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HUMAN CAPITAL FORMATION AND FOREIGN DIRECT INVESTMENT IN DEVELOPING COUNTRIES

by

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PREFACE

The main theme for the programme of work 2001-2002 at the Development Centre was Globalisation and Governance. Multinational enterprises (MNEs) are a key actor of globalisation and also raise numerous governance issues. Accordingly, their role in poor countries has always interested the development community.

The Development Centre has contributed to the debate by organising a forum entitled "FDI, Human Capital and Education in Developing Countries" in December 2001 in Paris. During this event, a number of experts, including policy makers, researchers and civil society specialists from around the world gathered to discuss how MNEs and government policies can be mobilised to promote human capital formation and hence economic growth. Ironically, one of the main conclusions from the conference was our lack of knowledge with respect to the human capital development activities of the MNEs.

This synthesis by Koji Miyamoto, presently at the Directorate of Employment, Labour, and Social Affairs of the OECD, is a follow-up of this conference. The purpose is to assess the current state of the literature on FDI and human capital formation and to see what we could learn from the information available to policy makers, academics, and other stakeholders.

The author finds abundant evidence in the literature that human capital formation is indeed among the important pre-requisites for developing countries to start benefiting from FDI. However, an intensive investment in human capital is not sufficient for developing countries to continuously benefit from FDI. Other essential fundamentals include: *i)* sound policy and an attractive investment climate; *ii)* co-ordination between formal education and training policies; *iii)* collaboration among all stakeholders of human resource development including host government, investment promotion agency (IPA), MNEs, and educational institutions; and *iv)* identification of the type of MNEs that would benefit host countries the most in terms of human capital development and technology transfer. These conclusions point out the importance of solid governance in host developing countries to fully benefit from the waves of globalisation via human capital development and technology transfers.

Prof. Louka T. Katseli
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28 July 2003

RÉSUMÉ

Ce Document technique propose une synthèse des travaux existants sur la formation du capital humain et l'investissement direct étranger (IDE) dans les pays en développement. Il vise à examiner de près les relations complexes qui s'établissent entre les activités des multinationales et les politiques des PED d'accueil. Cette synthèse permet d'identifier les tendances générales, les meilleures pratiques ainsi que les expériences politiques afin d'évaluer l'état actuel des connaissances. Il en ressort que le niveau élevé du capital humain est de toute évidence l'un des principaux facteurs permettant d'attirer les IDE et — pour le pays d'accueil — de tirer le plus grand profit de leurs activités. Mais la plupart des pays en développement n'investissent pas suffisamment dans le capital humain, et l'investissement actuel est inégalement réparti entre les pays et les régions, dont les politiques de développement des ressources humaines (DRH) sont différentes. Pour améliorer la formation du capital humain et attirer davantage d'IDE, une approche plus cohérente qui tiendrait compte des contraintes du pays d'accueil et des limites des ressources budgétaires est donc nécessaire. Une possibilité est d'inciter fortement les firmes multinationales et les agences de promotion de l'investissement à s'impliquer dans le système de formation formelle et professionnelle, y compris en ce qui concerne les employés des firmes nationales. Le DRH serait ainsi guidé par la demande et gagnerait en flexibilité. Une autre mesure possible serait de faciliter ce DRH dans les petites et moyennes entreprises locales qui, généralement, n'investissent pas suffisamment dans la formation de leurs employés, en dépit du fait qu'elles auraient beaucoup à y gagner. En outre, les politiques de promotion des IDE pourraient cibler les multinationales à forte valeur ajoutée, plus susceptibles d'apporter à l'économie des compétences et des connaissances dont profiteraient également les entreprises locales. Enfin, il est important que les éléments clés des politiques de DRH (instruction de base, formation professionnelle et continue) soient correctement coordonnés, de sorte que les étudiants bénéficient de savoirs qui se révèleront ultérieurement complémentaires de ce que leur offrira le marché du travail.

SUMMARY

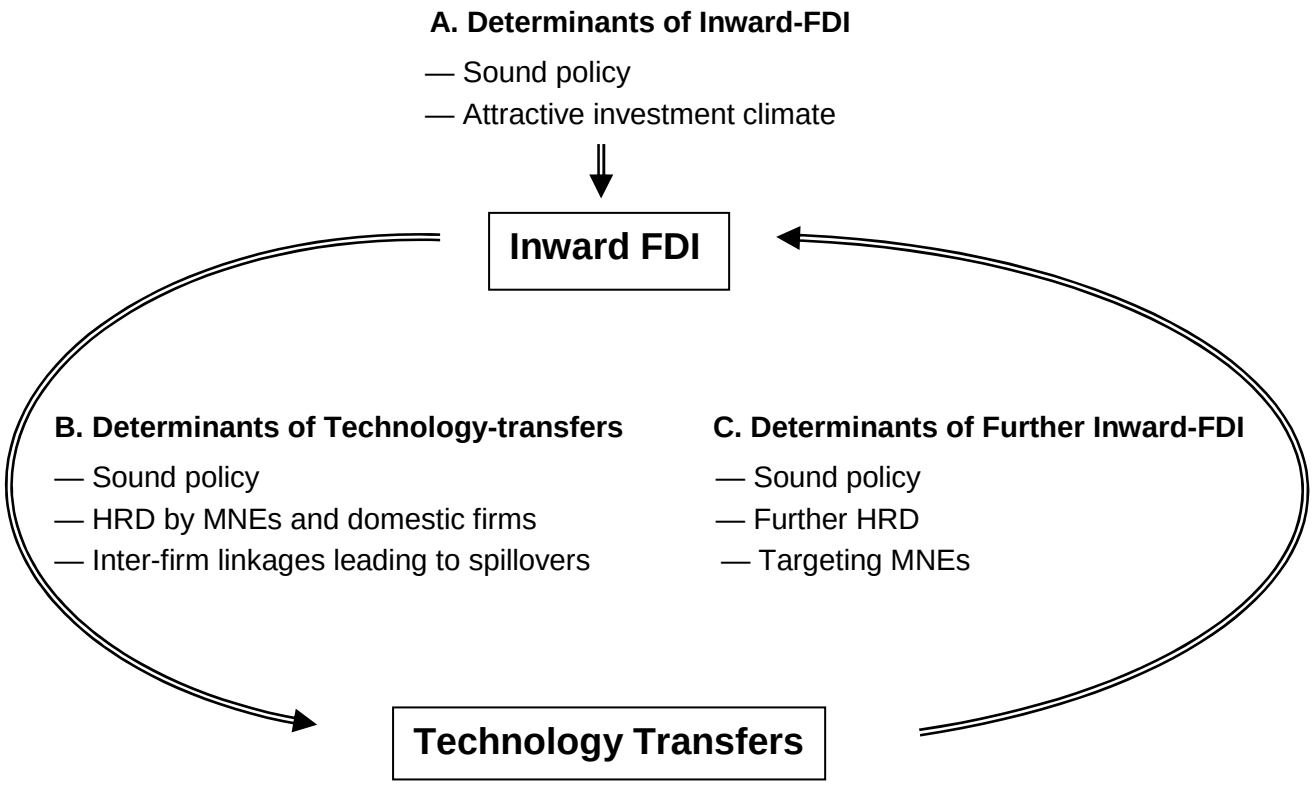
This paper synthesises the existing literature on human capital formation and foreign direct investment (FDI) in developing countries. The aim is to take a bird's eye view of the complex linkages between the activities of multinational enterprises (MNEs) and policies of host developing countries. In doing so, general trends, best practices and policy experiences are extracted to evaluate the current state of knowledge. The literature indicates that a high level of human capital is no doubt one of the key ingredients for attracting FDI, as well as for host countries to gain maximum benefits from their activities. Most developing countries, however, underinvest in human capital, and the investment that is actually taking place is unevenly distributed across countries and regions that have adopted different human resource development (HRD) policies. To improve human capital formation and thus to attract more FDI would therefore require a more coherent approach that takes host country constraints such as limited budgetary resources into account. One such approach is to provide strong incentives for MNEs and Investment Promotion Agencies (IPAs) to participate in formal education and vocational training even for workers employed by domestic firms. This allows HRD to be flexible and demand-driven. Another policy option is to facilitate HRD for small- and medium-sized domestic enterprises which usually do not invest sufficiently in training of employees although these enterprises stand to gain most from education and training. In addition, FDI promotion policies can target high value-added MNEs that are more likely to bring new skills and knowledge to the economy that can be tapped by domestic enterprises. Lastly, it is important that key components of HRD policies, i.e. formal schooling and vocational education and training policies (post-formal schooling) are well co-ordinated so as to equip students with knowledge and skills that will later be complimentary to training opportunities provided in the labour market.

I. INTRODUCTION

Human resource development (HRD) and foreign direct investment (FDI) are among the key drivers of growth in developed and developing countries[1]. While HRD and FDI individually affect growth, they also reinforce each other through complementary effects. In general, enhanced HRD increases incoming FDI by making the investment climate attractive for foreign investors. This is done through a direct effect of upgraded skill level of the workforce, as well as via indirect effects such as improved socio-political stability and health (World Bank, 2003; UNESCO and OECD, 2003). On the other hand, FDI contributes to HRD since multinational enterprises (MNEs)[2] themselves can be active providers of education and training, bringing new skills, information and technology to host developing countries. Ultimately, this complementary effect leads to a virtuous circle of HRD and FDI where host countries experience continuous inflow of FDI over time by increasingly attracting higher value-added MNEs, while at the same time upgrading the skill contents of preexisting MNEs and domestic enterprises.

Figure I.1 illustrates how this virtuous circle takes place. The first part of the cycle (A: Determinants of Inward-FDI) shows that sound government policies are important determinants of FDI[3]. Host investment climate such as market access and availability/quality of factors of production are other key factors affecting inward-FDI. Sound policies should also contribute to a better investment climate. After a host developing country succeeds in attracting FDI, the next step of the cycle is to mobilise MNEs so that the new technologies that they brought into the country are transmitted to other firms and industries. This is usually achieved through MNEs' links with domestic firms as well as through their own HRD activities. Note that HRD is not limited to enterprise training but extends further to MNE collaboration with governments, investment promotion agencies (IPA), and domestic enterprises to design and co-ordinate HRD activities of the country or of the industry. The final step of the circle is for host countries to take advantage of the upgraded skill levels of the economy so that more inward FDI takes place. This is not simply to increase the flow of inward FDI, but to attract higher value-added MNEs, in which the key factor of production is the skilled workforce. To this end, host country governments need to constantly fine-tune policies so that the investment climate adapts in a way that higher value-added MNEs that utilise new skills and information will be attracted.

Figure I.1: **The Virtuous Circle of Inward-FDI and Technology-Transfer/Spillovers**



The objective of this paper is to delve into the vast literature of HRD and FDI in order to identify how this virtuous circle takes place and to seek ways to fine-tune polices to promote it. In doing so, empirical regularities, best practices and numerous policy experiences are extracted from the literature. Surprisingly, there has been a lack of comprehensive survey done on this issue as yet in spite of the growing concern and interest on this issue by policy makers, academics and other stakeholders. Since the major aim of this paper is to capture common regularities in how host developing countries mobilise human resources, it will not cover the whole literature exhaustively.

The paper is organised as follows. The rest of this section summarises questions to be posed throughout the paper. Section II presents background of the issue by summarising recent trends in FDI and HRD in developing countries. The next three sections provide the meat of the paper including: *i)* attracting inward FDI; *ii)* human capital formation by MNEs and technology transfers; and *iii)* the virtuous circle of human capital formation, incoming FDI, and technology transfers. Section VI concludes by revisiting the posed questions and providing directions for future research.

