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Globalisation, Information Technology, and Economic Development

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The decrease in coordination and transaction costs on account of information technology creates more opportunities for firms to make production "footloose"; it allows firms to base different parts of their business in different countries and connect them by real time information networks. The rapid growth in information services is thus facilitating the integrated international production of goods and services.

This paper discusses the linkages between information technology and economic globalisation, and examines the reality of developing countries in relation to the perceived benefits of information technology and globalisation to these countries. Moreover the issues involved in furthering the information technology effort in Pakistan are also discussed in the paper. While the usefulness of additional resources to further the establishment of an information technology base in developing countries cannot be denied, the paper argues that substantial headway can also be made with the existing resources given a more considered approach to the problem.

Basic to a higher level of information technology involvement and interaction in the economy is that policy-makers at the government and organisational levels develop an understanding of the impact of technology in their objective of improved economic welfare. The paper therefore discusses the set of policies, short-term and long-term, needed to help draw the country into the integrated international production system reflective of the current trends of economic globalisation.

1. INTRODUCTION

This paper considers how Information Technology (IT) promotes economic globalisation, how well it can be used to benefit the developing countries, and examines the issues involved in furthering the information technology effort in developing countries, especially Pakistan. Information Technology is defined as the acquisition, transmission, processing and presentation of information in all its forms; audio, video, text and graphics. Information technology includes semiconductors, computers, software, and telecommunications and is different from other technologies in its ability to greatly reduce communication and transaction costs and in its degree of pervasiveness across all aspects of the economy and the society as well as geographically.

At the policy level interdependence is being furthered by an unprecedented and widespread consensus currently prevalent among economic policy-makers, that policies of liberalisation and deregulation that unfetter markets best ensure national economic welfare; a corollary is that the economy should be open to two-way flows of trade,

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technology, and capital, so as to best profit from the opportunities that the increasing globalisation of the world economy offers. For the developing countries the pursuit of openness and liberalisation and the consequent integration with the global economy is therefore seen as a *sine qua non* for growth and increased welfare.

The technological advances of postwar years and the ensuing increasingly global nature of production have resulted in a quantitative and qualitative change in the degree and nature of this interdependence. Qualitatively new forms of international alliances have developed and these facilitate value creating activities jointly by different operators across national borders. Such economic networking is particularly prevalent in services as well as in certain high-tech industries; and the introduction of computer-aided design, production, marketing and maintenance systems into more traditional areas has promoted and continues to further the spread of economic networking there as well.

The spread of data communication networks and resulting benefits will inevitably continue to be concentrated in the first instance in the industrialised countries. These countries have used information technology in its own right as well as to generally enhance the global competitiveness of their economies. The general absence of such communication networks in developing countries impacts on the flow of foreign direct investment to these developing countries in the first instance, and more generally on the growth and development prospects when the spillovers of and linkages arising from technology transfers and foreign investment are taken into account.

There is a real danger that a large number of developing countries may lack the technically competent labour resources required for the tasks or the financial resources for the necessary but substantial infrastructure, and for this reason may lag behind in taking up the new opportunities being created by the increasingly integrated production of goods and services in the global economy, and hence deepen their predicament of poverty.

This paper begins by illustrating how developing countries can benefit from information technology and how information technology can be introduced in these countries; the present reality of these developing countries, in the midst of information technology and globalisation of economic activity is also examined. While the usefulness of additional resources to further the establishment of an information technology base (for enhancing the competitiveness) in the country cannot be denied, it is the argument of this paper that substantial headway can also be made with the existing resources given a more considered approach to the problem.

2. INTEGRATED INTERNATIONAL PRODUCTION AND BENEFITS OF INFORMATION TECHNOLOGY FOR DEVELOPING COUNTRIES

Costs of information technology have fallen several-fold within a short timespan.[1]

This sharp reduction in capital costs is bringing information technology within reach of rapidly growing numbers. At the same time advances in information technology have increased the capacity to process and communicate information. Statistics are indicative: whilst in the 1980s trade volume increased by a total of 49 percent and foreign direct investment outflows increased by an annual average rate of almost 30 percent, data communication services expanded at an annual rate of over 40 percent by volume.[2] Within data communication services the real growth area is in the wide range of data, image and video transfers.

