

## Information Technology (IT) and the Learning Society: Growth and Challenges

<sup>1</sup>Nkasiobi S. Oguzor, <sup>2</sup>Austin N. Nosike and <sup>3</sup>Jacinta A. Opara

<sup>1</sup>School of Vocational Education, Federal College of Education (Technical), Omoku-Nigeria

<sup>2</sup>Development of Program and Globalization, The Granada Management Institute, Granada-Spain

<sup>3</sup>European School Science Project and International Association for Teaching and Learning, Spain

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**Abstract:** There is no human culture which has never learned anything from another. Learning from other cultures is a natural phenomenon. There is nothing wrong with it. However, when foreign influence is overwhelming, beyond the control of the receiving country, psychological delicate problems emerge. This paper holds the view that the extremely rapid development of modern information technologies (ITs) has accelerated the speed of cultural transmission some times resulting to cultural imperialism and value re-orientation. Technology has both beneficial and adverse effects. It cannot progress or be useful independently of the society in which it operates. It must be developed and chosen by the society itself. The paper views international co-operation as a vehicle for transfer of technology and a source of financing and managerial know-how. The aim of this paper is that developing countries must determine their criteria for choosing the technology best suited to development. They must also give a high priority to human development. Without highly educated and skilled manpower, no nation can hope to become a serious participant in the new world order. It must be added that while appropriate domestic potentials are most important, it must be accompanied by the acquisition of advanced technologies; a comparatively rational system allowing for the convenient and inexpensive transfer of technologies. Therefore, keeping many variables in mind, this paper addresses specific issues in the analysis of information technology's effect on developing countries. The challenges of IT in education for the advancement of technologies are overwhelming and must be digested and enhanced.

**Key words:** Information technology • Development • Society

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### INTRODUCTION

A society is a living, dynamic system, permanently renewing the balance [1]. Fascinated with the means and flabbergasted ends, politicians, planners, educators and computer experts alike are puzzled by the possibilities of the technology. The reasons for introducing computers in schools are generally related to four concerns, 1) changing labour markets, 2) scientific and technological innovations, 3) educational quality and 4) cultural experimentation. Although official rhetoric and plans are very ambitious, resources allocated for technological development are very limited especially in developing countries [2, 3]. Moreover, broad policies are commonly established in the absence of convincing evidence about the potential benefits and the actual effects of introducing computes in schools [4] and society [5]. The challenges

for policy makers in developing countries is to reconcile their personal preferences for the new technology, the pressures to respond to job markets, the need to respond to the society's aspirations and the anxieties provoked by automation with the provision of effective conditions for the use of computers in schools. The speed and pervasiveness with which microcomputers have been introduced in the world probably confirms that the policy maker's instincts are correct. At the same time, educators feel that schools would lose even more of their already eroded legitimacy if they failed to adapt to technological and social changes brought by the impact of computer technology.

**Growth Versus Absorption:** Information technology's impact on developing countries is complex. This term aggregates a number of new technologies including

electronics, computer hard wares and soft wares, robotics, computer - aided design and manufacture, fibre optics, optical instruments, communication equipment, photovoltaic technology, biogenetics and yet other new inventions. During the last four decades, man has seen tremendous advancement in the field of electronics, from the creation of discrete transistor components to very large scale integration. There has been fantastic progress in computers from a single function to intelligent computers. There has been progress in conventional telecommunications services, made possible through the integration of computers and communications.

Developing countries can no longer afford to ignore the technological revolution but have to put on the agenda, the development of new technologies and their own development. There are two approaches: One based on an internal technological revolution or one based on the absorption and efficient application of new technologies from abroad otherwise known as technology transfer.

In order for a developing country to forge ahead with the first approach - that of a technological revolution, that nation needs an appropriate background for such an effort to be successful. First, there must be an adequate educational level as well as scientific level. It is required for the mastering of various technologies and for supporting technological development. Technology must become an internal self-operating factor in the socio-economic process and a related component in the internal motivating force of a country. Technological advancement, once begun, promotes scientific, educational cultural economic and social development and quickens the accumulation of material wealth. A democratic and open society is essential especially today, when the rapid growth of information technology is increasing contact among nations and when a highly centralized and closed society does not suit the needs of the new technological revolution. More often than not, developing countries do not have these resources or institutional structures which make an internal technological revolution possible.

In view of this, the major alternative to the internal creation of new technologies is the absorption of technology abroad. Historically, most of the inventions capable of inducing a technological revolution came from the developed countries. This is particularly true of the current new technological revolution centred on microelectronics. Those technologies come from countries with a vastly different social, economic and cultural environment such an approach can be successful if

certain conditions are met. Su [6] holds the view that modern technologies must be absorbed, digested and enhanced. The first criterion in this respect is the advancement of the general educational and culture, quantitatively as well as qualitatively. To this effect, developing nations must adopt proper policies and create institutions which serve to heighten popular interest in acquiring and disseminating advanced knowledge and technologies and which provide the necessary material conditions for drawing on new technologies.

