THE INFORMATICS
REVOLUTION
AND
THE
DEVELOPING COUNTRIES

**Summary Report
on a
Consultative Meeting
Of
the North South Roundtable**

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THE INFORMATICS REVOLUTION AND THE DEVELOPING COUNTRIES - A SUMMARY REPORT Introduction

The North South Roundtable, in cooperation with the Government of The Netherlands and the UNDP Study Programme, organized a consultative meeting on "The Informatics Revolution and Developing Countries, With Special Reference to the Development of Human Resources." The main focus of the meeting was on the problems and opportunities confronting the developing countries, particularly in respect of human resource development priorities and policies, as a result of the rapid changes in computer and telecommunications technologies and their application to an increasingly broad range of development and development-related activities. The meeting, which was attended by 33 high level experts and policy makers of diverse back-grounds and expertise (a list of participants is appended), engendered a lively discussion on identifying principal policy issues and options for the policy makers of the developing countries, relevant international agencies and private industries. All participants attended the meeting in their personal capacities.

This summary statement, prepared on the basis of the rapporteurs' reports, reflects the major ideas and concerns expressed by the participants but does not represent an agreed statement. This process of dialogue on the informatics revolution was initiated by a very thoughtful analysis circulated to the participants of the Consultative Meeting by the Chairman of the North South Roundtable, Maurice F. Strong. That paper is appended to this summary report.

Issues

The meeting, and its attendant discussions, were motivated by a single concern: By most social and economic indices, the gap between the richest 30 per cent and the poorest 30 per cent of the world's population has widened over the past twenty years. Now, the developing countries' traditional sources of disadvantage are likely to be supplemented by profound new forces associated with advances in new information technologies. It is clear that the so-called informatics revolution will produce a set of social and economic changes comparable in magnitude to those resulting from the industrial revolution. Without deliberate and sustained efforts, these new technologies will probably serve to widen the gap between rich and poor countries even further. The questions that were asked frequently by the participants were; Is it possible for the less-developed countries to "leap the gap" by using new computer technologies? Would the lack of adequate capital infrastructure and trained manpower in the less-developed countries stand in the way of using these technologies? Since these technologies are designed and produced by and for the industrialized countries, can they be suitably used by the developing. countries? Or do the developing countries need to manufacture not only the software, but also the hardware? And, above all, the crucial question was: What was the real priority of the developing, especially the least-developed, countries - satisfaction of the basic needs of the bulk of their population, or building a high-tech society for the privileged few?

Developing-Country Experience

The participants highlighted a variety of experience in the developing countries. The salient points were:

1) It is difficult to identify the needs of the LDCs in view of the very different levels of development in these countries, and also taking into consideration the financial implications of introducing new information technologies. However, guidelines should be provided for use by interested countries concerning different types of applications, with an indication of appropriate

technical solutions. It is important to trigger off self-sustaining projects which could be successfully introduced in many LDCs.

2) To identify areas of interest, needs, and possibilities of cooperation, Nouth South and regional seminars are needed. WHO is planning to give assistance for such seminars.

3) The group called attention to the problem of standards. Not only might machines have different operating systems, but also, future development and utilization would be affected by different standards for coding procedures, if these issues were not dealt with openly before acquisition.

4) Even in conditions of low rates of literacy and inadequate infrastructure, it is possible to increase the efficiency and profitability in certain sectors, such as health and banking, by using microcomputers and radio and satellite communication. But it is important to encourage specialized technical and non-formal education along with the literacy drive which, although a slow process, is a must for all societies.

5) On the other hand, satellite communication for education requiring voice, facsimile and graphic transmission, and proper sitting of ground stations, has proved to be exceedingly complex from a technical standpoint in some countries.

6) A 20-year survey of computer use in developing countries by IBI indicated that there had been limited penetration to date. Public administrations and large companies, often foreign, were the principal users, and it was mainly mainframes rather than microcomputers.

7) WHO's experience in using computer systems for health support has been quite good in LDCs. Until now, statistical and bibliographic data systems had been most in demand, and only a few countries had asked for assistance in developing management projects. It is believed that the latter systems would be o£ greater importance in future to increase the effectiveness of hospitals in LDCs. There is a need to establish a methodology for computer-assisted health management systems, and WHO is working toward this goal.