Questions Posed

The following lists key policy questions on HRD and FDI to be tackled throughout the paper. All the questions will be reviewed and assessed in the concluding chapter.

Question 1: What are the level and type of human capital necessary for host developing countries to attract FDI?

It is often argued that MNEs determine the choice of location based on the availability of high level of human capital. What exactly is the level of human capital (education and skills) that the MNEs are seeking? Do different types of MNEs seek different sets of skills, or are there minimal levels of human capital commonly acknowledged without which it is difficult to attract even the least skill-intensive MNEs?

Question 2: What are MNEs and domestic firms doing in terms of human capital formation? What are the correlates and determinants of training activities?

After host countries successfully attract FDI, the next step is to have MNEs participate in improving the level of human capital of their workers as well as employees in other domestic firms. Case studies and firm surveys can be used to address: *i)* incidence, intensity, and the type of training activities performed by MNEs and domestic firms; *ii)* beneficiaries of training; *iii)* source of finance for training; and *iv)* the type of MNEs that are more likely to train?

Question 3: How does human capital formation of MNEs contribute to technology transfers?

One of the key motivations for the host countries to attract MNEs is to enjoy technology transfers. Is there any strong evidence of technology transfers in developing countries? What are the underlying conditions for such transfers to occur?

Question 4: What has been the role of government policies within the linkages between human capital formation and FDI? What are the good practices? What are the tentative policy conclusions?

After clarifying all the information surrounding the linkage between FDI and human capital formation, we address the most important question in this paper: which policies work and which do not? In doing so, past policy attempts will be assessed to identify tentative policy conclusions.

Question 5: Is there any evidence of a virtuous circle of human capital formation and increased inflow of MNEs? What is the role of policy to facilitate the virtuous circle?

Perhaps the ultimate scenario for the host country is to attain the virtuous circle where improvements in the level of human capital lead to more incoming MNEs, and improved training and technology spillovers from MNEs lead to a further increase in the human capital which leads to more incoming MNEs. Although it may be too early to assess the extent/mechanism for this circle to occur, we gather all possible evidence to identify the underlying conditions.

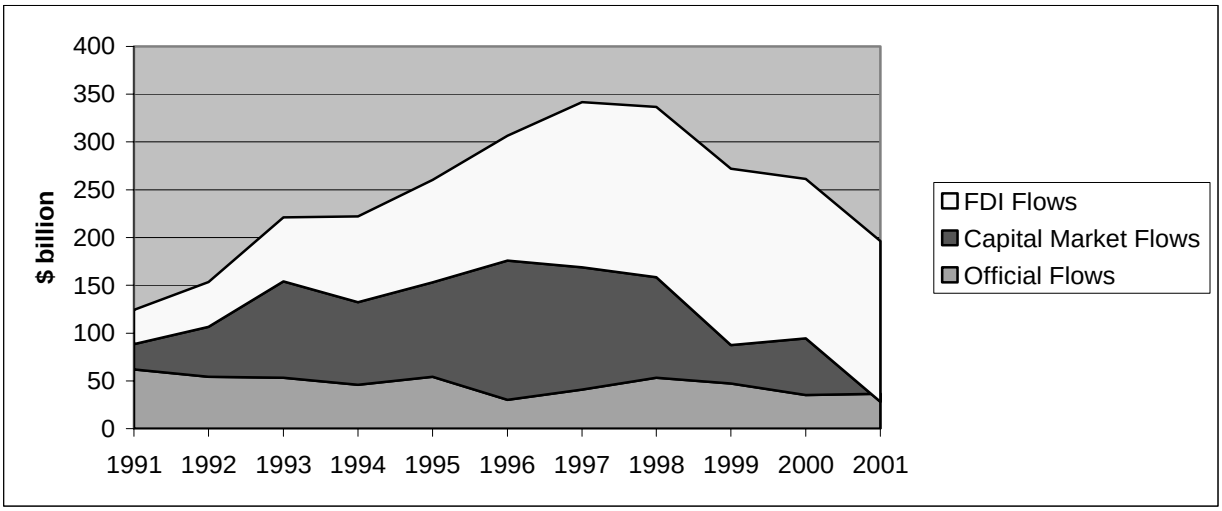
II. BACKGROUND

During the past two decades, a number of developing countries witnessed a growing importance of FDI as the primary source of financial capital flows into their economy. FDI brings not only increased access to foreign exchange, trade and employment, but also new products, information and technology. It is no coincidence that this rapid growth of FDI was accompanied by an increase in the level of human capital. The latter was achieved by strong government commitments to expand formal education and vocational training along with improved enterprise efforts to improve training opportunities for workers. This section looks at recent trends in both FDI and HRD in order to highlight the magnitude of this issue as well as to explain some of the key issues raised in this paper.

II.1. Trends in FDI in Developing Countries

Developing countries receive financial flows from numerous private and public sources. Private flows come from FDI and capital markets, the latter being bank lending, bond financing and equity flows. Most official flows come from official development assistance (ODA). Figure II.1 presents trends of different sources of financial flows to developing countries during the past decade. It indicates that FDI used to be relatively less important as compared to official flows, before the early nineties. After 1993, however, both the share and the level of FDI grew substantially and it is now the dominant source of financial flows into developing countries.

Figure II.1. **Net Long-term Resource Flows to Developing Countries**



Source: World Bank (2002).

This large expansion in FDI took place in two different forms: mergers and acquisition (M&A) and Greenfield investment. The former include equity acquisition of private companies and privatisation of public enterprises, the latter being quite popular in developing countries. Greenfield investments involve new capital investments by MNEs via establishing overseas subsidiaries (or affiliates) that serve as part of the global production/distribution network. Due to the difference in the mode of investment, M&A and Greenfield investment are expected to exhibit different impacts on host developing countries. Greenfield investment is more likely to have strong impact, at least in terms of HRD, since the former is a change in ownership structure while the latter is in essence a new investment which requires large MNE involvement to the local environment.

Table II.1 presents FDI by forms of investment. It shows that industrial countries have invested two to five times more in M&A than Greenfield investments during the past 15 years. In developing countries, however, Greenfield investment has been the major mode of FDI. This trend implies, to some extent, that developing countries do not as yet have abundance of firms attractive enough for foreign investors to acquire. However, for host developing countries seeking large capital investment in infrastructure and human resources, Greenfield investment provides large prospects for streamlining government and private sector investments that can be complementary. For developing countries with severe budgetary constraints, increased Greenfield investment may also compensate for underinvestment by the governments.

Table II.1. **Mergers and Acquisition (M&A) Versus Greenfield Investments**
(% of GDP)

	Mergers and Acquisitions (M&A)			Greenfield Investment		
	1987-89	1990-94	1995-99	1987-89	1990-94	1995-99
Industrial	0.82	0.53	1.55	0.25	0.29	0.33
Developing	0.10	0.32	0.94	0.87	1.28	2.01

Source: Calderon *et al*. (2002) using balance of payments data from the IMF and cross-border M&A data from UNCTAD.

The gradual increase in M&A and Greenfield investment as well as its relative importance in developed and developing countries should be reflected in the trends of FDI across time. Table II.2 presents inward flows and stocks of FDI during the past two decades. It shows a gradual increase in FDI flows until the year 2000 for developed and developing countries. The sudden drop in FDI flows in the year 2001 is related to depressed stock market sentiments and business cycles, both of which led to a massive drop in M&A investments especially in the developed countries (UNCTAD, 2002*a*). Table II.2 also indicates that FDI in developing countries is not necessarily a small fraction of the global FDI. While the drop in FDI in the year 2001 is acute in developed countries, developing countries show a relatively mild drop[4]. This is presumably due to the fact that a large fraction of FDI in developing countries is in Greenfield investment (UNCTAD, 2001).

Table II.2. **Inward FDI in Developed and Developing Countries**
($ million)

		1980	1985	1990	1995	2000	2001
Flow	Developed	46.530	42.693	164.575	203.311	1.227.476	503.144
	Developing	8.380	14.873	37.567	112.537	237.894	204.801
Stock	Developed	389.715	568.670	1.382.978	2.021.303	4.124.261	4.504.122
	Developing	245.819	344.463	484.954	849.915	2.002.173	3.292.349

Source: UNCTAD, FDI/TNC database.

In spite of the rapid growth in the level of FDI during the past two decades, these investments have not been equally distributed within the developing regions. To see this, Table III.3 breaks down the flows and stocks of FDI by regions within developing country. The African region has not been successful in attracting a large amount of FDI due to the fact that it has only been able to attract FDI in primary and resource-based manufacturing sectors, both of which have limited scope for future expansion. The Latin American and the Caribbean (LAC) and Asian & Pacific (AP) regions, however, have both succeeded in increasing the level of FDI during the past two decades. This is partly due to these regions successfully attracting relatively higher value-added FDI over time. Table II.3 thus indicates large cross-regional inequality in the level and growth of FDI over the past two decades.

Table II.3. **Inflows and Inward Stocks of FDI in Developing Countries**
($ million)

		1980	1985	1990	1995	2000	2001
Flow	Africa	380	2.407	2.483	5.743	8.694	17.165
	LAC	7.485	7.278	10.282	30.866	95.405	85.373
	AP	516	5.187	24.803	75.928	133.795	102.264
Stock	Africa	34.326	35.473	50.291	77.863	142.173	158.840
	LAC	50.297	80.019	117.001	201.426	613.094	692.978
	AP	161.196	228.970	317.663	570.625	1.246.700	1.329.431

Source: UNCTAD, FDI/TNC database.

One reason behind cross-regional disparities of FDI in developing countries may be due to concentration of FDI in selected countries. Indeed, the five largest host countries in the developing world received 62 per cent of total FDI inflows while the ten largest host countries received three-quarters of total FDI in 2001 (UNCTAD, 2002*a*). This, however, does not necessarily diminish the role of the small country's role in FDI. If FDI is measured as a fraction of GDP, many small countries actually fair better than most of the above-mentioned five largest host developing countries (World Bank, 2003).

To summarise, FDI has been the most important form of financial flow in the developing countries with Greenfield investment being the most dominant form. Although these countries have enjoyed a gradual increase in both the stocks and flows of FDI over the past decade, the growth of FDI was unevenly dispersed across the developing region.

II.2. Sectoral Trends of FDI in Developing Countries

The recent waves of globalisation have substantially transformed the modes of production and trade in both developed and developing countries. This is reflected in the changes in the extent of information and technology in the workplace, firm's production and organisational strategies, trade and FDI liberalisation policies, and new rules of international trade and investment. Given these developments, the sectoral trends (primary, manufacturing and services) in FDI have changed rapidly over the past two decades.

The most striking feature of FDI over the past 15 years is the sharp decline in the share of the primary goods sector. Indeed, the share of the primary goods sector has more than halved between 1988 and 1997 in developing countries (Table II.4). Another striking trend is the growing share of the services sector[5]. This was especially prominent during the M&A boom between 1987 and 2000. Indeed, the share of the services sector M&A in the year 2000 was more than twice the sum of the primary and manufacturing sectors (World Bank, 2003). Table II.4 shows that the drop in the share of the primary goods sector is almost equal to the increase in the services sector. In terms of the level of FDI, however, the manufacturing sector remains the most important sector in developing countries.