Again, a society for transfer of technology should be an open one ready to liberalize culture particularly through education [7]. Measures should be adopted to extend democracy within the country, stimulate the economy and open the nation to the outside world. In absence of these conditions, it will be impossible to assimilate *let alone* put to good use - advanced technologies even when there is strong foreign assistance. It must be added that while appropriate domestic policies are most important for developing countries, it is obviously inadequate to depend exclusively on domestic research and development. In order for these countries to absorb and digest advanced technologies, such measures must be accompanied by the acquisition of advanced technologies through a system of international cooperation- a comparatively rational system allowing for the convenient and inexpensive transfer of technologies.

**The Desirability of Change:** A vital corollary to the question of whether developing countries can effectively absorb advanced technologies is the question of whether such a step is desirable. New technologies being neutral by themselves can be used for a variety of purposes, good or bad and they can have a variety of influences. In general, the adoption of new technologies has an overall impact on the economic, political and social aspects of a given society, involving, for instance, economic growth, efficiency, the employment level and structure, income management, a change in the requirements for particular human skills and capabilities, a shifting of regional economic activity, a change in the structure of world trade and an intensification of international cooperation.

In the context of North-South relations, advanced science and technology, which is usually research, capital or knowledge intensive, have made the North superior to the South. It worries the developing countries. Despite their best efforts, they lag increasingly behind the developed countries and become more and more on dependent them for technological know-how. These

worries are not without foundation. Most of the developing countries have an economy which suffers from a surplus labour force. Poverty and under development often give rise to persistent and enormous unemployment and under employment. As it is, the employment situation is fairly susceptible to the impact of new technologies. In particular, micro electronics and other technologies with labour displacing tendencies are likely to make more people lose their jobs.

Even if the introduction of these technologies does not cause more unemployment, their introduction will change the composition of the labour force. It must be emphasised that the necessary expansion of the ranks of scientists, engineers, a high-level technicians will reduce the need for technically inferior workers in the section of the work force engaged in manual labour. Due to the fact that there are comparatively low educational and cultural levels, it is usually difficult for the people to shift from jobs requiring only a low technical level to those calling for greater skills. New technologies, thus, may entail more unemployment [8]. In the end increased unemployment and the changed composition of the labour force will widen the income gap in the developing countries.

A second new factor to consider is that since the developed countries can update their mature industries by using new technologies, it is no longer necessary for them to move such industries to the developing countries. This will begin to delay the industrial shift from the former countries to the latter ones. As a result, the pace of industrialization on developing countries will suffer.

Thirdly, by applying technologies to the production of new goods, the developed countries will begin to use new materials or will save energy or raw and semi-finished materials. Being research and knowledge intensive, the new products manufactured will carry a higher value. This means not only that there will be a widening ratio of exchange between manufactured and primary goods, but also that the economics of the developing countries which chiefly depend on the export of farm and material products as well as raw materials, will be seriously disadvantaged. Cheap labour has been one of the strengths of the developing countries when competing on the world market. With new technologies, especially microelectronics and robotics, this advantage will be lost.

**Information Technology and Unemployment:** A heated debate has evolved during the few decades over the impact of information technology on the society. Particularly, the discussion has focused on the effect of

technological change upon employment and has produced a vast number of studies [9-11]. Some scholars knew the recent progress in the field of IT, as part of a long term evolution of technical capacities and consider today's technology induced unemployment as a limited and temporary phenomenon due to slow adjustment to changing circumstances. Others consider the new information technologies as a revolutionary development forcing changes in values, processes and institutions. This is a longer term view and sees the present unemployment as a structural problem.

The debate demonstrates the common difficulties of economic analysis, such as lack of reliable statistics and experimental verification and the complexities of technological assessment. Not only is the term "information technology" far from being clearly defined but technology itself is difficult to grasp. It is everywhere and no where. The measurement of technological change by calculation of changes in (labour) productivity is equally problematic. The hardest evidence of the impact of information technology on labour comes from case studies of individual firms and industrial sectors. They describe the direct effects, that is to say, the net changes in jobs at the point of introduction of new technology. The immediate effects do not tell of the ripples and waves created by new products and processes. Schutte [8] identified two indirect effects which need attention.

Firstly, increased productivity through new application of technology results in higher returns. In any case, the creation of additional wealth will occur. Secondly, if the new technologies lead to additional gross investment, this brings additional demand for capital goods. These direct and indirect effects are relevant in the context of international trade and global competitiveness. Innovation firms which gain an advantage through the application of information technology may compensate for labour displacement with additional jobs created by the success of their export potentials. Multiplier effects on suppliers and income effects on shareholders may also accrue to the country which introduced new technologies first. Countries resistant to or slow to adopt technological opportunities, on the other hand, will neither benefit from direct or indirect effects, nor experience wealth and job creation in the industry concerned especially the educational and other human capital enterprises.