8) There is need of a network for speedy interchange of information within LDCs, and between LDCs and DCs. Non-compatibility of computers was one of the problems encountered by many countries. Better coordination within national administrations is also required.

9) It was recognized that computers would help in currency inventory, financial plans, human services such as health and education, agriculture and management administration. All the technologies needed for these areas are available.

Policy Options

1) The pressure for change from the new informatics technologies cannot be ignored. At best, developing nations can think through their options and develop internally consistent policies that could potentially offer useful new tools for enhancing human development. But any viable policy will need to harmonize the relationships between traditional technologies with modern ones, and both with the kind of human development that is required in a particular society.

2) Most of the informatics equipment available to developing nations is designed and produced in the industrialized countries. Circumstances governing the use of these technologies are enormously different in the two regions. Thus, developed-country experience (and software) are of somewhat limited relevance to the developing countries. Much responsibility for designing national informatics policies and producing software must, therefore, reside with the governments of the poorer countries. In this respect, there are great possibilities for technical cooperation among developing countries (TCDC).

3) The process of designing effective plans and policies could be aided substantially by associations of users that can balance the power of the producers.

4) The benefits of computers cannot be fully realized without a mature telecommunication system, an educated labor force, effective national institutions for monitoring developments and establishing general policies, and reliable power grids. However, many substantial gains can be realized even by installing isolated minicomputers in present institutions. It is unwise to ignore the importance of infrastructure, but it is also impossible to wait until conditions are ideal for implementing a complete national informatics program.

5) The costs o£ implementation programs must be assessed candidly. It is simply unrealistic for any country to expect that grants and gifts will provide the foundation for its extensive use of the new informatics technologies. However, it is possible that innumerable applications can return many times their costs by raising export earnings or reducing import needs. Thus, eventually, the informatics programs of most developing nations can be largely self-financing.

6) National standards are required to ensure that proliferation of hardware and software does not diffuse the energies of the scarce personnel resources of the developing countries. These standards must be set with sophistication so that they do not stifle national spirit, innovation and

initiative. The standards should not narrowly specify hardware types; this would preclude competition among alternative suppliers.

7) Even before a comprehensive national plan is established, there are many concrete applications for computers that offer tangible, short term gains, and that will provide experience and expertise relevant to the larger and longer-term policy issues. Many of these early efforts should focus on the computer skills of teachers so that trained personnel are produced quickly.

8) Explicit policies related to networking and computer telecommunication are essential. Some members of the Roundtable felt that informatics programs could not proceed far without major efforts to strengthen the telecommunication system of a country. Others felt that the need for networking was. less certain.

9) Networking has two functions: It can bring data from the periphery to facilitate centralized monitoring and control; or it can provide data to those on the periphery, so that their decisions can be based on more comprehensive considerations. These two options have very different implications for diversity, initiative and power. Any national effort to develop guidelines for the telecommunications industry should recognize the social implications of the technology.

10) The establishment of a Telecommunication Development Center by the ITU was seen as an important step in extending the benefits of traditional voice communications to all parts of developing countries in building up their basic telecommunications infrastructure. However, some of the participants suggested that the ITU consider the early selective implementation of non voice services which can support informatics applications and which can make innovative use of new information technologies, such as satellites. Such specifically informatics-supporting activities can take place in parallel with the larger task of building infrastructure.

11) The final point was probably the most important. Numerous examples prove that computers and related technologies can already produce significant gains in the effectiveness of developing nations' limited teaching and administrative staff. New technologies are not required to achieve major advances. But much work is required to refine the software and develop implementation procedures appropriate to Third World settings.

Conclusions

The participants agreed that the informatics revolution had such profound implications for the future development of the. Third World, and for the evolving relationships between the North and the South, that a full exploration of all the policy implications and concrete institutional proposals will require a sustained process of dialogue. In this context, the first Roundtable could only be regarded as exploratory, where preliminary diagnosis was. undertaken and key issues identified for further analysis. It was agreed that the next Roundtable would be held sometime in the summer or autumn of 1986, when the focus of the participants would be on sharpening the policy options confronting the developing countries and on suggesting concrete institutional mechanisms through which the present exploding informatics revolution could be translated into a lasting benefit for the majority of mankind.