Table II.4. **Share of Inward FDI Stock by Sector in Developing Countries**
(percentage)

	Asia		LAC		Africa		Total	
	1988	1997	1988	1997	1988	1997	1988	1997
Primary	8.4	3.5	8.8	5.7	51.8	53.4	10.3	3.9
Manufacturing	62.1	62.9	67.4	38.8	20.8	26.8	62.3	60.7
Services	29.4	33.6	23.8	55.5	27.4	19.8	27.4	35.4
Total	100	100	100	100	100	100	100	100

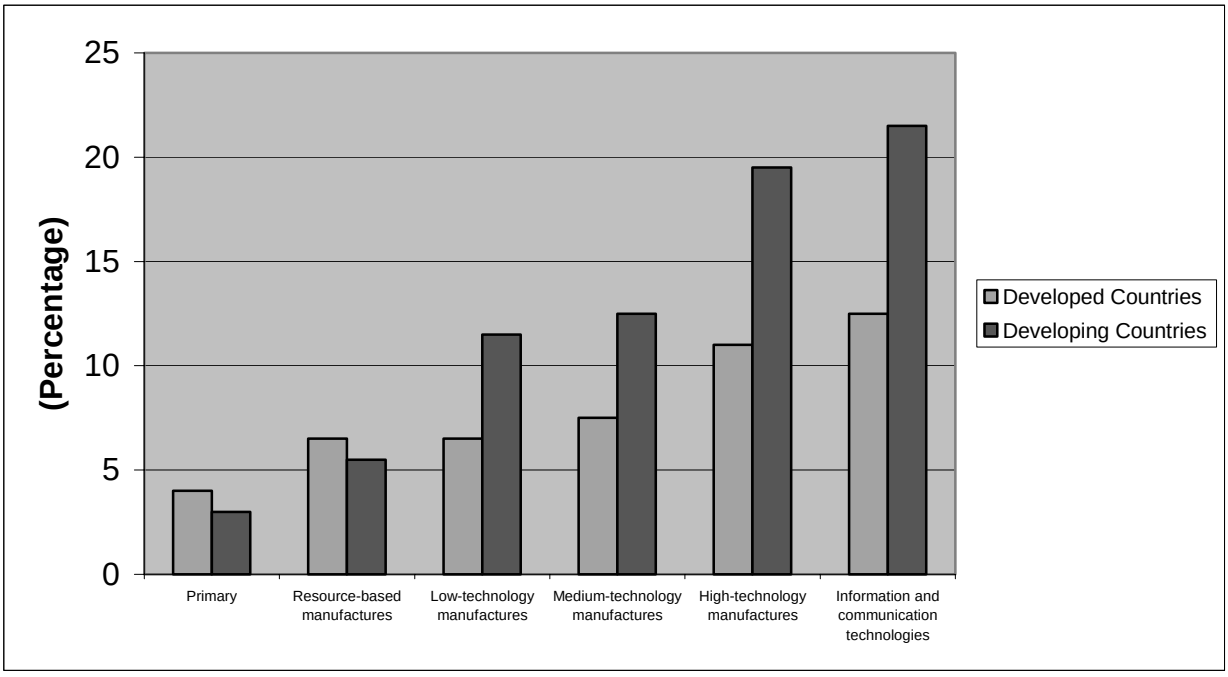
Source: UNCTAD (1999), World Investment Report, Annex Table A.I.18-19.

The increasing role of the services sector is notably the case in China, which receives the highest level of FDI in developing countries[6]. Between 1984 and 1993, the service sector has grown from 32.2 to an astonishing 47.3 per cent share of total FDI. This was at the expense of a diminishing primary goods sector which went down from 40.9 to 3.1 per cent during the same period. Following the general trends in developing countries, the share of the manufacturing sector in FDI for China remains dominant at 51.2 per cent in 1993.

Regional disparities in the sectoral composition are evident in Table II.4. The African region appears to go against the overall developing country trends with the share of primary goods remaining high and constant and the share of services diminishing. This is due to the fact that a large number of MNEs operating in Africa are still attracted by the abundance of natural resources rather than the market or host-country investment climate. The Latin American and the Caribbean regions show a large drop in the share of the manufacturing sector with a corresponding increase in the share of the services sector. The Asian region exhibits a large and stable share of the manufacturing sector.

Technologically advanced FDI has become more and more dominant in recent years. This should be reflected by resource-based manufacturing being replaced by high-technology manufacturing firms. There is also evidence that a number of manufacturing firms have created services-related enterprises due to the necessity of outsourcing part of the enterprise operation (UNCTAD, 1999). While Table II.4 is consistent with this observation, the trends in the technology content of production are not so evident. In order to clarify the distinction in different levels of technology that are imbedded in goods produced by the MNEs, Figure II.2 presents the annual growth rate of world exports by technological intensity. Given that a substantial fraction of manufacturing goods generated by MNEs in developing countries is exported, Figure II.2 should provide an approximation of the trends in the technological level of the goods produced through FDI. Figure II.2 clearly indicates that the higher the technological content of the exported goods, the higher the growth rate. Products with the lowest extent of technology such as primary goods and resource-based manufacturing exhibit the lowest growth rate in world exports.

Figure II.2. **Average Annual Growth Rate of World Exports by Technology Intensity**



Source*:* UNCTAD (2002), *World Investment Report 2002*, Figure VI.4, page 146.

II.3. Trends in Human Capital Formation in Developing Countries

The level of human capital in developing countries has on average improved over the past three decades, owing to enhanced government commitments in formal education and vocational training as well as increased incentives of firms to provide enterprise training. Section II.3 describes recent trends in human capital formation, highlighting general trends and regional disparities. Trends in human capital are reflected in numerous educational indicators including adult literacy and educational attainment of

the adult working age population. While education level of the working age population provides a picture of the *current* state of human capital, focusing on the present state of education among students and training activities among enterprise workers sheds light on the future prospects of human capital. To this end, the current state of education and training is also described.

Trends in Human Capital

Adult literacy is one of the common indicators used to capture an important, yet limited, aspect of human capital in developing countries. The benefit of this indicator is that it is, in general, readily available in most countries and is relatively easy to compare across different countries and regions. It is, however, also quite a limited indicator in the sense that it fails to capture many intricate features implied in worker skills and productivity. Adult literacy is thus considered to be a good indicator to capture some extent of human capital for least developed countries where a large fraction of the adult population lacks basic education. For these countries, alternative indicators such as educational attainment are not informative since it tends to be very low in many countries with small variances. According to UNESCO (2002), adult literacy[7] in developing countries has improved substantially over the past 20 years. That is, the literate working age population increased from 70 per cent (of total working population) in 1980 to 80 per cent in 2000. However, the remaining 20 per cent of illiterate adults in 2000, a large fraction of whom are female and are concentrated in highly populated developing countries in South and East Asia[8], is yet a non-trivial concern among policy makers.

Formal education in developing countries has become widespread over the past three decades, owing to an increased awareness among policy makers and individuals of the importance of this issue. The major event in this context is the global initiative called *Education for All*, an intergovernmental effort to increase quality and quantity of basic schooling in developing countries. All these past efforts have led to an increased educational attainment among the working-age population in developing countries. Table II.5 shows cross-regional trends in average years of schooling among the working-age population. It indicates that all developing regions show substantial gains in average school years. There are, however, large cross-regional disparities, with Latin American and the Caribbean (LAC) and East Asia and the Pacific (EAP) regions making significant gains while South Asia (SA) and sub-Saharan Africa (SSA) achieve only modest gains.

Table II.5. **Trends in Average Years of Schooling**

	1980	1990	2000
East Asia & Pacific	4.3	5.4	6.4
South Asia	2.6	3.1	4.3
Latin America & the Caribbean	5.3	6.7	7.6
Middle East & North Africa	2.7	4.3	5.9
Sub-Saharan Africa	2.1	3.0	3.9

Source: Cohen and Soto (2001).
Note: Figures are for population aged 15~64 not going to school.

Since most workers in developing countries, and in particular the least developed countries, have at most basic schooling, numbers in Table II.5 do not clearly indicate the extent of an adult's school attainment at the upper-secondary and tertiary level. Table II.6 thus presents an adult's educational attainment at the post-basic schooling level. Although sample countries are rather limited, it provides some insights to the extent and the regional disparities of post-compulsory schooling. First, consistent with trends in the average school attainment (Table II.5), the LAC-region shows the highest post-basic school attainment for the working-age population. The African region is presumably largely behind LAC and EAP regions, in the light of the fact that Tunisia is among the countries in Africa with relatively high educational attainment. Table II.6 also indicates large intraregional disparities with stark differences in post-basic school attainment between Chile and Paraguay for the LAC-region and between Malaysia and Thailand for the EAP-region.

Table II.6. **Educational Attainment in Post Basic-Schooling (1999)**
(percentage)

	Upper Secondary	Tertiary	Total
Argentina	28.1	13.7	41.8
Brazil	17.6	7.5	25.1
Chile	34.9	9.5	44.4
Jamaica	33.3	3.8	37.1
Paraguay	16.2	3.0	19.2
Peru	30.8	15.8	46.6
Uruguay	23.0	9.1	32.1
LAC average	26.3	8.9	35.2
Indonesia	16.9	4.5	21.4
Malaysia	28.3	8.6	36.9
Thailand	6.6	10.3	16.9
South-East Asia average	17.3	7.8	25.1
Tunisia	2.8	6.4	9.2

Source: UNESCO and OECD (2003).
Note: Numbers represent the share of population aged 25-64 that have either upper secondary or tertiary as the highest level of schooling attained. Averages have not been weighted.

Prospects of Human Capital in the Future

Future prospects of human capital development can be seen from the current trends in education among the children as well as the training efforts made in enterprises. Table II.7 shows net primary school enrolment ratios, among primary school-aged children in developing countries. It indicates that primary school enrolment in developing countries, on average, is well behind that of developed countries. This appears to be due to a few developing regions that show extremely poor performance, such as Central Asia and SSA. On the other hand, both the LAC and EAP regions show an impressive performance that is comparable to the developed countries. This regional disparity poses a big challenge to the less performing developing regions with a high number of undereducated children lowering the average level of human capital among the working-age population.

Table II.7. **Net Primary-School Enrolment Ratios, 2000**

East Asia & Pacific	Central Asia	South/West Asia	Central & Eastern Europe	Latin America & Caribbean	Sub Saharan Africa	Average Developing Countries	Average Developed Countries
93	69	79	87	96	57	82	97

Source: UNESCO and OECD (2003).

To see how developing countries are doing to foster a higher skilled workforce, Table II.8 examines entry rates in post-basic schooling (i.e. upper-secondary and tertiary) for selected developing countries. Similar to the trends found in educational attainment in basic schooling (Table II.6), Table II.8 indicates that both the LAC and SE-Asia regions have high average enrolment rates of 74 and 67 per cent (upper-secondary) and 31 and 25 per cent (tertiary), respectively. Intraregional disparities in entry rates remain large, with low-performing countries such as Paraguay and Indonesia lagging behind high-performing countries such as Argentina and Malaysia.

Table II.8. **Entry Rates to Post-Basic Schooling, 2000**

	Upper Secondary	Tertiary
Argentina	85	50
Chile	83	38
Jamaica	77	9
Paraguay	48	-
Uruguay	78	26
LAC average	74	31
China	83	8
Indonesia	39	14
Malaysia	83	22
Philippines	68	41
Thailand	63	40
South East Asia average	67	25
Tunisia	53	27

Source: UNESCO and OECD (2003).

Note: Numbers represent new entrants in each schooling level as a percentage of total population at typical age of entry. Averages have not been weighted.

While numerous sources of cross-country data on formal education exist, cross-country evidence on vocational training within the enterprises is rather limited[9]. A rare example is the World Bank's *World Business Environment Survey*, which covers vast regions of the world including OECD countries, Latin America, and East Asia. The survey shows that approximately 60 per cent of firms in both the East Asian and Latin American regions conducted some formal training in the year 2000 (Batra and Tan, 2002; Batra, 2003). There are, however, large intraregional disparities in training. In the East Asian region, large training incidences exist between high training countries such as Singapore (76 per cent), Philippines (76 per cent), China (65 per cent) and low training countries such as Indonesia (46 per cent) and Malaysia (29 per cent).

