sales workers | 11.2 | 24.9 | 14.5 | 15.1 |
| 5. Service workers | 11.9 | 19.3 | 13.6 | 10.8 |
| 6. Agriculture, animal husbandry and forestry workers, fisherman and hunters | 18.5 | 0.4 | 0.1 | 38.8 |
| 7. Production and related workers, transport equipment, operators and labourers | 32.7 | 14.4 | 30.1 | 22.4 |

Source: International Labour Office, *Yearbook of Labour Statistics*, 1999, Geneva.

Technological progress and R and D activities

To gain competitiveness it is crucial for the ASEAN 4 countries to achieve significant progress in technological development. Although it may be difficult to identify and measure progress in this area, technological effort such as spending on R and D and the numbers of scientists and engineers involved in R and D are effective surrogate indicators and can be used to measure progress across countries. Table 5 shows that the amount of public expenditure on R and D and the number of scientists and engineers in R and D activities in the ASEAN 4 countries are still relatively low compared with other countries in the region, especially the more developed ones. Low investment in R and D results from the fact that it is often cheaper to purchase technology from abroad than to develop it locally. Also, within the East and South-East Asian region private firms often find their competitors gain easy access to the new technology developed by them, owing to loose copyright regulations and lax legal remedies for infringement of intellectual property rights. Furthermore, scientists and engineers often prefer to work in the public sector.

Table 5. Public sector R and D expenditure and number of scientists and engineers

| <i>Country/area</i> | <i>R and D expenditure (percentage of GDP) 1998</i> | <i>Scientists and engineers (per million population) 1985-1995</i> |
|--------------------------|---|--|
| Malaysia | 0.4 | 500 |
| Thailand | 0.2 | 173 ^a |
| Indonesia | – | – |
| Philippines | – | – |
| Singapore | 1.8 | 2 728 |
| Taiwan Province of China | 1.7 | 1 669 |
| Republic of Korea | 2.7 | 2 636 |
| China | 0.7 | 350 |

Sources: UNCTAD, *The competitiveness challenge: transnational corporations and industrial restructuring in developing countries*, (New York and Geneva), p. 41; Malaysia, *The Third Outline Perspective Plan 2001-2010*, National Printer, Kuala Lumpur, p. 131.

^a Figure for 1991.

In addition, slower technological progress also results from a lack of scientists and engineers in R and D activities. In Malaysia for example, it has been recognized that R and D efforts, especially in science and technology were partly constrained by the lack of a critical mass of scientists and engineers (Malaysia 2001, p. 125). However, with regard to table 5, it is once again interesting to note that China, despite its

relatively slower progress in the development of technology, has managed to attract substantial amount of FDI inflows to the country. This confirms that China's FDI competitiveness does not relate so much to its technological progress, but rather to other determinants such as its open policy, huge potential domestic market and abundant cheap labour. On the other hand, since labour costs are increasing, in order to gain competitiveness it is likely that the ASEAN 4 will have to follow the policies of Asia's more successful technology-producing economies such as the Republic of Korea, Taiwan Province of China and Singapore. The Republic of Korea and Taiwan Province of China, for example, have nurtured technological capability through a successful partnership between public institutions and the private sector while also encouraging the import of new technologies from more developed nations. Such policies are likely to have a significant impact on FDI inflows into the country, especially from high technology-based foreign companies.

Composition of knowledge-based economy

Human resource competitiveness also relies on the composition of a knowledge-based economy. A knowledge-based economy refers to an economy that is mainly based on the production, distribution and use of knowledge and information (OECD 1996, p. 7, 13-14). The generation and acquisition of knowledge is highly dependent on research and development activities which encourage innovation, especially in the area of science and technology. Many successful countries place greater emphasis on their innovation capabilities through devoting a greater effort to these activities. However, new technologies will not automatically result in productivity improvements and enhanced international competitiveness unless they are diffused widely in the economy. It is obvious that a sufficient supply of intellectual capacity in terms of quantity and quality to sustain continual innovation and to broaden the knowledge base is absolutely vital to success. In that regard, the ability of the ASEAN 4 countries to develop and employ highly skilled talent is of critical importance in maintaining and strengthening their long-term competitiveness.

