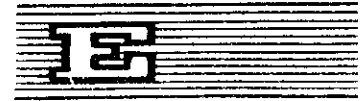




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**APPROPRIATE INFORMATION TECHNOLOGY IN AFRICA'S
ECONOMIC DEVELOPMENT AND INTEGRATION**

INTRODUCTION

1. Information technology has profound implications for the future development of Africa, and for the evolving relationships between the North and the South. A full exploration of all the policy implications and concrete institutional proposals will require a sustained process of dialogue.
2. Information technologies generally comprise the machinery for producing and disseminating data/information. Some of the equipment that make up these technologies include: printing, reprographic, micrographic, computer, telecommunication, transportation and video technology.
3. Africa's lack of development over the years is attributed principally to the information poverty which has characterised the socio-economic development planning efforts of many of the countries on the continent since their attainment of political independence. The prevailing situation is not because the planning environment of these countries lack data on which they could base various meaningful socio-economic planning exercises. On the contrary, the problem has been one of the inability of African countries to develop and maintain appropriate infrastructures for data generation and use.

ISSUES IN THE APPLICATION OF INFORMATION TECHNOLOGIES IN AFRICA'S DEVELOPMENT

4. A review of the provision of information infrastructure in Africa, and the appraisal of the application of information technologies by libraries, information, documentation and data centres established to meet the information requirements of development planners in respective countries of Africa, highlight a number of inadequacies in these two areas. These shortcomings derive primarily from the lack of appreciation of the role of information in development, by the political and planning officers of most countries in Africa. This lack of appreciation has resulted in a number of policy gaps in those areas which are vital to the acquisition and use of modern technology for implementing socio-economic development objectives.

5. The conclusion which derives from the foregoing observations is that if Africa must achieve the socio-economic development goals, and to create an African Economic Community, then the various countries must give priority to the development of their information infrastructures. They must strengthen existing establishments, as well as create additional ones at the national and regional levels in order to ensure the availability of data/information relevant to their planning process on a continuing basis. Greater emphasis in this arrangement must be placed on the use of appropriate information technology, which ensures timely and well-processed information.

6. By the same token, African countries must place adequate emphasis on the acquisition and use of modern information technologies in view of the important role which these technologies play in the generation and dissemination of information for development planning. The capacity of these technologies to store large quantities of data, process and disseminate such data with a high degree of speed and accuracy over time and space makes their use in the information activity very imperative. It is against this background that an examination of the policy and related issues on the application of information technologies will be undertaken. African countries should put attention on this in their respective efforts at getting information technologies respond to their individual and collective needs for plan development and execution.

7. In considering the potential for Information Technology utilisation in Africa, the different states of development between the developed vs the developing world should be taken into consideration. For example, in the United States, virtually every household has at least one telephone, while in Africa some countries have a telephone density of 1 unit per 1000 households and the average density in Africa falls at 0.7 telephone lines per 100 households. Additionally, African telephone networks are concentrated in urban areas, where they are often poorly maintained and offer mediocre quality service. In the U.S., nearly one third of all households have personal computers, many of them equipped with modems. In the business sector, they have become nearly universal. While we are unaware of statistics of computer density in Africa, it is clear that many vital institutions operate without any

computers (and without access to direct telephone lines). Even some national participating centres in the network of the Pan African Development Information system have no computers.

8. While Africa region is clearly deficient in the basic Information Technology equipment, there is no question that at least some sectors in Africa must participate in the information age in order to remain competitive and part of an international economic order. Development and utilisation of Information Technology is inextricably linked with economic development. According to the Board on Science and Technology for International Development:

"Economic development in Africa will depend heavily on the development of the information sector. Countries will need the ability to communicate efficiently with local and overseas markets to determine where they may have comparative advantages for supplying their products to consumers to purchase essential imports, based on current prices and services. Many of the economic development problems facing Africa countries have scientific and technological components that will require solutions to be developed in Africa by African scientists. It is thus essential that they obtain the means to carry on the necessary research and development and to provide realistic policy options to their governments and society. Lack of information is a critical constraint." (National Research Council, 1990)

9. The heart and soul of information technology lies in the ability to transfer data from its source to the destination where it is needed, using the fastest means possible. Therefore, data communication infrastructures need to be adequately developed in Africa. Information Technologies can play a very significant role in the implementation of upgraded technology transfer for socio-economic and scientific transformation of Africa. The use of these technologies can greatly improve and facilitate planning, monitoring and delivery of national programmes. These also provide logistic support for co-ordinating distribution of goods and services to remote geographical locations. Of special mention are opportunities to improve the delivery

of basic social services such as education, health care and dissemination of agricultural information, especially in rural areas for the benefit of small scale farmers and women.

10. The application of Information Technologies in Africa has been handicapped by a number of political, and socio-economic problems which individual countries in Africa are facing. Among these problems are the following:

- (a) The lack of awareness among policy makers regarding potential strategic opportunities as well as problem areas associated with the use of these technologies.
- (b) The lack of understanding of the unique issues associated with planned and controlled introduction of these technologies.
- (c) The lack of experimental data on the relative effectiveness of various approaches and techniques for selecting the best alternative responses suited to the needs of a particular country. In the specific case of the application of information technologies African countries

African countries must adopt policies aimed at achieving self-reliance in the information activity in these major areas.