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THE INFORMATICS REVOLUTION AND
DEVELOPING COUNTRIES
by
Maurice F. Strong

The informatics revolution is no longer a rhetorical term to describe an impending future phenomenon. It is a very real and present reality, touching the lives of most of the world's population and, more importantly, giving rise to radical, and perhaps decisive, changes in the prospects they face for the future. The informatics revolution is likely to produce changes in lifestyles, in patterns of economic growth, in education and training needs and. methodologies,

and in human and social advantage which could be as radical as any of those produced by the industrial revolution.

The informatics revolution is a product of the rapid development o£ both computer technology and telecommunications technology, and the growing integration between the two in networks which enable the data gathering, storage and analysis capabilities of computers to be made accessible to sources and users of information throughout the world by means of telecommunication facilities, including satellites. The development and application of these new technologies have been concentrated in the industrialized countries and have proceeded at a pace far in excess of the average growth rates of their economies. Indeed, the data communications service industry in Western industrialized countries has grown at rates of some 15 to 20 per cent per year in. recent years.

There has been a proliferation of data networks at the national level, as well as a rapid development of international networks, principally in the private sector. Amongst the most extensive of these are SWIFT, linking more than 500 European and American banks, and SITA, linking more than 200 airlines. A number of public data networks have also been developed, including EURONET, set up by the European Community and run by a consortium of European PTTs, and the Nordic Public Data Network. Many others are in the process o£ development.

Information technologies have developed at a much more rapid rate than the policies designed to deal with the important issues which they pose for national governments. The very nature of the information, combined with the electronic means of gathering, storing and disseminating it, makes it extremely difficult, and in some cases virtually impossible, to contain and control it within national boundaries. And rapid evolution of technologies can render existing policies and control and regulatory mechanisms obsolete or ineffective within a short times pan. Thus, cooperation amongst governments is indispensable if they are to ensure the full participation in the benefits which the information revolution makes possible, while minimizing the risks and dilemmas it poses.

These risks and dilemmas. have arisen to date amongst industrialized countries principally in relation to trans-border data flows. Two of the principal issues that have engaged the attention of governments to date in respect of trans-border data flows are the privacy and sensitivity of data, and the dependence of users in one country on reliable operation and standardization of hardware and facilities, tariffs and restrictions in another country. Ownership, and the desire of each country to develop its own capacities in the production of both hardware and software, are also significant issues.

Although developing countries are also concerned with these issues, they have another concern of a more fundamental nature: the danger that their own cultures, values, national independence and integrity may be seriously threatened as a result of the information revolution. To developing countries, as well as to some industrialized countries, measures designed to anticipate, evaluate and mitigate these threats are of particular importance.

While the processes of international consultation and cooperation in dealing with these issues have been initiated in a number of fora, both official and private, the principal progress to date has been made by the OECD through its Working Party on Information, Computer and Communications Policy, which produced in 1981 a set of "Guidelines on the Protection of Privacy and Trans-Border Flows of Personal Data", and by the European Community in relation to the creation of EURONET. Various members of the United Nations family, notably the Financing System for Science and Technology for Development and UNIDO, are also increasingly involved in examining these issues and providing the basis for dealing with them in a more global context.

Many developing countries are well advanced in their knowledge of and capacity to deal with these issues. Virtually all developing countries are now tied in to international telecommunication facilities which provide them with the means of access to computerized data networks. Some, like Brazil and India, are very much up to date in the development of their own national capabilities, as well as in their participation in the international dialogue and consultations on the issues that concern them. However, the developing world as a whole is still very much in the rear guard of the informatics revolution. For many developing countries it is extremely difficult to keep up with the rapid changes that have been taking place, both in the evolution of information technologies and in the control and use of such technologies by industrialized countries.

Thus, many developing countries find themselves facing the prospect of an important new comparative disadvantage in pursuing their own national development goals and obtaining the growing share of world economic growth which. they need to meet the needs and aspirations of their people. It can also create a new generation of dependence on the industrialized world, arising from the fact that industrialized countries and their multinational corporations have such

a high degree of preeminence in the field. Thus, it will be difficult for developing countries to obtain a major share of the research capabilities that produce new technologies, manufacturing facilities, control of data networks and the professional and intellectual skills necessary for leadership in the software aspects of the industry, which are so dependent on education and training and related employment opportunities.

