NATIONAL INFORMATION POLICIES
WITH SPECIAL REFERENCE TO
DEVELOPING COUNTRIES

Shahid Akhtar
Director, Information and Communications Systems and Networks
International Development Research Centre
250 Albert Street, P.O. Box 8500, Ottawa, Canada K1G3H9
Tel: (613)236-6163 ext: 2033. Fax: (613)563-3858

A. Neelameghan
Hon. Executive Director
Ranganathan Centre for Information Studies (Madras)
216, 4th Main Road, 16th Cross Road, Bangalore 560055, India
Tel: (91)(80)3341657. Fax: (91)(80)8430265
E-mail: ndrtc@isibang.ernet.in
INTRODUCTION AND BACKGROUND

Scope of the chapter; Working definitions
Developing countries; Regional alliances

SOME BASIC PREMISES AND COUNTRY CONTEXTS

Basic societal function of information systems and services;
Premises; Country Contexts

SOME LESSONS FROM PAST EXPERIENCES

SUGGESTED ELEMENTS FOR A NATIONAL INFORMATION POLICY

Goal of a national information policy; Information for national development; Structure and function of the national information policy coordinating body; Budget;
Provision of access to information; Indigenous information and information products; Promotion of use of information;
International information activities; Information manpower development; Informatics and telematics; India - an example.
NATIONAL INFORMATION POLICIES
WITH SPECIAL REFERENCE TO
DEVELOPING COUNTRIES

Shahid Akhtar; A. Neelameghan

Reviews issues pertaining to the formulation of national information policies especially for developing countries and is based largely on papers published between 1992 and 1994. Mentions lessons learnt from past experiences of formulating information policies in developing countries. Emphasizes the need to take into account the country context and situation in formulating information policy. Model statements of policy on select basic components of national information infrastructure and some of the implications of implementing the policy discussed are largely based on reports of technical assistance missions to developing countries and deliberations of national and regional meetings supported by international agencies. Human resources development especially enhancing people's propensity and capacity to use information as well as the education and training of information professionals to handle IT are of concern to developing countries. This has implications to national and international information policy and educational policies. Hence, the bibliography cites a few documents on applications of IT in education. The emerging reality of information superhighways, global information infra-structure and trends in public policy on information in developed countries that are likely to affect or otherwise of interest to public policy formulation in developing developing countries, also receive selected citations.
NATIONAL INFORMATION POLICIES
WITH SPECIAL REFERENCE TO DEVELOPING COUNTRIES

INTRODUCTION AND BACKGROUND

Scope of the Chapter

This chapter reviews issues pertaining to the formulation of national information policies especially for developing countries and is based largely on recent papers (1992-1994). The specimen statements of policy on basic components of national information infrastructures and the implications of implementing the policy, discussed in this paper are largely based on reports of technical assistance missions to developing countries and deliberations of national and regional meetings supported by such organizations as Unesco, International Development Research Centre (IDRC), Ottawa, Canada, and others bodies. Human resources development especially enhancing people's propensity and capacity to use information and the education and training of information professionals to handle IT are of particular concern to developing countries. This has implications to national and international information policy and educational policies (BUGLIARELLO; LESGOLD; DOYLE). Hence, the bibliography cites a few documents on the applications of IT in education. The emerging reality of information superhighways, global information infrastructure and trends in public policy on information in developed countries that are likely to affect or otherwise of interest to public policy formulation in developing countries, also receive selected citations.

Working Definitions

For the purpose of this review the following definitions derived from MONTVILOFF, and NEELAMEGHAN & TOCATLIAN are used:

Information resources is used as a generic term denoting data and information sources in textual, factual, numerical, graphical, and sound form, recorded in conventional or in non-conventional media and handled in conventional ways or through the applications of information technology (IT). The term also covers systems, services, and products of libraries, information and documentation centres; data bases, data banks, information clearing houses, and referral centres; information analysis, consolidation and repackaging activities, decision support and management information systems, expert systems and other similar specialised information support facilities.