Such technological developments have brought about changes in the organisational structure of Transnational Corporations (TNCs) driven by heightened competition and the growing awareness among companies of the necessity to invest abroad in order to serve those domestic markets better. TNCs use information technologies to integrate supplies, coordinate cross-border production processes, and also to match production more closely to demand in all the countries in which they operate and to coordinate research and development and disseminate the results. Hence the activities along the value chain that take place in different physical locations are coordinated by means of information technology. Even small and medium-size firms are now able to take advantage of falling transport and information costs to organise their production and sales on a global basis.

International production has become a central characteristic of the world economy and around one-third of the world's private sector productive assets are under the governance of TNCs.[3] The rise of the international production system is creating a self-sustaining momentum. Developing countries can benefit from this shift to an integrated international production system. These countries need a set of appropriate policies and incentives to attract TNCs. Incentives generally include cheap labour, relatively low cost of land, transportation and distribution, etc.; the presence of an information technology infrastructure, however, places the developing countries in a better position to attract TNCs.

More specifically, the introduction of information technology also creates new opportunities: new industries which include software development and data processing activities, a dynamic area in international trade. New communications technology, for instance, provides the software firms (in developing countries) to take advantage of more productive communications patterns with clients and joint venture partners; software and related information services to clients and foreign coproducers can be transferred at a low cost using the telecommunications infrastructure. The developing countries are, with the right effort, particularly well placed to exploit these new

[1]The price of a computer with a processing power of 4.5 mips (million of instructions per second) fell from US $4.5 million in 1980 to US $100,000 in 1990, and is expected to be only US $10,000 by the year 2000.

[2]Commission of the European Communities (1993).

[3]United Nations (1993).

opportunities on account of their labour cost advantage. Information technology thus contributes in opening up jobs to the developing world.[4] (See Box 1).

Box 1

The Growth of the Global Office: Opportunities for Developing Countries

Offshore back offices are similar for most firms. Materials, usually documents or magnetic media, are sent by air from the United States, Canada, or Europe to processing facilities offshore. Processing usually take the form of data entry, statistical analysis or information processing that involves decision-making by trained employees. After processing the results are returned to originating data-processing locations by courier, air freight, dedicated line, satellite or telephone modem. The scale of offshore back offices is substantial. For example:

- American Airlines assembles accounting material and ticket coupons in Dallas, Texas, for transport on its scheduled flights to Barbados for processing by its offshore subsidiary, AMR Information Services/ Caribbean Data Services. In Barbados, details of 800,000 American Airline tickets are entered daily on a Computer screen, and the data are returned by satellite to its data centre in the United States.
- Data entry for the white pages telephone directory for Montreal was handled on a contract basis in Asia, using labour intensive double entry, with two workers entering data and then checking for errors by electronic comparison of files.

New York Time (1988)

Introduction of information technology also provides an impetus to the growth of existing industry through increasing its efficiency and helps its spread to a wider geographic area, hence furthering its global reach. Increased efficiency in resource allocation by way of geographical spread that information technology makes possible also directly enhances competitiveness of existing industry in world markets.

Finally, the introduction of information technology should help improve resource management in the public sector. Planning and monitoring of development schemes and projects, and more generally control over public sector revenues and expenditure would certainly improve by using information technology based information systems.[5] Social sectors are another key area where information technology can contribute to improved performance; examples are uses in analysis and control of diseases, and analysis of crime records. Usefulness of information technology in education is well established.

3. DEVELOPING COUNTRIES AND THE INFORMATION TECHNOLOGY-GLOBALISATION LINK

We now turn our attention to considerations involved in case of developing countries whereby these countries are insufficiently utilising their present resources for developing the information technology base that would enable better exploitation of economic globalisation opportunities. We first examine the reality of the developing countries in relation to globalisation of economic activity, in context of Pakistan (a developing country) and then consider what is possible in the short-term with existing resources. Next, the longer-term possibilities and the resource considerations raised thereby are discussed.

In principle, information technology and globalisation should work in favour of

[4]The Economist (1996).