Protectionism remains to those non-innovative countries an attractive, though in the long-term ineffective, measure to prevent the transfer of jobs to those which lead in the introduction and application of new technology. The difficulties in coming to any clear

conclusions on the impact of information technology on labour are further aggravated by the fact that information technology, like all technical advances, needs time from the point of innovation to diffusion and application. So far, the time for adjustment to new technologies has been too short. This applies especially to the institutional and legal frameworks with their enormous impact on labour recruitment and displacement.

**Diffusion of Information Technology:** Transfer of technology is a function of diffusion. Without desirability of introducing new technologies, there cannot be transfer of technology. The countries that have succeeded rapidly in the application and diffusion of information technologies are likely to strengthen competitiveness. In contrast, those countries slow in adopting new technologies, have tended to lose their competitive edge. Yet, information technology is so important with its developmental implications that no country can afford to abandon completely, efforts to diffuse this technology within its socio-cultural structure.

The earlier mentioned consideration has relevance for developed countries but even more so for developing countries. This is because information technology plays an extremely important role in economic development in general, to the extent that there is concern in developing countries that existing gaps between the North and South may widen. Bearing in mind today's research and development expenditures, it may in fact be very difficult for the developing countries to catch up or even top, thereby avoiding falling further behind in the race in information technology. For then however, it is the issues of the diffusion and utilization of communication and computer system which are of utmost importance. There also exists a problem concerning the role of multinational corporations [12]. Ogura [13] substantiated this view

*"it seems that multinational enterprises are in a position to make the best use of information technology, but their activities have increasingly fallen outside the political control of their parent governments".*

The concern for widening gaps and the loss of political control has made many developing countries adopt a stance which maintains that information technologies will determine the political, as well as the economic independence of the developing countries. The difficulties experienced in international dialogues on services or intellectual property rights are clearly related to the widespread political concern over the impact of new technologies on the national sovereignty of developing countries.

In view of this, presently there is increasing conflicts between the economic interests of industrialized countries and the political concerns of developing countries and these conflicts appear to be intensifying as time goes on. Globalism and neo-globalism are advancing. Their implications in developing countries are legion. One important issue to note is that with their rapid pace and the more they grow and expand, the less accommodating globalised cooperations and economic interests are likely to be towards governments and their specific political needs. The diffusion of information technologies is going forward and will provide the foundation upon which many international disputes will be based. Of course many of these disputes involve developing countries. The nature and intensity of these disputes are likely to rise, causing greater instability in the international arena and fewer openings for easy compromise. International cooperations could diffuse tensions and provide the foundation for growing globalization

**Implications of Transfer of Technology:** It is indeed unavoidable that the differences between the North and the South will increase. Nonetheless, the authors cannot say that the developing countries cannot benefit from modern technologies, especially biotechnology and the use of solar energy. Easy to utilise biotechnology helps tap the potentials of agriculture and aids in the development of medicine. Take an example from South America where a computer-aided research project for the improvement of a strain of corn seed yielded direct and indirect benefits. Output was increased by three to four times. New technologies present a provocative challenge to the developing countries while simultaneously making them more technically dependent on the developed countries. Therefore, to avoid or minimise this dependency:

- The developing countries must raise their educational level; strengthen the sciences and their research capability.
- The import of new technologies should not be overemphasised. They should adopt technological pluralism.
- The developing countries need to create jobs to counteract the menace of unemployment caused by the introduction of new technologies.
- The interdependent nature of new order makes it imperative for enhanced North - South cooperation with the purpose of fostering international cooperation in new technologies and improving conditions for technology transfer.

Technology may have both beneficial and adverse effects [14]. Several observers have cautioned against the loss of privacy, the dehumanisation of man and the exploitation of the information-poor by the information-rich. Naisbitt [15] identified several trends which have been associated with progress in information technology. He discussed the rapid shift from an industrial society to an information society, such as more decentralisation moves towards a global economy, restructuring of the work environment and so on.

There is no human culture which has never learned anything from another [16]. Learning from other cultures is a natural phenomenon and there is nothing wrong with it. However, when foreign influence is overwhelming beyond the control of the receiving country, psychological delicate problems emerge. All people in the world want to be equal, not only in principle, but also in practice. The extremely rapid development of modern information technologies has accelerated the speed of culture transmission among different nations.

### CONCLUSION

People are now living in a new era - the era of information. The future is exciting because of the tremendous progress that is being made in this area. Transfer of technology has propelled information technology in the developing countries. Information technology has not had and will not have a uniform impact upon the developing countries. Progress in information technology has brought unprecedented changes into the world, moving us towards an information society. This progress, unfortunately, has not benefited all of us.

The implication of information technology on education for the advancement of science compels support and acceptance. The environment of rapid change is demanding higher priority to human resource development. However, the developing nations must design a clear strategy for technological development and the transfer of technology to suit their own societies. Information technology will enter our lives and change and influence them without our consent. The general goal of transfer of technology must be to ensure that the new technologies will bring a real enhancement of a sustainable quality of life. This is a challenge to Nigeria and other developing countries.

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