II.4. Summary

To sum up, trends show that educational attainment among the adult population has steadily increased over the past three decades. However, cross-regional and intra-regional disparities remain a disturbing issue with the African region consistently lagging behind other developing regions. Future prospects of educational attainment among the adult population are bright for countries in some areas of the developing world including LAC and SE-Asia. However, the present state of school participation in the African region shows limited prospects for future growth in human capital. Evidence on enterprise training is fairly consistent with these trends in formal education with large cross-country disparities.

III. HUMAN RESOURCE DEVELOPMENT AND ATTRACTING INWARD FDI

One of the characteristics of rich industrial economies is the availability of a workforce with a high level of human capital. Whether human capital has been the key driver of economic prosperity or *vice-versa* is still a matter of debate. Nevertheless, long time series trends in educational attainment and economic growth during the last century indicate that HRD and economic prosperity went hand in hand[10]. Some developing countries followed similar trends in human capital and economic growth. What was distinctive about these developing countries is that they appeared to have realised large economic benefits in attracting MNEs into host economies, and have thus mobilised inward FDI to attain rapid economic growth.

How do host developing countries attract FDI? Figure I.1 indicates the importance of an attractive investment climate and sound policy environment in order for host developing countries to successfully attract FDI. Investment climate includes availability/quality of factors of production, market size/access, logistic costs and numerous socio-political environments conducive for doing business with minimal risk. Past experiences of countries that have successfully attracted FDI indicate that many of these factors were indispensable. Among these, the level of human capital has been a crucial factor that MNEs, especially the high value-added MNEs, were seeking when determining the new location of operation. This has recently become even more crucial as the mode of MNE production is becoming relatively skill-biased with an increasing number of high-technology manufacturing and services MNEs seeking labour force equipped with knowledge in engineering, technology, organisational skills and business administration.

This section evaluates host developing country efforts to develop human capital to attract inward FDI. The aim is to determine the following:

— Is human capital essential for attracting *any* type of FDI?

— What are the level and type of human capital necessary to attract FDI?

Both questions have become increasingly important but at the same time difficult to tackle since the type and the mode of FDI have changed dramatically during the past two decades and host countries are striving to upgrade/adapt their human capital as well as other key host country environments. The following evaluates empirical evidence on the role of HRD on inward FDI, and assesses policy experiences to mobilise HRD.

III.1. Empirical Evidence: Does Human Capital Matter?

Although the theoretical literature on FDI presumes human capital to be among the key ingredients of inward FDI (Dunning, 1988; Lucas, 1990; and Zhang and Markusen, 1999), there are only few cross-country analyses done to identify the determinants of inward FDI in developing countries. Perhaps the reason for this lack of studies comes from the difficulty in constructing quality explanatory variables, especially for the indicator of human capital[11]. This becomes even harder when one tries to gather consistent cross-country variables. The literature on cross-country analyses can be divided into two groups. The first uses datasets that cover the period between the 1960s and 1980s while the second is based on datasets between the 1980s and mid-1990s. All studies adopt cross-section and time-series analysis covering different sets of developing countries.

The first group includes Root and Ahmed (1979), Schneider and Frey (1985), Hanson (1996), and Narula (1996). Root and Ahmed show that among the 58 developing countries, none of their proxies for human capital: literacy, school enrolment, and the availability of technical and professional workers, are statistically significant determinants of inward FDI. Schneider and Frey, using data for 54 developing countries, find the share of an age group with secondary education to be a less significant determinant as compared with other economic and political influences. Hanson, using a sample of 105 developing countries, shows that the adult literacy rate was not an important determinant of FDI as compared with other socio-political variables. Finally, Narula demonstrates that the number of tertiary education per population was not a statistically significant explanatory variable for FDI inflows among the 22 developing countries. Thus, all four cross-country studies show that human capital is not necessarily an important input for inward FDI. This conclusion is consistent with the fact that the period of the 1960s to 1970s was when FDI in the developing countries was concentrated on market and resource seeking and/or lower-end manufacturing types and that cheap labour and/or abundant natural resources were more important (Deyo, 1989; Ritchie, 2002; and Dunning, 2002). Thus, demand for higher-educated labour appears to be less crucial during this period.

The second group of cross-country analyses include Noorbakhsh *et al*. (2001), UNCTAD (2002*a*), and Nunnenkamp and Spatz (2002). Using a dataset that covers the 1980s to mid-1990s, Noorbakhsh *et al.* find that both the stock and flow measures of the human capital variable[12] show statistically significant and positive effects on FDI inflows, and that the effects became more significant over time. The major difference in the results compared with the first group of studies, apart from the econometric precision, should come from the fact that they used a more recent dataset that contains relatively more high value-added manufacturing firms. Indeed most MNEs operating in developing countries during the late 1980s and 1990s tend to be efficiency-seeking types and/or subcontracting (Dunning, 2002; Nunnenkamp and Spatz, 2002) and high skilled labour force is expected to be crucial. UNCTAD also finds a high correlation between human capital proxies — tertiary gross enrolment ratio and science and engineering student ratio — and FDI inflows[13] among 140 developed and developing countries (UNCTAD, 2002*a*). Nunnenkamp and Spatz uses Barro and Lee's (2000) average years of education of total population aged 15 and above in the 28 developing countries and finds that education becomes an increasingly important determinant from the mid-1980s to the late 1990s.

Thus, cross-country evidence indicates that human capital is an important determinant for inward FDI especially among efficiency-seeking MNEs, while not being an important determinant among market or resource-seeking MNEs. This is consistent with evidence that none of the Southeast Asian countries had institutions for industrial upgrading with skills development before the influx of FDI, at least in the low-end manufacturing sector (Deyo, 1989; Ritchie, 2002). This is also consistent with the experience in the African region, where much of the growth in FDI was in natural resources and market-seeking MNEs that were accompanied by stagnant growth in human capital.

Does this evidence indicate that countries seeking natural resources and/or market-seeking MNEs do not necessarily need to improve the level of human capital, while countries that seek higher value-added MNEs need to have a solid human capital base? To the extent that increased human capital contributes to civil liberties, political stability, health and reduced crime/corruption, all of which are considered to be key determinants of any type of FDI, human capital can still be a determinant for *any type* of FDI. One possible reason why human capital was not a significant determinant among studies using FDI data for the 1960s and 1970s is that other control variables may have captured the effect of improved socio-political stability due to improved human capital. Another reason may be that it may take longer time for improved human capital to have an impact on improved socio-political stability.

Although supported by limited evidence, education at the secondary school level appears to be the minimal level of education that is necessary for attracting relatively high value-added, efficiency seeking FDI. The evidence, however, does not inform us which type of human capital, be it level or types of education or firm-based training experience, is most effective in facilitating inward FDI. Most cross-section studies use secondary or tertiary level of schooling as a proxy of human capital. None of the studies compare different levels or types of human capital to identify the most effective level/type of human capital.

While cross-country analyses provide a general idea of the importance of human capital on inward FDI, inconsistencies in the definitions of each explanatory variable are likely to plague their results. In this sense, country-specific studies are likely to reduce this bias. Unfortunately, there are equally less country-specific studies that delve into the role of human capital. Broadman and Sun (1997), and Coughlin and Segev (2000) provide evidence for China in the early 1990s, where they show that adult literacy is one of the key determinants for geographic determinants of FDI. Mody *et al.* (1998), identify the determinants of Japanese MNEs' expected investment in Asia. A variable representing labour quality[14] shows strong impact on expected investment for China, India, Indonesia, Malaysia, Philippines, Thailand and Vietnam. While a limited amount of evidence exists for other Asian countries, to the author's best knowledge, none exists for the Latin American and African regions. Thus, the experience in limited country case studies is consistent with the importance of human capital on inward FDI, while giving no clear picture of the minimal level of human capital that is essential nor the level/type of human capital that is most effective.

Recently, a number of international organisations and bilateral donors have initiated surveys related to FDI and the host-country investment climate. They include the *World Business Environment Survey* by the World Bank in the year 2000, *Foreign Direct Investment Survey* by the Multilateral Investment Guarantee Agency[15] in 2001, and *JBIC FY2001 Survey* by the Japan Bank of International Cooperation (JBIC, 2002) [16]. The attractiveness of these surveys is the wide coverage of countries in developing countries, the relatively large sample size, and the recentness of survey years[17]. The latter two surveys contain direct questions regarding the firm's motive of location selection. Although detailed analyses on location determinants have not yet been undertaken, preliminary analyses using these surveys show that the quality of human resources is an important criteria for MNEs investment decisions. The *Foreign Direct Investment Survey* shows "ability to hire technical/managerial staff, and skilled labourers" to be among the critical factors of location choice[18]. *JBIC FY2001 Survey* show that many Japanese MNEs considered "availability of superior plant workers and managerial personnel" to be an important factor for future investment choice of production bases[19].

To sum up, the literature on human capital and FDI indicates that human capital is an important determinant of FDI, especially among efficiency-seeking FDI that requires a skilled workforce as one of its key inputs. Although higher human capital does not appear to affect inflows of resource/market seeking FDI directly, it can indirectly affect FDI by improving civil liberties, health and crime rates. Basic schooling (until lower-secondary school level) appears to be the minimal level of schooling required for FDIs after the mid-1980s. Given that the tendency of FDI in recent years is towards relatively skill-intensive production and services, and less towards primary and resource-based manufacturing, basic schooling should be the absolute minimum level of education the developing countries must provide. For countries seeking to attract higher value-added MNEs, it is necessary to upgrade human capital way above the basic schooling level.

III.2. Policies to Develop Human Resources

Now that the importance of human capital in attracting FDI is understood, the next question is: what are the past HRD policy experiences of host developing countries that have strived to attract inward FDI? This section focuses on formal education policies to attract FDI. While vocational training policies also help improve human resources of host developing countries, they are likely to be more important after some influx of FDI into the economy.

Policy Experiences to Improve Basic Education

Basic education is the starting point of a HRD policy. Without wide access to quality basic education, host countries not only face difficulties in attracting low value-added MNEs, but also lose opportunities to move-up the value chain by upgrading worker skills. Experiences in host developing countries that have invested in basic education appear to have led to a large influx of FDI. The following evaluates policies that have mobilised such efforts.

Perhaps the most celebrated policy initiative to expand basic schooling is *Education for All*, a collaborative action by international donors, governments and NGOs to improve education[20]. This initiative called upon all stakeholders to plan and initiate measures to improve numerous aspects of educational constraints faced by developing countries. They include lack of access to and quality of basic education and high adult literacy. Although many participating countries made large efforts to attain target goals set during the conference[21], many of the these goals have not been achieved, with regions such as Central Asia and sub-Saharan Africa still facing low primary school enrolment rates and adult literacy rates. Gender gaps also remain quite large in these regions.

While the above initiative had a strong impact on increasing donors' official development assistance (ODA) for basic education, it also stimulated developing countries' own efforts to improve basic schooling. Mexico is a good case example where compulsory education was increased from primary to the end of basic schooling in 1993. This effort by the government as well as inputs from donors led to a substantial improvement in access and quality of basic schooling, with enrolments increasing 7-fold while total population tripled, and adult illiteracy decreased from 40 to 12 per cent. The government has also implemented a comprehensive reform of the education sector over the last five years with an emphasis on improving literacy and numeracy levels of the population. As a consequence, the average educational attainment among the population aged 15-64 has indeed increased from 5.9 years in 1980 to 7.95 years in 2000 (Cohen and Soto, 2000). Brazil is another country that has mobilised the *Education for All* initiative to reform the education system. The reform was undertaken in a direct manner via integrating the *Education for All* initiatives into the government's education policies. This has led to an improvement in access and quality as well as the management and financing. Net primary enrolment at the 1st-4th grade has increased from 86 (1990) to 97 per cent (1999), while that of 5th-8th grade increased from 40 (1990) to 62 per cent (1999).