[5]Examples: Employment and manpower planning system, development project preparation, appraisal monitoring systems, government expenditure monitoring systems, consumer billing (national utilities), etc.

the developing countries as these countries can now exploit the link between the two to further their socio-economic development. In reality, however, a few developing countries have availed themselves of these opportunities. On one hand countries like India and Singapore have made substantial headway in utilising information technology for enhancing their global competitiveness (see Boxes 2 and 3). On the other hand for the larger number of countries information technology and globalisation have had little or no effect on the pace of economic development; in such cases the country has not been able to develop an information technology culture that could compliment its efforts to attract FDI. The reasons, contrary to what might appear on the surface, are not necessarily a lack of financial, or educated human resources or infrastructure. Even in the presence of some of these resources, the desired end results in terms of information technology, or furthering the economic development process through the use of information technology, are not being achieved.

A serious issue, therefore, now confronting many of the developing countries like Pakistan, is why the available resources are not appropriately used to avail opportunities within grasp. This aspect is analysed below.

Box 2

Information Technology in India

In 1995-96, India's software industry grew rapidly, with turnover up 61 percent to $1.2 bn. More than 100 of the top 500 US corporations now use on-or off-site software services from Indian companies.[6]

The Indian city of Bangalore has acquired a new name: India's Slicon Valley. With over US $ 700 million of computer-related hardware, software and other services exports in the past year, besides the substantial sales within India, the description is indeed apt. Bangalore has become a major research and engineering centre. Some of India's leading science, engineering and business schools are located there, as are high-tech State-sponsored industries and research laboratories. There is thus a concentration of engineers and scientists, fluent in English, working in and around the city. Salaries tend to be relatively low, reflecting an abundance of labour of all skills. Arguably, Bangalore's "good fortune" is an outcome of the tendency on part of companies to put high value functions in places where the best and cheapest facilities exist. The names of companies represented in Bangalore reads like a Who's Who of the information technology world: Texas Instruments, Motorola, Hewlett Packard, Apple Computer, Sun Microsystems, Intel Corporation, Dell Computer, and IBM.

These are not "screwdriver" plants either. Texas Instruments' Indian US $ 15 million investment, for example, is an R&D facility which employs about 300 engineers recruited in India. Texas Instruments (India) is one of four R&D centres of this nature, the other three being in Dallas (United States), Tokyo (Japan), and Bedford (United Kingdom). The Indian facility is connected to Texas Instruments' worldwide data communication network on a "real-time" basis: products designed and developed in India can thus be manufactured by other affiliates.

Holiday Inn Hotels, General Electric, Digital Electric and Reebok have their software designed by local firms. Swiss air has moved its accounting operation to a majority-owned Indian affiliate in Bombay. Satellite technology facilities instantaneous communications.[7]

Lack of Adequate (Information Technology) Education Even in the Presence of Resources

At present there are schools in Pakistan with sufficient resources to offer instruction in information technology at different levels. If this is not being done or the instruction offered is limited to the very basic (as is generally the case) it would seem to be chiefly on account of a lack of interest in information technology and perhaps

[6]*The Financial Times* (1996), 'India emerges as world's centre for software'.

[7]United Nations (1993) and United Nations (1995).

insufficient knowledge about uses and advantages of information technology in the education system.

What is perhaps lacking in curriculum design is the identification of the objectives, nature and scope of information technology exposure at different levels of education. It is self-evident that information technology education imparted at a primary level is not the same as that imparted at the college or university level. The objectives of the two differ; where the former might attempt to produce an information technology/computer literate population in general, the latter would be directed towards building capabilities in information technology use in professional areas (e.g., medicine, engineering, business studies, accountancy, computer sciences, etc.). In case of information technology education at primary level, information technology instructors would be easily available; for use of information technology in higher education, the lack of resources in terms of instructors required may present a more serious bottleneck. For the current situation on the lack of information technology personnels see Table 1.

Table 1

Information Technology Skill Base

	Number of IT Professionals per Million	Number of IT Graduates/Year
Pakistan (Year 1994)	78	400
Singapore (Year 1998)	3863	700
Singapore (Estimated for Year 2000)	13636	–

Source: Pakistan Computer Bureau Survey (1994), Turkey, Informatics and Economic Modernisation, World Bank (1993).

Inability to Exploit New Opportunities (Created by Information Technology)

Next there are accessible opportunities in information technology that go unexploited in developing countries for lack of interest. There are qualified information technology personnel, some of them actively working as independent consultants, who do not as a reflex tap the Internet or seek business opportunities that are being created by the growing ease of international communication even though these persons have easy access to the Internet and they are on-line.