Information infrastructure consists of information resources, human and knowledge resources, and facilities necessary for the processing and delivery of information. The traffic within an information infrastructure is information itself.

In relation to developing countries, information systems will
be viewed as facilitators of development communication, the flow of and convenient access to, relevant development messages by all sections of society. Several papers on communication and development have been presented in a special issue of Development (1993) guest edited by AKHTAR. Some aspects of communicating development messages are briefly discussed below.

**Development messages**: Messages communicated deemed relevant to the development concerns of the recipients more particularly of people at the grass roots in developing countries, for example agricultural practices, water, health and sanitation, food and nutrition, women, family and child welfare, preservation and conservation of natural and other resources, fuel and energy, environment protection, literacy, etc. Also, messages that help prevent exploitation of people and/or deny them their rights to development, development process, and outputs, by others, whether the latter be locals, nationals, or people of other nations.

Development messages also guide people at all levels in the positive use of knowledge, and prevent its use in ways that are harmful to people, material, and environment; enable people to overcome barriers to communication and access to development-related messages; and build or enhance indigenous capacity to access, retrieve and use information effectively.

**Development communication**: Communication of messages or information that enhance the capacity of recipient individuals or groups to select and integrate appropriate exogenous knowledge with indigenous knowledge systems to support their socioeconomic development within the respective development contexts and, in the process, to preserve their respective cultural and spiritual value systems. This should be accomplished through a judicious blending of traditional and modern communication media in such a way as to facilitate the exchange of messages among local communities on the one hand and between them and communities of other nations at the international level on the other.

Development communication must "empower the majority of the populations in the South" which are still striving just for self sufficiency and a marginal degree of social progress (BLAKE). It should enhance sustainable human development potential that is, investing in human development, enabling informed participation of people in development policy making and implementation, and equitable distribution of economic growth.

**Development communication system**: A large scale development program involves a large number of people, and organizations of different professionals, social classes and interests at various levels, ranging from the village to national and international development agencies. In developing communities development communication at the grass roots consist largely of change agents and the target populations. They are linked among themselves and
with other people and organizations through various communication channels, means and media, ranging from direct person-to-person to sophisticated telematics. Such communication networks, the messages or information flowing through those networks, and the individual and institutional nodes taken together constitute the development communication system. In this physical structure, activities at one level or communicating node will have their impact at other levels and nodes.

The symbolic structure of development communication consists of "meanings, motivations, values, beliefs, customs, norms and rules of development and communication shared/or contested by individuals and organizations." (RAHIM)

In this development communication framework, the levels of socioeconomic development at which information and IT impact may be studied are: national, community/organization, and individual. And the criteria for assessing IT impact include: Does it reach all sections of the community? and Is it sustainable? (WAENA). Will it help preserve the symbolic structure cherished by the community? In any development communication process the people, the individuals are the nodes who spread the message (MORINO).

In formulating public policy, a goal is an overall ultimate desideratum sought. Statement of a goal is an enduring statement of an encompassing purpose toward which action will be directed over an indefinite period of time; and a Policy is a statement of principles and strategies, and a commitment to a generic course of action for attaining a given goal. Policies are embodied in policy-instruments, such as, legal instruments (constitution, parliamentary act, law, regulation, treaty, etc.) professional instruments (codes of conduct, professional ethics, etc.) and cultural instruments (customs, beliefs, traditions, conventions, social values, etc.)

In this perspective, a national information policy adopted by a government, would become a long term commitment to support a generic course of action that can be translated into a plan of action for its implementation. Thus, a national policy provides guidance and direction for designing strategies, projects, and programs for developing and using information infrastructures.