A number of countries have made efforts to increase access and quality of basic education before the *Education for All* initiative. With the collaboration of the World Bank, *Indonesia* achieved an unprecedented increase in the number of primary schools of 61 000 between 1973 and 1978, which was later shown to have a large impact on school participation and wage gains (Duflo, 2001). The Indonesian government, with substantial financial assistance from donors including the World Bank, later implemented a scholarship scheme under the *Back to School Programme*, which allowed further improvement in the access to basic education. Several countries have made attempts to increase the quality of basic education as well as the access. They include Singapore, Indonesia, El Salvador, Haiti and Costa Rica. During the import-substitution phase back in the 1960s, *Singapore* initiated a scheme called *Standardized Education System* to streamline necessary types of skills in maths, science and English, to be covered in basic schooling. *Indonesia*, under the *Back to School Programme*, promoted improved efficiency in learning and service delivery by providing large lump-sum cash subsidies directly to schools and communities. This is a part of the community-participation scheme[22] which became a well-known model for developing countries to gain efficiency and quality in basic schooling. Other countries that followed the community-participation scheme include *El Salvador*, which emphasised the role of school-based management,

and *Haiti*, which involved NGOs and a religious organisation. Recent developments in improving quality in delivering basic education are the use of technology in schools (World Bank, 1999). Costa Rica has been a front runner in the introduction of computers in classrooms to improve learning efficiency and to prepare students for the knowledge-economy. The *Educational Computing Programme* and *Community Computing Programme* started in the late 1980s have already supplied over 10 per cent of all public primary schools in Costa Rica. It has been found that these initiatives had an enormous impact in spreading pre-internet digital culture in the communities (Monge and Cespedes, 2002).

In general, most of the above-mentioned policy experiences have indicated positive impact on quantity and quality expansion of basic schooling. However, care must be taken in applying these experiences to other countries each facing a unique set of constraints. For example, programmes to mobilise information and technology in schools are increasingly popular in developing countries. While computers may potentially be an efficient tool to facilitate learning and to equip students with technological skills, many developing countries simply do not have stable infrastructure nor educational budgets to keep up with the recurrent cost of such investment. For these countries, other means to improve quality of schooling may well be more effective.

Policy Experiences to Improve Post-Basic Education

There have also been numerous individual country and inter-governmental efforts to expand upper-secondary and tertiary education. Ireland and Korea are among the countries that have achieved increased access through policy change. To increase enrolments at upper-secondary and tertiary education, *Ireland* changed educational financing policies to reduce the tuition burden of students. The secondary education fee was abolished in 1967, followed by an introduction of free tertiary education. *Korea*, while already enjoying a relatively high tertiary school enrolment rate, faced problems in allocating students to subject areas that reflect industry demands (UNCTAD, 1994). In particular, it was difficult to expand students in fields of technology. After identifying that lack of qualification and recognition in these fields led to low enrolments of students in these fields, the government decided to redesign a technical qualification system that allowed graduates who studied these subjects to have the same status as other professionals.

Several countries have also tried numerous policy initiatives to improve the quality of tertiary education. They include Singapore, Ireland and Africa.

Singapore's Investment Promotion Agency (IPA): the Economic Development Board (EDB) has recently made an attempt to shape the Singaporean education system which is highly responsive to industry demands. This effort began in 1997 with the *World Class Universities Programme*, with an aim to set up ten world educational institutions in Singapore to deliver quality courses on demand-driven subjects. Singapore already has eight American and European schools that have strong links to industries. The amount of education and R&D delivered through these schools is expected to meet the skills needs of the industries.

Ireland's IPA: the Irish Development Authority (IDA) also has a role in shaping educational policy in synchronisation with industry demands. In 1997, for example, the *Experts Group on Future Skills Needs* was formed to identify skills needs of sectors and recommend action for HRD. Furthermore, the Irish IPA led a strategy called Education, Skills and Research, which includes research programmes in tertiary education to promote R&D and innovation capacity of the economy.

In spite of the over-mounting problems to expand basic education, a number of countries in *Africa*, with the assistance of the World Bank, have initiated *African Virtual University* to overcome supply and quality constraints in tertiary schooling. This initiative, begun in 1997 with 17 African countries participating, has already produced 24 000 graduates in the field of technology, engineering and business. The main idea of this initiative is to provide demand-driven tertiary education of high quality in areas where either infrastructures or the type/quality of courses are non-existent. However, to the extent that many of the graduates of these courses may go outside Africa, the true impact of the African Virtual University, on upgrading skills in Africa is unclear. However, experience in Singapore provides a good example for countries that aim to attract high value-added FDI.

Policy Initiatives in the EU-zone: The Minimum Learning Platform

Attempts have been made in a number of EU member countries to set a so called "minimum learning platform" which defines areas of knowledge and competence that are necessary in the forthcoming labour market. They take into account the new skill requirements such as communication skills, understanding ICT, ability to learn independently and further personal and social skills (McIntosh and Steedman, 1999). Furthermore, the "minimum learning platform" is expected to include not only skills that increase employability, but also skills that relate to all aspects of human conditions, such as personal and social skills (McIntosh and Steedman, 1999). The concept of minimum learning platform contains an important message that the minimal skills necessary to meet the future labour market demand is increasingly moving towards higher technology areas as well as personal developments.

Policy Conclusion

Past trends in inward FDI and policy experiences lead to two policy conclusions. First, HRD policies should at the minimum, address access-to and quality-improvement of basic education. Without a sound basic education policy, the education system will constantly feed under-skilled workers into the labour market, which gives a bad signal for potential MNEs seeking location advantages. While basic education is important in itself to upgrade human capital, it also provides means for further increasing human capital by opening options for tertiary education, which has become increasingly demanded by high-value added MNEs. Even for countries that intend to attract primary and resource-based manufacturing FDI, basic education is important since it has a long-lasting effect on other key investment climates such as socio-political stability, health and civil liberty. However, effective ways to rapidly improve basic education is unclear from past host country experiences. It should depend on specific educational constraints faced by each country.

Second, HRD policies must be demand-driven. Past experiences indicate that participation by industries and foreign academic institutions that have close ties with high-technology industries can be effective. Moreover, experiences in Singapore and Ireland show that IPA-driven educational policies allow demand sensitive HRD policy reforms. To the extent that not all IPAs have authorities to have an impact on education policy making, IPAs should collaborate closely with the Ministry of Education.

III.3. Attracting Service Sector MNEs

As shown in section II.2, services sector FDI has been a growing area in the past 15 years. Since the service sector FDI, in general, involves high value-added MNEs that possess knowledge and technology, host developing countries may want to mobilise their human resources so as to attract these types of MNEs. While not all services-related MNEs require high-skilled workers, some of the growing services-related MNEs do actually require a high-skilled workforce. They include MNEs operating in the area of financial services, information technology, telecommunication, pharmaceutical, medical, as well as firms that locate regional headquarters in the host country.

The common feature among these services-related MNEs is that they require strong business support linkages and global connectivity. This calls for a highly-skilled workforce that could handle business administration and management as well as computing and information and technology.

One good example of a rapidly growing services sector is regional headquarters. Singapore is a country that has successfully attracted a large number of corporate headquarters and is now a key hub in Asia. More than 60 per cent of the 6 000 foreign companies now based in Singapore have regional responsibilities and headquarters functions[23]. With a sufficient supply of computer-literate English-speaking workers with tertiary education, as well as other key factors such as sound logistics, financial infrastructure, and tax incentives, more corporate headquarters are likely to be based in Singapore in the future.

III.4. Summary

To sum up, empirical evidence indicates that human capital is important for attracting FDI, and that host developing countries need, at least, a minimum of basic schooling for all adult population to show that their country has a sound investment climate to potential MNEs. Countries that seek high value-added MNEs in high-technology manufacturing and services need to develop the tertiary education sector further. This calls for HRD policies that secure access and quality of basic schooling. To formulate effective demand-driven HRD policies, it is necessary to have industries and IPAs participate in policy making as well as the delivery of educational services.

IV. HUMAN CAPITAL FORMATION BY MNES AND TECHNOLOGY TRANSFERS

The previous section examined the role of host countries in attracting inward FDI and found that efforts to develop an attractive investment climate supported by sound policy reforms in HRD would help open doors to inward FDI. This section focuses on what host countries can do next to mobilise these MNEs to strengthen HRD further.

The obvious place to start is the role of enterprise training by the MNEs, since they are one of the limited channels of foreign technology coming into the host developing country[24]. MNEs cannot only afford to provide more training but should also provide innovative training in areas such as information and technology, organisational skills, and management, to which otherwise host developing countries have limited access. However, it is not just the host country effort that is crucial for maximising the role of HRD by the FDI. It is in fact also important to have domestic firms, which constitute the majority of firms and workers in developing countries, conduct HRD in order to maximise the amount of skills transferred to the host country. Thus, this section will consider training activities of both MNEs and domestic firms.

IV.1. Human Capital Formation by MNEs and Domestic Firms: Determinants of Enterprise Training

It is a general understanding that firms in general underinvest in training in both developing and developed countries (Batra and Tan, 2002; OECD, 2003; OECD, forthcoming). Among the few surveys that cover enterprise training in the developing countries, the World Business Environment Survey (WBES) provides some information about cross-country comparison in training incidence. It shows that on average, 60 per cent of firms in both East Asia and Latin America and the Caribbean (LAC) regions conduct some formal training (Batra and Tan, 2002; Batra, 2003). However, there are wide variations in the incidence of formal training, which ranges from 65 to 75 per cent in China, the Philippines, and Singapore to 30 per cent in Malaysia. Another set of enterprise surveys that compared training incidences in Indonesia, Malaysia, Chinese Taipei, Columbia, and Mexico in the early 1990s[25] also confirm large variances, with high performing countries such as Columbia (50 per cent) and Malaysia (35 per cent) to low performing countries such as Indonesia (19 per cent), Chinese Taipei (9 per cent) and Mexico (11 per cent).

What are the sources of training? WBES distinguishes between formal in-house training provided by the employer, and formal training provided by external public/private training institutions. It indicates that formal in-house training is the major source of training provided by firms in both East Asia and LAC regions, accounting for 40 per cent in East Asia and 50 per cent in the LAC. Among firms that use outside training sources, most firms in both regions appear to rely on private training institutions.

Underinvestment in training that is relatively unequally distributed is a disturbing evidence when host developing countries are trying to catch up with the skills level of the industrialised economies and enterprise training is one of the most important sources of skills acquisition. Indeed many studies have shown that enterprise training raises labour productivity substantially. Empirical studies show that productivity gains of training range from about 50 to 75 per cent in Indonesia, Nicaragua and Guatemala, to about 30-45 per cent in Mexico, Malaysia and Colombia (Tan and Batra, 1996; Batra, 2003). These productivity gains are even stronger for small- and medium-sized firms (World Bank, 1997). Before describing policy measures to tackle these training problems, the literature on training determinants is assessed to identify the reason behind this underinvestment.

Determinants of Enterprise Training: What are the Training Constraints?

Enterprise Surveys have shown that large variances in training incidence exist across firms. A natural question then is why do certain firms invest more in training and others do not. There is a certain amount of cross-country and individual country evidence in the literature to identify why this is the case.