In the software development business, specifically, programming/coding as per given specifications is considered to be labour intensive with limited overheads, and Pakistan, for example, possesses reasonable resources (in terms of skilled technical persons) to promote its software development, data processing, etc., businesses. One would expect developing countries like Pakistan to exploit their comparative advantage in the form of cheap and skilled labour in this industry as is the case in India (see Box 2); this however has not been done thus far. (See Table 2.)

Table 2

Software Industry in Pakistan

No. of Software Houses	Value of Software Export (US $)	Software Houses Engaged in Exports
130	15 m	10

Source: Pakistan Software Export Board.

A closer examination of this syndrome (where the qualified information technology personnel despite having required resources, have not sought to the business opportunities being brought about by information technology) in Pakistan's case provides us with some explanation.

First, the private sector (software houses) appear to perceive the labour intensive job of coding/programme writing as lacking the aura of high technology and hence prestige. Besides, there is a mismatch between the type of services/businesses the local software houses would like to get involved in and the businesses that can help them enter the global software market.[8]

Second, the software development activity in the domestic market is generally being carried out by small software houses with limited resources and marketing strategies/international contacts. A vicious circle is set up whereby a small firm is unable to bid internationally because of its small size and limited resources, and the inability to garner such businesses keeps it small. For example in Pakistan only a few big business groups have software development/information technology business which could compete internationally. The small software firms thus do not find themselves in a position to break into the global software market in any respect (e.g., joint ventures, individual efforts, etc.). Apparently, the local software houses have not been able to join hands in setting the goals for the software industry; important issues like identification of the selected areas of software development/information services, customisation, marketing of software for domestic as well as export purposes, initiatives to attract foreign investment in the software sector, have not been taken up collectively by the local software houses/companies in the country.

Third, there is reportedly an element of mistrust between the government and private sector regarding such incentives that have been offered by the government for the promotion of information technology sector. Lack of coherent and coordinated information technology business development policies has resulted in failure to achieve the desired objectives. The considerations involved in the distribution of available (scarce) resources to the concerned parties/agencies is being viewed as an obstacle in exploiting the new business opportunities created by

[8]An example is that of a local software firm engaged in producing multimedia products exclusively for the overseas Pakistani clients; obviously the size/significance of this market is negligible when it comes to competition with other highly demanded software services offered by the international players. Pakistan is probably missing out the opportunity of utilising the existing resources in a manner that ensures larger economic benefits nationally as well as to the individual firms.

information technology. There are said to be instances where the government established new information technology educational institutions but only at the cost of seizing resources from already established institutions.

Inappropriateness of Technology

A particularly discouraging aspect (impeding the use of information technology for economic development) is the frequent occurrence of situations where an organisation has introduced information technology but the system has failed to deliver; generally on account of incongruities between organisational capabilities and expectations on the one hand, and the technology introduced on the other. This is sometimes the case even in organisations where the systems are flawless from a technical viewpoint. There are no bugs, the response time is acceptable, the latest hardware and software tools have been incorporated and yet the system is not used/underutilised; it is hence a failure. This failure can only be explained on the basis of incompatibility of the technology with the organisational environment and capabilities.

Thus taking into account the above mentioned factors it might be argued that in the typical developing country the population has to first develop an awareness of role of information technology in development, the potential business opportunities provided by information technology, and appropriateness of technology *vis à vis* organisational capabilities. Neither is the state of telecommunications a hindrance for the present, given the existing information technology requirements.

Box 3

Information Technology in Singapore

Singapore presents a case where information technology has been used to further industrial growth and telecommunications, and where a conscious effort to integrate information technology in the island's plans for the future also exists.

The authorities are now channelling their efforts into transforming Singapore into a hub for high-tech electronics and a centre for research and development in Asia.

A number of R and D institutes have been set up by the government in co-operation with academics, and foreign and local electronics companies. For example leading players such as Hewlett Packard, Apple Computer, and NEC Corporation have research and development facilities in Singapore that work at the cutting edge of the science.

In the last few years Singapore has developed a number of sectoral networks within the island which testify to its ability to deliver technological benefits for business. Under the widest of them, a system known as Trade Net, automated import-export approvals now link some 12,000 companies with 20 government ministries and agencies, and the response time is down to 15 minutes compared with up to two days previously.