- (i) Computer acquisition and use.
- (ii) human resource for technology development, use and maintenance and
- (iii) telecommunications.

(i) Computer Acquisition and Use

11. Many African countries are presently dependent almost entirely on external sources for the procurement and use of computer technology (Adeyemi, 1988). If this situation continues for an undetermined period of time, African countries will continue to lose valuable foreign exchange which could be used to achieve some other

socio-economic projects at home. Besides, the challenge to develop some indigenous capacity in the manufacture of computers will continue to elude Africa. Therefore, the development, and effective implementation of policies relating to the acquisition, use and maintenance of computer hardware and software should occupy a high place on the scale of priorities of each African country. These policies should check undue proliferation of hardware configurations in the African countries. Additionally, these policies should determine the nature of agreements in such areas as software importation, training, know-how, and outright purchase of technology. African countries can gain from the experiences of other Third World countries like Brazil (Leeson 1984, Adler 1986), and India (Kumar, 1984) in the development of the indigenous capacity for the manufacture, use and maintenance of the computer technology within the context of south-south, technical co-operation among developing countries.

(ii) Human Resources Development

12. Deriving directly from (i) above is the need to develop viable national policies to develop the human resources base for the development, use and management of information technologies in Africa. The experience of countries in North Africa and those of English-speaking West Africa show the need to evolve such policies for manpower training in these relevant areas of information work (Adeyemi 1988). The identified inadequacies of the present training programmes in various countries of Africa dictate the pressing nature of this need. Practical experience shows that the library and information science programmes administered by various universities in Africa cannot adequately cope with the demand for the skilled manpower required to handle information technologies for accomplishing various information needs. The curricula of many of these institutions lack practical application in new information technologies (Adeyemi 1988). Much emphasis is still placed on teaching traditional librarianship. The report of the UNECA/PADIS survey of available training facilities for information and documentation scientists in Africa (1988) provides the latest evidence for this assertion, the low return received to the questionnaire sent out for the exercise notwithstanding.

13. The need to develop skills for the management of Information Technology is imperative for the African countries. In 1988 UNESCO had this to say:

"Only 0.4% of the world's 3.7 million scientists and engineers live in Africa. The figures, based on data for 1980, show that 88.8% of the world's 3,756,000 scientists and engineers live in developed countries. The regional disparity is even more evident in terms of numbers relative to overall populations. While the Soviet Union has 5,100 scientists and engineers per million inhabitants, North America 2,600 per million, Africa has only 49. Of the total research expenditure of US\$207 billion worldwide (in 1980), only 0.3% was spent in Africa compared with 93.8% in developed countries and 6.2% for all developing countries.

As a proportion of GNP, North America spent 2.28% on Research and Development, Europe 1.7%, the Soviet Union 4.7% and Africa 0.36%."

These figures tell a story, even when we allow for the definitional differences across countries and regions of the world. Indeed, because the 1980s were a "lost decade" for most of Africa, the figures today probably give an even less favourable comparison for Africa than in 1980. Most African countries still cannot give a precise indication of the financial and human resources devoted to research. The same report goes on to observe.

"The Situation in research training in Africa is just as gloomy. No African country spends more than 2% of GNP on higher education and for the majority the figure is under 1%..... (computers in Africa).

The short-fall in technological skills is a very serious one, and one which will continue to be a severe constraint on the applicaiton of technology in African Development. In the area of IT applications to development, the shortage (lack) of IT professionals in Africa has led to reliance on expensive expatriate consultants. The effect of this is to slow down IT development because of the scarcity of financial resources to pay for IT imports. The whole area of human resources development

for the IT market should be a major component of Africa's national policies. Training for the IT market must start in African schools and extend to work places. Policies (especially on remuneration) that attract and keep IT professionals within our countries will have to be put in place if the brain-drain that has occurred in other areas of educational development is not to be repeated.

14. Another problem hindering the effective utilisation of Information Technology relates to the African IT market, which is still little understood. There is a need to identify the regions "leading markets" the needs that drive these markets, and also to compile information on the likely demand for systems of all sizes in the next few years. Areas of concern include: users complain regarding lack of training, unsatisfactory after sales maintenance, lack of software solutions on the market, and not enough wide range of software on the market to meet the desire to computerise. (computers in Africa)

Telecommunications

15. Telecommunications facilities in many African countries have been described as deficient. In a majority of cases, however, the development of these facilities are rated as uneven, low level, grossly inadequate, and underinvested. The implementation of telecommunications in many African countries is characterized by:

- (i) Conflicting policy signals from government,
- (ii) Haphazard and uncoordinated planning,
- (iii) Poor quality of service,
- (iv) Underutilization of available resources,
- (v) Lack of manufacturing capability,
- (vi) Inadequate logistic machinery (manpower, equipment/tools, transportation)
- (vii) Proliferation of different technologies leading to problems of interworking the system and inadequate executive capacity.