Developing Countries

As this review relates to developing countries, it will be useful to note some features of this group of countries:

Differences: The political, social, technological, cultural, regulatory and other environmental influences on the information systems, services and infrastructure and of the latter on the socioeconomic development in developing countries are not of a
similar nature, and neither are they at the same level. There is also difference in the extent of use information and in the range of applications of IT. This is in part due to the differences in the nature and level of development among these economies. Developing countries may be categorized as: newly industrialising economies, developing countries, and least developed countries. And, in terms of policies and strategies on information and IT, there are differences among them. These are discussed in the section Country Contexts below.

**Common features:** Some common features in the history of the developing countries in the second half of the Twentieth century include the following:

- Attaining political independence (decolonization).
- Attempts at planned national development:
  - move toward industrialisation;
  - efforts at infrastructure development through policy and institutional changes, and administrative reforms;
  - programs for human resources development;
  - establishment of research and development (R & D) facilities;
  - technology acquisition, adaptation, and development of indigenous technology
- Establishment of library and information facilities to support the above-mentioned efforts.

**Some external influences:** During this period, we may also notice the

- establishment of several international organizations, such as the specialized agencies of the United Nations and non-governmental organizations (NGOs) concerned with social, economic, technological, and cultural development especially of developing countries;

- formation of regional alliances of nations for cooperation for political, trade, economic, scientific, cultural or security purposes (e.g. ASEAN, SAARC, APEC, OAU, SADC, EU, OAS, Andean Pact; NAFTA)

- accelerating pace of developments in information handling, especially in informatics and telematics;

- developments in and activities of industrialized countries including their large investments in R & D, adoption of strategies and institutional structures for applying research results to develop new products and services, together with their vigorous efforts to seek markets for the products, services and expertise through establishing multinational corporations, joint ventures, bilateral arrangements with or in developing countries;
- significant developments in the information industry in the industrialised countries and their move toward an information society whose economy depends in a large measure on trade in information;

- globalisation of national issues and increasing interdependence among nations.

These developments, with their pace accelerating during the past two decades have had and continue to have their impact on the information scenario of developing countries.

Impact of international programs: The impact of the programs, projects, and activities of international intergovernmental and nongovernmental organisations on the information infrastructure of developing countries may be summed up as follows (NEELAMEGHAN):

- technology transfer, North-South and, sometimes, South-South;

- establishment of national documentation and information centres, particularly in science and technology fields;

- strengthening of information resources (including the provision of hardware and software) of selected institutions;

- training of information professionals through short term workshops, and training courses, as well as supporting the establishment of regional graduate/postgraduate training and research programs in institutions of higher education;

- production and introduction of norms and standards in information work;

- assisting in the formulation of national information policies; and

- providing a model for voluntary cooperation among information facilities.

Regional Alliances

Information and information exchange are the substance and modality in most regional cooperation arrangements, be it for political, economic, trade, technological, social, or cultural purposes (TIMBERGEN).

The formation of such alliances of nations calls for data and information support for the effective execution of their functions of coordination and promotion of cooperation in the selected
sectors of the participating countries. Some areas of common interest and on which information is required among the countries include:

- market status for products and services;
- trade opportunities;
- customs, duties, taxes, and related regulations;
- available technologies and innovations;
- natural resources data;
- available expertise and skilled manpower in different fields;
- banking and other financial services;
- status of various infrastructural components;
- demographic data;
- public health, communicable diseases situation, epidemiology and health legislation;
- intercountry travel regulations;
- existing bilateral and multilateral agreements, treaties, and contracts;
- ongoing development projects and programs;
- national development plans and priorities thereof;
- national policies relating to various sectors;
- political, social, and cultural information;
- laws relating to resource sharing, transborder data flow, patents, trade marks, etc.

These information requirements have promoted the creation and development of general and sectorial information facilities, in the participating countries as well as at the secretariat of the regional alliance. These developments have added a dimension to national information policy formulations in the participating countries.