Moreover the presence of a strong information technology infrastructure in Singapore is seen as essential for enhanced electronic means for "remote management" where companies locate their higher value-added functions in Singapore. Thus the executives based in Singapore would be able more precisely to monitor manufacturing centres sited elsewhere in the region where land and labour outlays are lower. Complex tasks such as product planning, involving design, production and marketing staff, could be conducted down the line.

Critical to the island's future as an Asian hub for transnational companies is the infrastructure investment. For example Singapore Telecom has modernised its telecom network to world competitive standards: optical fiber is to be laid to all high-rise commercial and residential blocks by 1997. The business district is already fully supplied with fiber-optic links, and about one-third of all residential blocks also have fiber telecoms links capable of carrying multimedia services.

"We see technology as allowing us to enlarge our economic space, overcoming our country's small size", says Mr Ko Kheng Hwa, chief executive of the National Computer Board, the state agency co-ordinating the IT 2000 project. "Using technology will enable us to compete better in the first division of nations—we have resource and manpower constraints, and our costs are rising".

IT 2000 vision of an "intelligent island" aims at building a network to link homes, offices, schools and factories across Singapore and to provide access to and from sites elsewhere in the world.

Source: *The Financial Times*, February 24, (1995).

4. HOW INFORMATION TECHNOLOGY CAN BE INTRODUCED FOR ECONOMIC DEVELOPMENT

In view of the previously discussed issues confronting a developing country like Pakistan that wishes to improve its information technology situation, it is essential to adopt a considered approach for the introduction of information technology so as to better integrate into the global production system and hence further economic development. The country in the short-term needs to address the issues that are relatively independent of the availability of more resources (such as financial resources and skilled personnel). Developing countries, for example Pakistan, therefore need to deal with the removal of the constraints discussed in the preceding section that could impede progress, even in the presence of some usable infrastructure, technical and financial resources, towards the ultimate goal of becoming active player in the international integrated production system and hence to gain economic benefits. Once those hurdles are removed, the long-term issues of an educated and information-technology-literate population, and sound telecommuni-cation infrastructure would need greater attention.

Short-term Considerations

As a preliminary step the developing countries in Pakistan like situations need to create awareness/recognition as to the importance of information technology. Widespread awareness of implications of going on-line in terms of increased access to information networks and opportunities must be the prior agenda; in case the economic benefits (of gaining greater access to information networks are not made clear to the nation, even the online facility would be of very limited economic significance.

This awareness is essential at different levels. To start with, the government and the political leadership of the developing nations should be cognisant of the significance of information technology and its implications for economic development. The policy-makers must be able to comprehend and promote the link between information technology, international integrated production framework and development in context of globalisation. Awareness is also essential at the mass level. The public must realise what the idea and potential of “information technology” means for the nation.

Awareness

Government and business can play a significant role by taking steps for general, and sectoral information technology awareness programmes. Such programmes may need media projection at a mass level. The present inability to exploit available information technology resources for availing new business

opportunities can be reduced to some extent by greater information technology exposure to the target industries/businesses. This can be done by way of seminars, exhibitions for selective as well as general population. The awareness programmes can highlight, by giving cases, the use of specific information technology application for enhanced productivity. For instance, use of information technology in manufacturing or service industry can be introduced/exposed.

The academic community too needs to organise itself for a more conscious involvement with and absorption of information technology. This could partly be done by collaborating activities related to of information technology research and its application with the government and private sector. Research in to local experience and development of local information technology literature and resource material is another area where the academic community's efforts could be directed. Industry-academia partnership is essential for the alignment of curriculum design with the information technology market demands.

In this respect Singapore represents a success case where the government adopted a proactive role in the promotion of IT for the socio-economic development of the country and carried out programmes for IT popularisation and assimilation. Similarly in India, the private sector in collaboration with government mobilised its resources for the development of a strong base of IT skilled personnel; a wide variety of computer education programmes are offered by India's numerous colleges, universities, polytechnic and private institutions. Government-sponsored research projects in computer related subjects are undertaken at a number of Indian institutions[9] where topics of research range from hardware and engineering applications to computer languages, information systems and systems using Indian languages.