The only cross-country/cross-region survey in developing countries that sheds light on the training determinant is the WBES. This survey contains questions where firms are asked to rank on a scale of one (not important) to five (very important) the relevance of seven statements to their decision to provide little or no training (Batra, 2003):

1) training is not affordable because of limited resources;

2) training is costly because of high labour turnover;

3) firm lacks knowledge about training techniques and organisation;

4) firm used a mature technology, so learning-by-doing is sufficient;

5) informal training is adequate;

6) skilled workers are readily hired from other firms;

7) firm sceptical about the benefits of training.

Among the most important reasons for providing little or no training, East Asian firms responded: *4)* mature technology (45 per cent); *5)* adequacy of informal training (35 per cent); and *2)* labour turnover (33 per cent), to be the three most important determinants. Firms in LAC region responded: *6)* availability of hiring skilled workers from other firms (44 per cent); *4)* mature technology (35 per cent); *5)* adequacy of informal training (33 per cent), being the three key reasons. For firms already using mature technologies, there is limited scope for improving on existing techniques and workers can become more proficient by learning by doing or through informal training (Batra, 2003).

The WBES also indicates that 27 per cent of firms in East Asia and 13 per cent of firms in the LAC region face training constraints due to *1)* non-affordability coming from limited resources. This is likely to be the case due to the credit constraints faced by many enterprises in developing countries. While there are increasing numbers of training grants and subsidy schemes available in developing countries, not all the firms are eligible for training subsidies and credit availability may thus be important. Small- and medium-sized enterprises (SMEs) are more likely to face this type of training constraint since they are the ones who are less likely to have access to the credit market. Indeed, the WBES show that, in East Asia, 29 per cent of small-sized firms, and 19 per cent of medium-sized firms cannot afford training due to limited resources, whereas only 13 per cent of large-sized firms cannot afford it (Batra, 2003).

Lack of knowledge also appeared to be an important reason for providing little or no training. This was especially true in East Asia (24 per cent). Larger firms are more likely to have better access to information on training techniques and organisation. Indeed, in East Asia, only 18 per cent of large firms claimed to have constraints while more than 28 per cent of small firms lacked access to such information (Batra, 2003).

Firms having a perception of high-labour turnovers is another important reason why firms provided less or no training. Thirty-three per cent of firms in East Asia and 18 per cent of firms in the LAC region indicated their doubt that training investment is not worthwhile due to worker turnovers. This is more likely to be the case among small firms facing difficulties, whether financial or contractual, in providing incentives to keep trained workers. This is verified by the high percentage of small firms (32 per cent) showing concerns, while a smaller fraction of large firms (22 per cent) indicate this to be a problem.

To sum up, the WBES indicates that firms in East Asia and LAC face training constraints due to a number of market failures including information constraints, credit constraints and labour turnovers. These constraints were found to be less binding for larger firms. Larger firms have much wider opportunities to receive information regarding training techniques and organisation methods. Their training burden per worker is likely to be lower than smaller firms, since the opportunity cost of losing one employee in training activities and per worker cost of training is presumably lower.

Studies that focus on individual countries using firm surveys are consistent with these findings. For example, Zeufack (1999), Tan and Batra (1996), Tan and Lopez-Acevedo (2003), and Miyamoto and Todo (2003) show that the effect of firm size on training incidence is significant and large for Mexico, Indonesia, Thailand and Malaysia. Miyamoto and Todo (2003) use variables capturing legal status[26] in order to capture the extent of credit constraint among Indonesian firms. They find that having no legal status reduced the probability of training. Note that the findings that large firm size positively affects training is consistent with firms not training due to information and credit constraints and labour turnovers. This is because larger firms are less likely to be credit constrained, more likely to have access to information on training, and less likely to suffer from high labour turnovers. Smaller firms on the other hand usually find it hard to gain credits, participate in training workshops, face difficulties replacing workers engaging in training activities, and will not be able to provide attractive incentives for workers not to quit after training.

Another interesting finding from these studies is the positive role of a firm's technological sophistication on training determinants. Tan and Batra (1996), Zeufack (1999), and Tan and Lopez-Acevedo (2003), all show that R&D investment is an important determinant for training in Mexico, Malaysia, Thailand and Chinese Taipei. For Mexico this impact becomes even stronger over time (Tan and Lopez-Acevedo, 2003). This is consistent with firms using a sophisticated production process and R&D requiring intensive training for workers to adapt to such a mode of operation.

Do MNEs Train More than Domestic Firms?

Most empirical findings confirm this by using variables representing foreign ownership. Tan and Batra (1996), Tan and Lopez-Acevedo (2003), and Miyamoto and Todo (2003) show that higher foreign equity share is indeed an important determinant of training in Mexico, Indonesia and Malaysia. Why do MNEs train more than domestic firms? The literature provides numerous explanations. MNEs are less likely to face credit constraints since they usually have wide access to foreign capital. It is also suggested that MNEs are more likely to gain information on techniques and organisation of training since their range of information is global. They can also reduce the probability of labour turnovers by providing attractive compensation packages to keep the employees after the training provision[27]. A recent analysis in Almeida (2003) indicates that foreign-owned firms "cherry pick" domestic firms to be acquired, choosing those firms with a higher educated workforce. If an educated workforce is more likely to be trained, or if "cherry picked" firms tend to be high-technology firms that require training, MNEs are more likely to train than domestic firms.

Does Availability of Educated Workers Increase Enterprise Training?

A number of studies have addressed the issue of whether educated employees are more likely to receive enterprise training. Since productivity gains of training activities among educated workers are expected to be higher, firms with a higher proportion of educated workforce are more likely to provide training. Much empirical evidence supports this. Tan and Batra (1996) show that firms with high mean years of education are more likely to provide training in Colombia, Mexico and Malaysia. Tan and Lopez-Acevedo (2003) and Zeufack (1999) show that firms with a higher proportion of educated workers are more likely to provide training.

However, this does not necessarily imply that firms, faced with an abundant supply of educated workers, would train more. Indeed the WBES indicates that as many as 44 per cent of firms in LAC and 21 per cent of firms in East Asia provide less or no training due to the availability of skilled workers in the labour market. Miyamoto and Todo (2003) further confirm this by showing, after controlling for endogeneity of average workers education variable, that firms in Indonesia substitute training by hiring more educated workers.

This has an important policy implication since these findings indicate that simply expanding educational attainment may reduce firm's incentives to provide training.

IV.2. Human Capital Formation by MNEs: Supporting Formal Education

While training is no doubt the major source of HRD activities undertaken by the MNEs, they can also contribute to the HRD of host developing countries by mobilising formal education. One of the MNEs that has invested substantially in formal education is Intel. They have invested in curriculum, educational equipment, infrastructure and technical support to almost all countries where they have production facilities, including Argentina, Brazil, Costa Rica, China, Malaysia, South Korea, India, Russia, Poland, Ireland and South Africa.

For example, in China, Intel has supported tertiary education through effective curriculum development and research. Working closely with the Chinese academia, Intel has participated in joint research projects, facilitated technology development, and provided scholarships. In Costa Rica, Intel has assisted all levels of formal education in their *Robotics Programme* by providing training workshops for teachers, curriculum development, and providing equipment and materials. Their collaboration with the tertiary education sector includes technical assistance to the engineering curriculum and equipment supply to the University of Costa Rica and the Costa Rica Technology.

Another example of MNE participation in education is Toyota Motors Corporation in Indonesia. Toyota decided to collaborate with ASTRA foundation and created the Toyota-ASTRA foundation with the aim of supporting HRD through education, training and R&D. Recent programmes include scholarships to students at all levels of formal education, but in particular for children from poor families; educational materials and equipment to schools and universities; and research grants to universities and research institutions.

What are the motivations for MNEs to support formal education? Is it out of charity or to gain good publicity, which may well make sense under the recently growing hostility towards the MNEs? Does recently growing awareness of corporate social responsibility help in supporting MNE investment in human capital? Moreover, are there economic benefits for MNEs to invest in education? One economic benefit that MNEs may gain is the possibility to hire graduates from the educational institutions that MNEs are supporting. In other words, if it is more cost efficient to invest in formal schooling rather than providing in-house enterprise training, MNEs' investment in formal education can be justified. However, it is not clear if the graduates will end up working for the MNEs that had financed part of the education. To the extent that the type of skills funded by MNEs are most likely related to the skills relevant for the MNEs themselves or for their suppliers and distributors, most of the students are likely to be employed in firms with at least some backwards or forwards linkages to the MNEs. To verify these hypotheses, tracer studies of graduates of MNE-funded educational institutions are necessary.

One interesting example of services sector MNEs that have direct links to educational institutions are Universities and Business schools in the US and Europe. In fact, this is a special case of MNEs supporting HRD of host developing countries by themselves being the provider of education services. Examples of these include Harvard Business School in the US, INSEAD in France and the Stockholm School of Economics, all of which have school branches around the world including the developing countries. Singapore is one of the popular places where foreign educational institutions are located.

Recent efforts by governments to further attract and expand educational services MNEs is the *World Class Universities Programme*, which aims to attract at least 10 world class education institutions. Today eight top American and European schools with strong linkages to industry conduct advanced postgraduate education and R&D programmes in business, management, engineering and applied sciences. Although some of the participants of these educational programmes may be non-Singaporean who may not stay in the country after graduation, these educational services MNEs are expected to contribute to HRD by fostering R&D and supplying high-skilled graduates to the fast-growing industry.

IV.3. Technology Transfer through Training Spillovers

HRD activities conducted by the MNEs have proven to be important for host developing countries since domestic firms are more likely to face training constraints due to market failure. MNE training is also important since it is most likely to bring in the advanced skills and technologies to which domestic firms otherwise have no access. One important channel through which this technology may transfer from MNEs to domestic firms is the so-called training spillovers.

Training spillovers may occur through four routes: vertical-linkages, horizontal linkages, labour turnovers, and labour spin-offs. Vertical linkages happen when MNEs train or provide technical support to domestic firms that supply them with intermediate goods (backward linkages), or to buyers of their own products (forward linkages). Horizontal linkages occur when domestic firms in the same industry gain skills through industry or region-wide skills development institutions that are supported by MNEs[28]. Labour turnover occurs when MNE-trained workers or managers transfer their knowledge to other firms when switching employers. Finally, labour spin-offs happen when an employee of MNEs starts up a new firm based on the know-how gained from previous experience.

Training-Spillovers through Vertical Linkages

One of the most common linkages between MNEs and domestic enterprises is made through backward and forward linkages. MNEs can affect domestic firms that supply goods by providing technical assistance as well as training in innovative production methods, management and organisation.

There is much evidence of such training spillovers. One case was in Mexico during the 1980s, when the Mexican auto industry rapidly grew through the location decision made by General Motors and other major foreign car and auto parts companies. Within a short five-year period, more than 300 domestic suppliers of car parts and accessories had sprung up to serve these MNEs. Spillovers appear to have occurred through interactions between MNEs and domestic suppliers such as shop-floor training, quality-control training, weekly meetings and technical assistance (UNCTAD, 2000; Lim, 2001).

Costa Rica provides another case of training spillovers through backward linkages. Intel started to operate the semiconductor assembly and testing plant in Costa Rica in 1997. While providing a substantial amount of training to their own employees, Intel also provided training to suppliers of specialised goods and services (Larrain *et al*., 2001).

Training Spillovers through Horizontal Linkages

When MNEs support industry/regional skills development institutions through infrastructure investment, technical support and programme design, advanced technologies and skills of MNEs are expected to spillover to other firms in the same industries receiving training at these skills development institutions.

Malaysia provides a successful case of an MNE-government collaborative effort to mobilise domestic firm skills through horizontal linkages. This collaboration effort was made by two states: Penang and Selangor, to establish two state-run skill development centres: the Penang Skills Development Centre (PSDC) and the Selangor Human Resources Development Centre (SHRDC). Before the establishment, a series of meetings between MNEs and the state government was made to plan and design the content of the Centre, during the period when both of these states faced severe skilled labour shortages. Both of the skills development centres now provide, under the management of MNEs, training in technical manufacturing, managerial skills, and further education primarily to workers in domestic firms.