In Malaysia, a Knowledge-based Economy Development Index (KDI) was developed which compares several developed and developing countries on selected key factors required to drive a knowledge-based economy. These are computer infrastructure, infostructure, education and training, R and D and technology (Malaysia 2001: The Third Outline Perspective Plan 2001-2010). As can be seen in table 6, based on these indices, the ASEAN 4 countries were positioned at the bottom of the list, which reflects the relatively low composition of a knowledge-based economy. The relatively low achievements in education and training and R and D and technology seem to correspond well with the earlier finding that ASEAN 4 countries are inferior in these important aspects.

Table 6. Country position by components of knowledge-based development index, 2000

| Country | Knowledge index | Computer infrastructure ^a | Infostructure ^b | Education and training ^c | R and D and technology ^d |
|--------------------|-----------------|--------------------------------------|----------------------------|-------------------------------------|-------------------------------------|
| United States | 1 | 1 | 10 | 8 | 3 |
| Japan | 2 | 8 | 3 | 10 | 1 |
| Sweden | 3 | 5 | 2 | 3 | 2 |
| Finland | 4 | 2 | 4 | 4 | 4 |
| Norway | 5 | 4 | 1 | 1 | 10 |
| Denmark | 6 | 7 | 5 | 2 | 9 |
| Australia | 7 | 6 | 6 | 6 | 11 |
| Switzerland | 8 | 13 | 7 | 9 | 5 |
| Canada | 9 | 3 | 12 | 5 | 15 |
| Netherlands | 10 | 10 | 9 | 13 | 8 |
| United Kingdom | 11 | 9 | 8 | 11 | 14 |
| Germany | 12 | 12 | 13 | 12 | 7 |
| New Zealand | 13 | 11 | 14 | 7 | 17 |
| Ireland | 14 | 15 | 15 | 15 | 12 |
| Republic of Korea | 15 | 16 | 11 | 16 | 13 |
| Singapore | 16 | 14 | 16 | 19 | 6 |
| Malaysia | 17 | 17 | 17 | 17 | 16 |
| Thailand | 18 | 19 | 21 | 14 | 19 |
| China | 19 | 18 | 19 | 18 | 20 |
| Philippines | 20 | 22 | 18 | 20 | 18 |
| Indonesia | 21 | 21 | 20 | 21 | 21 |
| India | 22 | 20 | 22 | 22 | 22 |

Source: Malaysia, *The Third Outline Perspective Plan 2001-2010*. National Printer, Kuala Lumpur, p. 131.

^a This is measured through share of worldwide computer use; computers per 1,000 population; share of total worldwide millions of instructions per second (MIPS); computer power per capita; and connections to the Internet.

^b This includes indicators such as investment in telecommunications; main line telephones in use per 1,000 population; television sets per 1,000 population; radios per 1,000 population; fax machines per 1,000 population; international call cost; and newspaper circulation.

^c This is assessed in terms of total expenditure on education per capita; literacy rate; student-teacher ratio (primary and secondary) secondary enrolment, and higher education enrolment.

^d This includes high-technology exports as a proportion of manufacturing exports; number of scientists and engineers in R and D; number of R and D personnel nationwide per capita; total expenditure on R and D as per cent of GDP; average annual number of patents granted to residents; and business expenditure on R and D per capita.

In this new era of a knowledge-based economy, computer-based information and communication technology has developed at an astounding rate and is generating a greater need for versatile workers who not only have advanced education and knowledge but adaptive and learning skills. Information is becoming a direct factor of production and its immediate accessibility and wide applications are fuelling its development. Table 6 also shows that the ASEAN 4 countries are still lagging in such facilities compared with other countries. In order to gain competitiveness, the table implies that a leapfrog approach is required by these countries. The ability of the ASEAN 4 countries to attract FDI, especially from knowledge-based foreign industries, will depend on their competitiveness in this regard. Since knowledge is imbedded in people, human capital is therefore becoming a key source of comparative advantage, giving those with it greater opportunities in the global economy.