Box 4

Bengalis are Downloading E-mail from Net to Newspaper

Even in the absence of computers and telecommunications, Bangladesh has found a way to enter the global village of computer network. The *Daily Star*, an English language newspaper now features a weekly page called "Live from the Internet". This page covers the articles/posts that come from the Bangladesh Internet news group called *soc.culture.bangladesh*.....In this newspaper Internet users from around the world, mostly Bengalees, discuss issues relevant to Bangladesh. The *Daily Star* prints these in verbatim—just as they appear on computer screen. Bangladesh is one of two countries in South Asia without a full Internet connection (the other is Bhutan). It is among the world's dozen poorest countries, with a population of 120 m and an official literacy rate of less than 30 percent.

While the growth of newspaper in Bangladesh has been startling (there are nearly 1500 registered newspapers and magazines) computer literacy is scarce in a country experiencing an information famine. Bangladesh has just six commercial Net e-mail providers; an electronic bulletin board system; and the Net news group soc.culture. Bangladesh.

Some see the *Daily Star's* page as heralding the dawn of much wider Net awareness in Bangladesh. Others see it as pitiable hitchhiking on the global information highway. Linking the Net to a mass-market non-computer medium such as Dhaka's *Daily Star*, will at least raise Bangladesh's technological temperature by a few degrees.

Source: *The Financial Times*, March 4 (1996) "A Rickshaw on the Infobahn" by Martin Mulligan.

[9]These include the five Indian Institutes of Technology, the four Indian Institutes of Management, the Indian Institute of Science, the Tata Institute of Fundamental Research, the Computer Maintenance Corporation, Tata Consultancy Services and the National centre for software technology.

Long-term Approach

In the long-term as the awareness of use of information technology for socio-economic development becomes established, there may be a sharp increase in demand for information technology in education as well as more generally for information technology personnel and equipment. Table 3 below gives indicators of long-term information technology considerations:

Table 3

Information Technology Indicators (1985-90)

	IT Investments per Capita (US$)	Software as percent of IT (%)	Telephone Density per 100
USA	400	42	52
Japan	400	35	41
Korea	45	24	29
Turkey	12	13	14
Pakistan	0.43 (1994)	9(1994)	2.2(1995)

Source: Turkey: Informatics and Economic Modernisation, World Bank, (1993). Pakistan Software Export Board (PSEB), (1994).

Once there are effective measures to deal with the problems faced in the short-term, the problems of existing infrastructure would need attention. For instance, it would then be essential to improve/upgrade the telecommunications setup for the promotion and development of new industries like offshore software development, integrated production, high value-added services. As in case of India and Singapore, telecommunications infrastructure has been improved to a substantial degree to exploit the new economic opportunities.[10]

Similarly the literacy problem would need to be addressed at different levels. What minimum elements of knowledge would make a person information technology literate so as to enable him/her to avail opportunities created by information technology? The quality and content of the information technology education also needs attention as it ensures the competitiveness of information technology professionals emerging from these educational institutes and training centres. Moreover it is arguable that information technology literacy cannot be obtained without first increasing the literacy rate in general. Should that be the case then the long-term process of increasing country's literacy rate would need dedicated and planned efforts.

[10]In India computer intensive networks like INDONET have been set up for the use of software exports, distributed data processing, centralised and remote processing and wide area networks. A dedicated packet switched data communication network has also been established.

Decisions regarding the nature and level of information technology education necessary for different levels of general and personal education would become important while introducing information technology in curriculum. Purpose-built courses should be designed for introduction of information technology in the education system at Primary, Secondary, High School, University levels. This "information technology" literacy would facilitate creating an information user society. Singapore's long-term plans for building an information technology workforce offer a positive example; by 2000, the country expects to increase its information technology workforce to increase to 30,000. Several initiatives have been taken by the Singapore government:[11]

- rapid growth of informatics degree programmes in the higher education system;
- a sustained programme of sending students overseas to the US, Japan and UK for post-graduate training;
- a programme of continuing education for informatics professionals under which Government subsidises 70 percent of the total costs of skills upgrading and refresher courses; and
- incorporation of information technology into all university disciplines, upgrading the computing resources of the universities and a special programme for office workers.

Recently, (in May 1995) Government of Pakistan set up a Private Software Export Board (PSEB) for the formulation of a national software policy framework to facilitate the development of software industry of Pakistan. The board is entrusted with the tasks of (a) developing human resources information technology (b) development of Software Technology Parks (c) execution of software marketing plans (d) attracting FDI in software development sector. Various financial and corporate incentives have also been announced by the Government to promote local software industry. The important task now is for the private sector to avail themselves of these opportunities.