Training Spillovers through Labour Turnovers and Spin-Offs

When employees of MNEs seek alternative firms to work in after receiving MNE-based training, it is likely that they will try to sell their skills and experiences attained while working at the MNEs. Domestic firms interested in new skills and technologies would most likely seek ex-employees of an MNE in the same industry. Labour turnovers occur when such a demand and supply of skills clears in the labour market. Training spin-offs occur when such employees decide to use the acquired skills to start up a new company. Case examples of these are found in the Intel case for Costa Rica (Rodriguez-Clare, 2001) and in the machine-tools industry case for Malaysia (Lim, 2001).

Another interesting case is found in the enterprise training by Siemens India Limited, which manufactures a wide variety of electronic items such as switchgears/boards, control equipment, and communication/medical electronics equipment (Dagaur, 1997). The training programme provided by Siemens is a three-year apprenticeship programme for 140 young entry-level workers. After the apprentices have completed the in-house training which involves rotation of different divisions of the firm, half continue to work in Siemens, while the rest are employed in large- and small-scale industries or start up their own firm.

Training Spillovers by Improving the Absorptive Capacity of Domestic Firms

Is it only the efforts made by MNEs that stimulates training spillovers? The literature indicates that efforts made by host developing countries to improve their absorptive capacity also help transfers of skills. For example, Borenzstein *et al.* (1998) show that reducing the technology gap between MNEs and domestic economy increases technology transfers. Blomstrom *et al.* (1994) also show that FDI contributes to growth only for a country that already has the necessary capabilities to absorb FDI-related technology transfers. These two pieces of evidence imply that domestic firms' efforts to develop skills through training helps skills to transfer from MNEs to domestic firms.

Todo and Miyamoto (2002) provide direct evidence supporting the importance of domestic firms' absorptive capacity on training transfer. Using enterprise survey in Indonesia, they show that their variables capturing absorptive capacity of domestic firms, including R&D and human resource development expenditures, were important determinants of technology spillovers.

IV.4. HRD Policies to Promote Training and Spillovers

The above assessment of selected past empirical evidence suggests that firms, in spite of large productivity gains, underinvest in training due to market failures such as credit market constraints, lack of information and labour turnovers. The underinvestment is even more acute among small- and medium-sized domestic firms that tend to have higher productivity gains from training compared to MNEs or large domestic firms. It has also shown that MNEs have numerous channels to improve HRD in host developing countries by training their own workers and facilitating training spillovers. This calls for policy measures to tackle market failures in training and to stimulate training spillovers, especially among domestic small- and medium-sized firms.

Policies to Finance and Promote Training

To determine the optimal policy to tackle underinvestment in training, it is necessary to identify the nature of the market failure. If lack of information is the main reason for firms not training, the right policy response should be to address information failure. If firms lack incentives for training due to high labour turnovers, optimal policy should require firms to train or to contribute to the cost of training organised by a third party (Batra and Tan, 2002).

Information failures: Results from the WBES indicate that firms in the East Asian and LAC regions, on average, underinvest in training due to either "lack of knowledge about training techniques and organisation" or "being sceptical about the benefits of training". This calls for policies that facilitate dissemination of information regarding the benefits of training, best practices in training, and availability/costs/procedures to participate in training. Several developing countries including Malaysia and Mexico took such an approach as part of their training policies.

In Malaysia, the Double Deduction Incentive Scheme for Training (DDIT) was created in 1987 to tackle underinvestment in training. It later turned out to be less effective than originally envisaged and training take-up was low. According to the Malaysia Industrial Training and Productivity Survey 1995, the most frequently claimed reasons for firms to underinvest in training turned out to be that many firms were not aware of such training opportunities. The Human Resource Development Fund (HRDF) was later created in 1993 using a matching grant from the government. The council was formed by representatives from the private sector and from responsible government agencies to administer the scheme. One important feature of the HRDF was to disseminate information on training using workshops on training needs analysis, clinics to answer questions about different schemes, and employer associations to participate (World Bank, 1997). This new scheme, although not entirely due to the increased level of information dissemination, was shown to have increased the use of training funds.

Mexico initiated the Integral Quality and Modernisation Programme (CIMO) in 1988 to provide subsidised training to small- and medium-sized enterprises. After the pilot programme that consisted of training subsidy, it expanded the scope to provide integrated training package and industrial extension services to 23 000 SMIs per annum and 150 000 employees (World Bank,1997). An information campaign to disseminate this new programme was an important component, which included workshops explaining basic information about this scheme and technical assistance services. The key aspect of this information campaign was that the CIMO promoters actively sought out the small- and medium-sized firms to deliver assistance (World Bank, 1997). An evaluation study shows that the CIMO increased participation of training programmes.

Labour turnovers: WBES indicated that 33 per cent of firms in East Asia and 18 per cent of firms in the LAC region considered labour turnovers as important factors hindering training activities. A number of governments have tried to overcome this market failure by imposing payroll tax or profit tax to *de facto* force firms to spend on training. In general, financing schemes in developing countries can be categorised as follows (Batra, 2003): *i) levy-grant scheme*, where payroll levies are later used by fund administrators to make grants to employers for approved training; *ii) levy-rebate schemes*, where payroll levies are later partially reimbursed for approved training; *iii) levy-exemption schemes*, where payroll levies are exempt for employers that spend a given percentage of their payroll on training; and *iv) tax-incentive schemes*, where firms can deduct training expenditures from their profit tax.

A number of countries including Singapore, Chinese Taipei, Argentina and Costa Rica have adopted the levy-grant scheme. While there has been a mixed outcome of this scheme, its success appears to depend on the management methods of funds[29]. Malaysia, Korea, South Africa, Chile and Zimbabwe have adopted levy-rebate schemes. An evaluation study for Malaysia shows that this scheme resulted in positive contribution to training, especially among medium-sized firms (Tan, 2001). Chile's levy-rebate scheme, *franquicia tributaria*, also indicated that small firms have benefited from the training scheme, with an increase in training participation among the disadvantaged groups such as women and unemployed. Levy exemption schemes are adopted in France, Turkey, Botswana and Morocco, and tax-incentive schemes have been implemented in Malaysia (previously) and the Netherlands. Evaluations for Malaysia indicate that this scheme was not effective in increasing training, especially among small domestically-oriented firms

(World Bank, 1997). The majority of firms that benefited from this scheme were export-oriented firms, mostly MNEs that have trained even without tax incentives. This is in fact the reason why Malaysia decided to introduce the levy-grant scheme.

Financial constraints: WBES indicates that 27 per cent of firms in East Asia and the LAC region on average provide less or no training due to financial constraints. Providing training grants to firms facing financial constraints is not a viable option for the government due to fiscal constraints. Tax-incentive schemes can be one option for constrained firms since this will not increase the financial burden of training expenditure. Payroll-levies may also be considered as an option since payroll taxes can be shifted onto wages[30]. Alternatively, governments may also design policies so that MNEs pay training costs for constrained domestic firms[31].

What can be learned from all these different experiences of policies related to training finance? Unfortunately, due to the lack of evaluation studies to compare different options, it is difficult to conclude which policy works best and which does not. A tentative conclusion is that: *i)* payroll tax levies are preferred to training grants since funding levels are more stable; and *ii)* aggressive information campaign on training can be effective.

Intergovernmental Policies to Promote Training: The OECD Guidelines

The *OECD Guidelines for Multinational Enterprises* (OECD, 2002), adopted by 30 OECD member countries and seven non-member countries[32] recommends MNEs to support local capacity building and to facilitate innovative capacities in science and technology in host countries (OECD, 2000). More explicitly, it recommends to "encourage human capital formation, in particular by creating employment opportunities and facilitating training opportunities for employees" and to "perform science and technology development work in host countries to address local market needs, as well as employ host country personnel in an science and technology capacity and encourage their training, taking into account commercial needs" (OECD, 2000). Although the Guideline is a code of conduct and thus, non-binding for enterprises, governments have committed themselves to promoting their observance and effective implementation.

HRD Policies to Promote Training Spillovers

Given past evidence and experiences related to training spillovers examined before, the following three tentative policy conclusions can be made. First, governments should increase training incentives for not only MNEs but also domestic firms that are of small and medium size. Given that MNEs usually have strong incentives to train their workers in the first place, training incentives should be focused more on domestic firms. Second, policies should provide strong incentives to support MNE-state partnership to mobilise demand-driven training schemes. Case examples of state-run skills development centres in Malaysia have shown that MNEs can contribute to training spillovers through horizontal linkages. Third, governments should provide incentives for MNEs to collaborate with educational institutions. Unfortunately, evidence does not exist on whether or not governments do provide tax incentives to MNEs investing in educational institutions. Finally, government policies requiring minimum local content may increase incentives for MNEs to train workers in domestic firms (OECD, 2002).

V. THE VIRTUOUS CIRCLE OF HUMAN CAPITAL FORMATION, INWARD FDI, AND TECHNOLOGY TRANSFERS

The past two sections described how host developing countries attract MNEs. It is found that while basic education for all adults is the key starting point, a demand driven HRD at a higher level is necessary to attract higher value-added MNEs including those in the recently growing services sector. To further squeeze-out the benefits of FDI, host countries need to further fine-tune policies to facilitate technology transfers. Even reaching this point is a difficult task for most host developing countries, especially for those countries that have historically relied on the primary sector and natural resource-based manufacturing in which a high level of human resources deemed less important an attraction.

This section discusses possible policy options so that the process of inflowing FDI and technology transfers continuously repeats as in a virtuous circle, for countries that have at least gradually succeeded in attracting FDI and are moving towards optimising HRD policies to facilitate technology transfers. What else, apart from the policy implications mentioned in sections III and IV, is necessary to start and sustain such a virtuous circle?

Policies to Facilitate a Virtuous Circle

There are only limited experiences of host countries that have succeeded in continuously attracting FDI while effectively moving-up the value chains through solid HRD and technology transfers. Among these, Singapore, Ireland and, to some extent, Costa Rica are the few countries that are considered to be in the process of a virtuous circle. All three countries started their industrial development with a large fraction of unskilled workers and minuscule level of FDI. All three countries have acknowledged the important role of foreign firms in the economy, consequently made rapid HRD, and have continuously increased the supply and quality of education. They have all initially started attracting low value-added MNEs, and have gradually succeeded in attracting high value-added MNEs in the past one or two decades, which went hand in hand with an upgraded investment climate and a policy environment driven by a well-functioning IPA. The following describes the common policy fundamentals behind the success of these countries.

i) Flexible Demand-Driven Policies

One of the most important fundamentals behind the FDI policies in the three countries is a demand-driven principle. The establishment of effective IPAs with strong authorities to co-ordinate human resource development was a key starting point. All IPAs

in the three countries had good links with industries and MNEs which helped identify the skill needs of the economy. This was crucial in devising effective educational policies and establishing government funded skills development institutions.

Another important feature of the successful demand-driven policies among the three countries is its flexibility. With the rapid innovation in technologies and increased importance of the services industry, the mode of MNE operation has been substantially transformed over the past ten years. This calls for host developing countries to devise HRD policies that are highly flexible, reflecting fast changes in the skill demands of the economy. In order for this to happen, industry involvement in HRD policy making, with industry-driven training schemes becomes a key.

ii) Targeting Inwards FDI

In the short run, increasing the amount of inward FDI is feasible for most countries by simply providing attractive tax exemption policies or rewarding preferential status to particular MNEs that host countries seek. This, however, is not likely to be effective in the long run since it will lead to a large fiscal burden, and the very MNEs, high value-added MNEs bringing skills and technology, that countries seek most are usually not attracted solely by tax incentives policies. Indeed, section III has shown that high value-added MNEs require other host-country conditions including a high level of human resources.