V. SUMMARY AND POLICY ISSUES

The impact of foreign direct investment within the ASEAN 4 countries goes well beyond a simple listing of directly associated investment, employment output and export statistics. By any standard, it has been a decisive source of knowledge transfer in technology, management know-how, an enhanced ability to exploit international market trends and participate in global investment trends and financial expertise. Such competitiveness provides not only a fundamental source of comparative advantage for countries but a central rationale for international investors in the modern global economy. FDI has thus been a major force in the transformation of the ASEAN 4 economies and has positioned the countries as significant players in the global business environment.

The preceding discussion has pointed out that the magnitude of FDI inflows to a host country is highly dependent on several components of its competitiveness, including resource availability and cost, openness, human capital achievement and technical advancement. Regarding these factors, it is obvious that there is a two-way relationship between FDI and competitiveness, where, on the one hand, FDI improves the competitiveness of a host country, and, on the other, the competitiveness of the host nation is also important to attract substantial amounts of FDI. The quality of human resources is a central feature of competitiveness.

With regard to human resources, it is apparent that the ASEAN 4 countries should be highly competitive in order to be able to continue to attract substantial amounts of FDI inflows. It could be argued that low-cost labour may have only a limited bearing on the comparative advantage needed to attract foreign capital. The lesson learned from China's experience indicates that abundant cheap labour is not the only factor which attracts large amounts of FDI inflows to the country. There are other factors that are more influential in determining its volume, namely the openness of the trade and investment policies, and, more importantly, the huge potential of its

domestic market. Another implication of relying on cheap labour to attract FDI is that it is likely to lead to labour-intensive industries with relatively low value-added per worker (see the case of China in table 2). In this context it is pertinent to note that though there has been a considerable increase in labour costs in most of the ASEAN 4 economies, in particular Malaysia, the effect on FDI has been minimal, thus far at any rate, if the increase is due to augmentation of skilled labour in the economy with beneficial effects on productivity.

Given that much greater emphasis is now being put on high technology and high value-added industries at the present stage of development of the ASEAN 4 economies, a move towards strengthening the existing FDI base to add more value and to stress the qualitative rather than the quantitative aspects of employment is very important. Educational and training facilities are the key and these should be geared towards producing a well-educated and skilled workforce tailored to the current and future needs of the economy. The availability of such a workforce, which embraces flexibility, especially in science and technical areas, is crucial. Earlier, we had observed that the composition of educated workers in Malaysia and the Philippines (see table 4) in the labour force was still relatively low. This is because economic activities that are still labour-intensive, or where there is only a limited requirement of well-educated workers, predominate. Thus, the ratio between professional-technical and production workers should be increased in favour of the former. This would generate positive externalities over the economy as a whole.

One of the problems faced by higher learning and training institutions in many developing countries as a supplier of manpower is inadequate information regarding the market needs for various types of educated and skilled labour. This is likely to hinder the effective role of these institutions to produce appropriately skilled manpower needed by the country. This, in turn, results in problems in the labour market such as mismatching, unfilled job vacancies and unemployment. To overcome these problems, a continuous labour market study to identify manpower requirements by various job categories is needed. Market-clearing mechanisms such as wage rates do not always perform their tasks efficiently as some shortages are temporary while others are long term. Both, however, put up wage rates.

Another policy issue that arises is the strength of research and development activities within the economy. It has been seen in table 6 that comparable statistics show that the proportion of scientists and engineers per million of population who are involved in R and D activities in the ASEAN 4 countries is extremely low compared with many countries. It can also be observed that national spending on R and D within the ASEAN 4 economies is still relatively low compared to these countries. It is self-evident that R and D activities are crucial for the generation, acquisition, diffusion and exploitation of new technologies. R and D -based activities are capable of enhancing creativity and innovative capabilities among the workforce and thus increase the long-term productivity and the competitiveness of the economy.

Since information, knowledge and communication technologies are important in the global economy, in order to gain competitiveness it is crucial to ensure that computers and information technologies are made more accessible to the majority of the population. The so-called digital divide may be only a theoretical concept but it is abundantly clear that the availability of high quality, affordable infrastructure and competitive business services at various levels is likely to produce major dividends by increasing the host country's long-term competitiveness.

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