INFORMATION TECHNOLOGY IN AFRICA'S
DEVELOPMENT AND INTEGRATION

16. Africa has entered its fourth development decade in weaker economic position than any other developing region. There is no question that a dynamic approach is needed in every section to bring Africa out of its current development malaise. Information support for development is no exception to this. Solutions to Africa's socio-economic problems require inter-alia a constant and adequate supply of accurate and timely information. A dynamic approach to information sharing can contribute to re-awakening of African development, particularly through a strategy emphasizing networking and economic integration.

17. In the area of information for development, the major problem is that most African countries are badly in need of information for development planning. While much of the necessary information exists, most of it resides in developed countries. It has become an axiom of the late twentieth century "Information Age" that developed countries are developed because they are "information rich". At the same time, that developed countries forge ahead with information services as one of their major growth industries. In Africa information activities suffer from an absence of expertise in information generation, processing; storage and retrieval and from the fragmentation of information. This is due in large part to inadequate domestic information policies, an absence of information networks and a low level of information technology employed. As a result planning frequently takes place without sufficient facts, and projections are based on out-dated data or inadequate documentation.

18. A clear need exists for the strengthening of African information systems and services in order for them to become dynamic providers of information for operational purposes. Revitalization, needs to take place in the context of stemming the present North-south information flow and information dependency of the south, by emphasizing the provision and exchange of development information within Africa. Africa needs to develop a high level of self-reliance in the establishment and

use of information systems. In order to do this, it needs to develop information technology know-how. Consequently African countries need fully developed information policies.

19. Information support for development is becoming particularly crucial in the context of the efforts which are underway to implement economic co-operation at sub-regional and regional levels, and to build the African Economic Community and Common Market. These efforts can successfully bear fruit only if all African development partners have mutual access to the relevant information, needed for decision making. The Pan African Development Information System (PADIS) can play a major role in strengthening information resources and capabilities of African countries, regional institutions, including those of the regional economic communities and groupings, and the private sector in Africa, both by providing the necessary information support and assisting in the development of viable information systems.

20. Through information networks developed using appropriate technologies, the economic integration of Africa may become a reality. For example, an Africa-wide electronic network, requires up-to-date and reliable technology in order for it to be effective. Such a network could be assisted by computer mediated communications. Computer mediated communications, a part from serving as an inexpensive way of obtaining information from such a network, could also allow institutions like PADIS to send immediate help on information technology problems and encourage on-line discussions on all relevant issues.

21. The establishment of an African economic community and the development of regional economic groupings will, therefore, need to be further supported by computer networks for electronic information exchange. Use of networks is essential for industrialists, investors and economic operators in order to get timely and accurate information for the design of a product or to gain access to a fruitful foreign market. Networking enables better circulation of information between partners in the private and public sector in the same continent and between continents. Networking also facilitates subregional and regional economic groupings in improving

productivity profitability and reducing costs. PADIS which is already identified as the lead institution in the field of computer networking in Africa as the results of its initiatives in the field, will promote networking as a mechanism for regional economic co-operation and integration in Africa. Electronic data interchange can be achieved in Africa if communities of interest and convenience form a link to share the same information. PADIS may be used to link its electronic network with those being developed in African institutions dealing with standards and technical regulations, trade information, food technology, manufacturing and design, and customs procedures, etc.

CONCLUSIONS

22. Meaningful socio-economic development and integration of Africa is almost impossible without a sound information base for planning. Africa's lack of development over the years is attributed principally to the information poverty which has characterised the socio-economic development planning efforts of many of the nations on the continent since their attainment of political independence. The prevailing situation is not because the planning environment of these countries lack data on which they could base various meaningful socio-economic planning exercises. On the contrary, the problem has been one of the inability of African countries to develop and maintain appropriate infrastructures for data generation and use.

23. This paper has identified various areas for information technology use in Africa, for socio-economic development and integration. It has also identified the infrastructural deficiencies which have inhibited the use of appropriate information technology in Africa. The paper has placed more attention on the problems facing African countries in the use of information technologies. PADIS has made attempts in alleviating the problem of human resources development, to some extent by developing and administering a number of courses some of which are designed to enhance the ability of information professionals in the application of information technologies.

24. This paper has stressed the need for policies in three major areas which have direct bearing on the capacity of countries in Africa to make use of appropriate information technology. These are the area of computer acquisition and use, human resources development, and communications. These policies should, as a matter of priority, aim at developing national capacity in the manufacture, use and maintenance of the facilities for the information activity on the continent. In this regard, the action of African governments in the acquisition and use of computer and telecommunications hardware and software should be directed towards:

- (a) Regulating importation,
- (b) Reinforcing the bargaining power of buyers,
- (c) Stimulating research; and
- (d) Fostering the development of technology capacity in the productive sector.

25. Human resources development should be given priority by training more people in the use of information policies. With the developments and advances in the application of new technologies for generating and disseminating socio-economic data/information, training in the use of appropriate information technology is becoming very crucial. However, the success in the implementation of the suggested policy guidelines depends significantly on the political will of each country on the continent, as well as of all of them as a collective entity, in pursuit of socio-economic development and integration of Africa.

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