It will not be. easy for developing countries to obtain a substantial share of the growth. prospects available from direct participation in the industry itself. At the same time, there is strong evidence that the information revolution may lead to a reduction in the markets for the raw material exports of developing countries by giving rise to a whole series of new manufacturing and industrial processes and techniques in which there has been a remarkable trend towards miniaturization.

This source of comparative disadvantage comes at a particularly bad time for the developing countries, when most are struggling to reinvigorate the internal economic growth on which their development prospects depend in a world economy that is increasingly competitive. Quite apart from their disadvantage in respect of the information industry itself, the information revolution will have a profound impact on virtually all sectors of their economies in which the application of information technologies is becoming an essential element in maintaining efficiency and competitive capacity, It is imperative that developing countries be in a position to understand and respond to these changes and the kinds of impacts they will have on their own economic and social development.

Thus, developing countries cannot escape the need to face up to the challenges with which the informatics revolution now confronts them. While they start from a position of comparative disadvantage, there is much they can do to overcome this and, at least in some respects, to develop certain comparative advantages of their own within the industry. Each country will, of course,

strive to obtain as much as it can of indigenous manufacturing capacity, and to control both the inflows and outflows of information from their countries. Their policies in these areas will have to be carefully balanced to ensure that they do not impair their ability to obtain the principal benefits available to them from the employment of the best information technologies in the various sectors of their economy to which they can make a significant contribution. There is a potential policy trap in this dilemma for even the largest developing countries, as few countries in either the developing or the industrialized world are in a position to enforce highly nationalistic information policies without severe costs to their own capacity to remain competitive.

One area in which the informatics revolution is likely to have a profound impact on developing countries is in the development of their human resources. This is also the area in which there is a potential for them to develop competitive equality with industrialized countries and perhaps, in some cases, comparative. advantage. The informatics revolution requires a quantum change in each country's educational and training systems; and, paradoxically, it also helps to facilitate these changes. The changing structure and patterns of employment within the various sectors of the economy produce the need for people with skills that are often very different from the traditional skills required in the industries concerned. The trend will be toward a relatively greater role for people with the kind of skills that require more education and training, and a proportionately diminishing role for unskilled labor. Of course, not all of the new skills required will be at a highly sophisticated level, and many will require only relatively short periods of specialized vocational-type training, to be supplemented by. on-the-job experience. Provision of the necessary educational and training facilities needed to enable people to acquire these new skills is not excessively expensive and should be within the range of most developing countries. Indeed, they have a great opportunity to accord high priority to the addition of these capacities to their present educational and training facilities. This should provide an exceptionally attractive and promising field for investment and concentration by developing countries.

The principal difficulties they will face are the policy and structural rigidities within their own educational and training systems, as well as the need to provide employment opportunities within their own countries, rather than simply adding to the emigration of their skilled people.

The difficulties which the developing countries will have to surmount in accommodating to, and benefiting from, these challenges are formidable indeed, but not insurmountable. Nevertheless, it will take exceptional measures on their part if they are to avoid or mitigate the new generation of comparative disadvantage they face, and to take advantage of the new opportunities the informatics revolution can make available to them. A primary need, and an urgent one, is to ensure that developing countries have full access to knowledge of the rapid changes taking place in information technologies and their applications, so that they may develop the capacity to

evaluate the implications of these changes, both positive and negative. Beyond this, they will need access to the best possible support for their own efforts to develop the policies, programs and measures which will enable them to realize the benefits and minimize the risks of the informatics revolution.

UNDP STUDY PROGRAMME

The Development Study Programme of the United Nations Development Programme (UNDP) was established by the Governing Council of the UNDP in 1981 in order to promote a greater understanding of the issues concerning development and technical cooperation; strengthen public and governmental support for development and technical cooperation; and generate new ideas and innovative solutions to the problems of development and technical cooperation. The activities of the UNDP Study Programme take different forms, such as seminars, lectures and informal discussion groups. Participants at the various events held under the auspices of the Programme are drawn from among high-level national policymakers, government representatives, senior officials of the United Nations Development System, leaders of public and private enterprises, representatives of the media and academics.

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