In the long-term international cooperation could be directly helpful in strengthening developing countries information technology capabilities. This would basically involve the transfer of technical and financial resources from developed to developing countries imparting skills and training of personnel, and the development of relevant infrastructure, all in a mutually beneficial fashion (whereby the developing countries avail the low labour, transportation, land, etc., costs of the developing countries and the developing countries have more opportunities for stimulating the economic activities by attracting FDIs). An international agency to

[11]World Bank (1993).

arrange and facilitate multilateral cooperation, to regulate the international aspects of the information world, and to provide a forum for discussion and analysis of issues of a multilateral nature and common interest would also be needed.

An interesting plan aiming at the development of the information poor societies through international cooperation has been floated recently by Director MIT Media Lab, Negroponte.[12] It is proposed that the transformation of information poor countries into information rich be achieved by (a) youth of North spending time teaching the youth in developing countries (b) basic information technology equipment with low memory requirements be made available to the developing countries so that they become on line (c) telecommunications infrastructure be improved and alternate arrangements like use of low orbiting satellites be made to link the schools in developing countries and (d) a UN Cyberspace agency be set up to facilitate the digital/on-line world immediately to everyone.

5. CONCLUSION

The impetus to the flow of investments from one economy to the other comes from the trend towards international integrated production whereby TNCs invest globally to best exploit opportunities that different geographic regions offer. In this process of investment flow, the economic benefits are shared by both, the home as well as the host countries, besides of course the TNCs. The role of FDI in faster economic development of any country including developing countries is well established. The significance of information technology has also become evident in facilitating the coordination, communication between the cross border operations of the TNCs and hence in greatly facilitating international integrated production and FDI. Thus it may be inferred that the presence of sufficient information technology knowledge base (to support the coordination between different value activities taking place globally) in the package of incentives offered by the developing countries should improve prospects for attracting FDI.

While discussing the issues involved in the transformation of information poor (developing countries) into information rich (developed countries) the general assumption is that basic hindrance in this transformation is the unavailability of resources in these countries. However, a closer examination shows that this assumption is not always true, for often the developing countries experience bottlenecks, especially in the short-term, that involve issues other than the availability of more resources.

Even with their present resources, developing countries can share in the benefits of integrated international production (being brought about by linkages between globalisation and information technology) by increasing the efficiency in

[12]Negroponte, Wired, 1996.

the use of the available set of resources. As explained earlier, substantial headway can be made with the existing resources given a more considered approach to the problem.

Basic to a higher level of information technology and its efficient use in the economy is that policy makers at the government and organisational levels need to develop a sound understanding of the impact of technology in their objectives of improved economic welfare. It is important the government for its part promote, encourage and support the development of information technology in the country. Thus the development of new information technology industries (such as software development) requires government to design and pursue short-term and long-term policies in a realistic manner.

Government thus needs a set of policies to draw the country into the integrated international production system. Of these policies, development of applicable information technology is an essential component. As businesses are distributing different functions geographically, for example, design, manufacturing, and marketing across national boundaries, developing countries like Pakistan must organise their efforts to take advantage of such developments. In the short-term this effort should be directed towards creating information technology awareness as well as appropriate use of information technology; the long-term efforts would require focus on such issues as information technology education, training, telecommunications, and investment policies. The short- and long-term policies, however require concerted effort on the part of government and private entrepreneur.

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Comments

This is an interesting topic that seeks to explain the linkages between globalisation, information technology, and economic development. Overall, the paper's description of information technology is quite detailed. It highlights its importance which, in economic terms, is the reduction in transaction costs. This is the most significant impact of the information technology that is being developed.

However, such positive developments also have a negative aspect. In this case, the increasing use of information technology is going to have an impact on civil liberties and on corporate structure and management unless proper controls are enforced specifically of a legal nature. The data bases that are being generated deal with various facets of human behaviour, his financial standing, his social relations, political leanings, health status etc. Such information, in the wrong hands, would cause a grave breach of privacy. This would be particularly true if one's health status records were made available to an insurance company. If one had AIDs or some other debilitating disease the chances of getting insurance would be practically nil. Other negative aspects of the spread of information technology could be its adverse effect on political and economic sovereiquity. It could also be used as a tool for cultural imperialism.

To conclude however, these negative aspects can be minimised by the establishment of consumer and other organisations that inform people and other users of the benefits of the new information technology.

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