The experiences in these three countries indicate that it is crucial to target the type of MNEs that the host country is likely to benefit in the long-run as well as in the short run. If host countries attract MNEs that will not lead to much skill upgrading of the economy, the virtuous circle can never be attained, and its impact on the economy is expected to be one-shot. Thus, host developing countries must first identify the type of MNEs that they would not only like to attract in the short run (potentially increasing employment and tax revenues), but also the types that would most likely benefit the economy in the long run, through increased training opportunities and technology spillovers. The next step is to assess whether the country has the right investment climate for this type of MNE to be attracted. If not, rapid policy reforms to improve the investment climate become imminent.

iii) Co-ordinating Education and Training Policies

Past experiences in the three successful countries show that HRD policies to attract FDI and HRD policies to promote skills transfers were both critical in each of the steps of the virtuous circle. In particular, formal education policy was shown to be important for the former while training policy was shown to be critical for the latter. Is it then sufficient that host countries simply make efforts in improving education and training policies as described in the previous sections? The answer to this question is most likely to be no. One reason could be that education policies that simply increase the number of school graduates may crowd-out enterprise training. Increased numbers of students finishing basic schooling level and above may give financially constrained firms incentives to increase hiring of these students instead of providing job-specific training that may be more beneficial for these workers and firms in the long run (Miyamoto and Todo, 2003). Another reason comes from evidence that the contents of enterprise

training programmes are in many cases very similar to what is taught in formal education[33]. While low-educated workers in the labour market who had missed basic education may gain from such training programmes, other workers may not benefit at all. All these policy/market failures can be reduced if formal education policies and (post-formal) education and training policies are well co-ordinated. In fact, one of the important goals of adult-learning and/or life-long learning policies adopted in many of the OECD countries emphasises the importance of co-ordination of formal schooling and education and training during the post formal schooling stage (OECD, 2003). They stress the importance of policy coherence and a co-ordinated approach to adult (life-long) learning by bringing all the relevant partners at different education and training levels together (OECD, 2003).

Co-ordination is important since formal schooling, depending on its contents, can reinforce or hinder post-schooling training. If workers gain the right skill/knowledge mix in formal schooling that would later increase the benefits of continuous training, both workers and firms would have more incentives to provide training. Unfortunately, even in most of the European Union member countries, there is as yet no coherent strategy to co-ordinate the different phases of education and training either in terms of curricula and/or recognition/certification of formal and non-formal learning. Co-ordination, thus, is an issue not only for countries concerned with adjusting workforce skills to the ever evolving skills demand, it is particularly important for developing countries that seek further gains by attracting and mobilising FDI.

VI. CONCLUSION

The literature on human capital formation and FDI provides tentative answers to the five questions posed in the introduction of this paper. *First*, to attract *any type of* FDI, host developing countries need an adult population with at least basic schooling. The type of human capital necessary to attract FDI obviously depends on the type of FDI host countries seek. To attract high value-added MNEs, it is necessary to develop the tertiary education sector with close collaboration with the industry so as to formulate demand-driven programmes. *Second*, MNEs can contribute to the HRD of the host developing country by providing training and supporting formal education. Small and medium domestic firms tend to underinvest in training as compared to MNEs and large domestic firms, even though the former group usually enjoys higher productivity gains from training. The underinvestment appears to be due to market failures including lack of information, financial constraints and training spillovers. *Third*, MNEs contribute to technology transfers through numerous channels of training spillovers, including vertical/horizontal linkages, labour turnovers, and spin-offs. Host country efforts to improve the absorptive capacity have also been shown to facilitate technology transfers. *Fourth*, government policies have been important to facilitate training, to minimise financial constraints and market failures, and to promote MNEs to invest in HRD of the host economy. Most of the successful training policies have been demand-driven, involving industries, MNEs, IPAs, and foreign academic institutions that have close ties with the advanced developments in technology, business administration and management. *Lastly,* there is limited evidence of a virtuous circle of inward FDI, HRD and technology transfers. Governments that emphasise *flexible* demand-driven HRD strategies, *target* MNEs in high value-added areas, and *co-ordinate* education and training policies are more likely to lead the country into a virtuous circle.

The arguments made in this paper are based on limited evidence extracted from the literature on human capital and FDI, and a number of selected case studies of firms operating in developing countries. Obviously, more evidence and detailed analyses are required to gain clear and in-depth understanding of the changing role of HRD, FDI and economic growth. In particular, there are few areas that may help extend the understanding on this issue. One is to initiate globally comparable firm-level surveys that contain detailed information on HRD activities among firms. While the World Business Environment Survey provides some cross-country information on training in East Asia and Latin America, it is limited with respect to its small sample size (per-country), limited coverage (East Asia and LAC-region), and lack of information on inter-firm linkage. Another area that may facilitate this line of research is the analyses of matched employers-employees surveys that contain detailed information on employee training and inter-firm linkages. While such surveys have become increasingly available in

developed countries, only a limited number exist in developing countries. The last area of research could be on the collaboration between different actors of FDI and HRD including MNEs, IPAs, governments and educational institutions, which would provide a better understanding of how synchronisation among different stakeholders can be best made so as to attain flexible and demand-driven HRD policies.

NOTES

1. Vast evidence exists on the role of human capital and growth, including Mankiw *et al*. (1992), Borensztein *et al*. (1998), Reisen and Soto (2001), Bassanini and Scarpetta (2002), and UNESCO and OECD (2003). Although there is still no clear consensus on this issue, the general perception appears to be that human capital positively affects growth.

2. In this paper, the term "MNE" is used for affiliates of MNE operating in host developing countries.

3. They include macroeconomic, tax, trade, regulation, corruption, and also education and training policies as well as the rule of law. Stein and Daude (2002) show that macroeconomic stability, corruption, rule of law, and effectiveness of the regulatory regime are significant determinants of location of foreign investments, while Kaufman, Kraay *et al.* (2000) show that the rule of law is significantly related to the FDI inflows both after controlling for other variables.

4. FDI inflows shrank by 59 per cent in the developed country as compared to a 14 per cent drop in the developing country (UNCTAD, 2002*a*).

5. The rapid growth in the services sector is partly due to the recent technological progress that helped increase production-scale and international trade. This brought changes in the mode of firm operation by out-sourcing information and technology intensive operations (Research and Development, engineering, design, IT/computing and data services, warehousing, public relations and management information system) to service-oriented firms. This facilitated the separation of services and goods production within a firm, and hence reduced the role of manufacturing while increasing service sector activities. Furthermore, the removal of restrictions on FDI and regulatory reforms (prohibition of entering in transport, communications, banking, utilities, and media) which started in the mid-1980s has also helped the services sector to grow (World Bank, 2003).

6. The sectoral composition for China is taken from Broadman and Sun (1997).

7. The definition of adult literacy used here is the fraction of literate adults above the age of 15 (UNESCO, 2002).

8. Over two-thirds of illiterate working age population consists of females, and over one-third of illiterate adults were living in India, China, Pakistan and Bangladesh.

9. Note that the bulk of the vocational training in developing countries is done by the enterprise.

10. Godo and Hayami (2002) present a long time-series of educational attainment in the US and Japan during the 20th century. Cohen and Soto (2001) also present cross-country evidence in 38 countries between 1960 and 2000.

11. Nunnenkamp and Spatz (2002) also mentions that "The shortage of relevant empirical studies is probably largely because non-traditional determinants, including cost factors and complementary factors of production, are difficult to capture for a sufficiently large sample of developing countries and over a sufficiently long time span. This is in marked contrast to traditional determinants such as size and growth of local markets".

12. Their human capital variable is the average years of secondary and tertiary education per worker and secondary school enrolment.

13. More specifically, UNCTAD (2002*a*) uses tertiary gross enrolment ratio as a percentage of relevant age group, science and engineering students as a percentage of total population, and the ratio of a country's share in global FDI flows to its share in global GDP.

14. Mody *et al*. (1998) do not use proxies for labour quality such as education. Instead they use each firm's perception of labour quality within a scale of 7.

15. Multilateral Investment Guarantee Agency (MIGA) is part of the World Bank group.

16. Japan Bank of International Cooperation is the lending arm of the Japanese ODA (official government assistance) agency.

17. World Business Environment Survey covers firms operating in 30 developing countries in Latin America and Asia, Foreign Direct Investment Survey covers 14 developing countries in Latin America, Asia, and Africa (location of headquarters), while JBIC-FY2001 Survey covers Japanese firms with subsidiaries in China, Thailand, Indonesia, Malaysia, and the Philippines.

18. More specifically, firms considered "ability to hire technical professionals" (39 per cent), "ability to hire management staff" (38 per cent), "ability to hire skilled labourers" (32 per cent) to be critical location factors.

19. 16.9 and 25 per cent and of firms considered "availability of superior managerial personnel" to be important.

20. This was first initiated at the World Conference on Education for All held in Thailand in 1990 by UNESCO, UNICEF, UNDP, the World Bank and UNFPA, along with 155 governments and 150 NGOs. A follow-up to this conference was the World Education Forum, held in Dakar in 2000.

21. The first goals set in 1990 include: "universal access to, and completion of, primary education by the year 2000"; "reduction in adult illiteracy to one-half its 1990 level by the year 2000"; and "improvements in learning achievements" (World Bank, 1999). The new goals set in 2000 include: "access to and complete free and compulsory primary education by 2015"; "50 per cent improvement in adult literacy by 2015"; and "eliminating gender disparities in basic education by 2005" (UNESCO, 2002).

22. In addition to the community participation, decentralisation of educational administration from national authorities to state/prefecture authorities has proven to be effective in Indonesia.

23. One recently established corporate headquarters is ASM International, a leading supplier of semiconductor process equipment in front and back-end markets. The role of its Singapore headquarters is to handle manufacturing, R&D, management and technical support for regional operations, and holding worldwide charter for several key product offerings.

24. International trade is another important channel.

25. With an exception of the survey in Chinese Taipei, which was done in 1986. Other surveys were done in 1992 for Columbia, Mexico and Indonesia, and Malaysia in 1994.

26. They include three dummy variables including limited corporation, limited partnership, and no legal status.

27. For example, Intel in Costa Rica has managed to keep the labour turnover low even after investing heavily in training (Rodriguez-Clare, 2001).

28. Note that the usage of *horizontal-linkages* here is different from what is understood in the literature. It is usually understood to occur when "local firms in the same industry or phase of the production process may adopt technologies through imitation, or are forced to improve their own technologies due to increased competition from MNE affiliates" (OECD, 2002).

29. The levy-grant scheme had a dramatically positive impact on training in Chinese Taipei and Singapore. Flexibility and demand driven design are among the key factors of success (Batra, 2003).

30. In such a case, payroll levies can be considered as a policy instrument to reduce underinvestment by employees due to credit market constraints (OECD, forthcoming).

31. It is probably not necessary to provide large incentives for MNEs to provide training for (or train) vertically-linked firms, since MNEs will be the main beneficiary in such a training.

32. This includes Argentina Brazil, Chile, Estonia, Israel, Lithuania and Slovenia (OECD, 2000).

33. This is even the case among most European countries where upgrading low-skilled workers is an important policy issue. Many of the European schools are producing young people inadequately equipped or prepared to take advantage of further education and training. Some school leavers have developed an aversion to learning and, at the same time, adult education tends to replicate the school system and therefore fails to attract low-skilled individuals (McIntosh and Steedman, 1999).

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