SOME BASIC PREMISES AND COUNTRY-CONTEXTS

Basic Societal Function of Information Systems and Services

The main function of information systems and services (ISSs) is to assist people in all walks of life to cope with change in the local, national, and increasingly, in the global environment. The environmental elements encompass political, social, cultural, technological, regulatory and other entities and issues. With the view to achieving this objective, ISSs must keep their antennae fine-tuned to monitor the changes and also to adapt themselves to those changes so as to perform optimally their functions. There is also a growing belief, supported by events of the past decade, that an effective national information infrastructure would make governance more transparent and assist spread democracy to all levels of society. It should, however, be noted that economic growth may not necessarily be accompanied by various social and individual freedoms associated with the concept of democracy in the West (cf. Singapore, China, Indonesia) (NAISBITT, 1994). ISSs
nevertheless, have a valuable societal role to play and also the potential to play it, that is, to help people shape the future.

Premises

The fundamental premise of an overall national information policy is that any economic-social-political system is likely to perform more efficiently and effectively if there exists within the system a mechanism for ensuring that such functions and tasks as gainful decision making, effective problem solving, planning, management, minimizing the chances of unnecessary duplication of effort and wastage of resources, promoting innovation, and thus enhancing overall productivity are supported by timely provision to all those participating in and contributing to the development process with relevant, up-to-date, and reliable information.

In recent years, the role of information as a vital national resource for socioeconomic development has been gaining wider recognition among government officials and decision makers. They express a need for timely, relevant and reliable information for policy and decision making and for planning in priority areas, such as, economic development, marketing, trade, domestic and foreign investment, human resources development, energy, natural resources, social and cultural aspects of the population etc. (INFORMATION IMPERATIVES).

On the other hand, at the lower levels of government there may not be a similar preoccupation and awareness of the data and information needs of the users, or may not have adequate access to pertinent sources of information, or they may not possess the required training and skills for responding to such needs with the result that top level officials may not receive the needed information and data in time and in a form convenient to use.

There is a growing trend in the globalisation of national issues and a corresponding interdependence among nations. This has been accelerated by, contributed to and strengthened by, developments in IT, regional alliances of nations, and regional and international information systems, networks and programs. The effective participation of a country in the development of and deriving benefits from, such regional and international networks and systems depend in a large measure on the backing of a strong national information infrastructure. The development of such an infrastructure and ensuring its effective participation in and contribution to, regional and international cooperative networks and systems will be facilitated by formulating and implementing appropriate policies in the participating countries.

In most countries there exist constitutional acts, policies, and legislation of various kinds relating in some way or other to the provision of information and IT application. Nevertheless the interrelationships among issues concerning the communication of information, IT, telematics, the information industry, economics of information, information management and services, privacy and
confidentiality, the right to information and communication, emphasize the need for an overall and comprehensive approach to the problem.

Every citizen of a country has the right to development— to benefit from and to contribute to, the development process. Data and information are essential support to as well as products of the development process. Further, the fact that the processes of sound decision-making and planning require inter-sectorial and inter-disciplinary data and information, such as, sociological, economic, political, financial, scientific, technological, and other information from domestic and foreign sources, makes it useful to adopt an overall comprehensive information policy to coordinate the flow of and access to, such information.

Thus, an overall national information policy, comprehending policies relating to informatics, telematics, and other emerging ITs, and fully integrated into the national social-, economic-, technological-, cultural-development policies and plans, is seen to be conducive if not a pre-requisite to national development in all sectors.

The overall national information policy statement should not only be comprehensive, but also sufficiently sensitive to the developments in IT, and responsive to the specific development needs of the country and formulated in broad terms to minimize the need for frequent revisions. Implicit in the statement of a national information policy is the need for an effective national level trans-sectorial and multi-level coordinating mechanism.

Country Contexts

In formulating a national information policy, the country context and the existing information infrastructure and policy status should be taken into account. The differences and common features among developing countries have been mentioned earlier. In respect of information policy and infrastructure development there are:

- Countries that have good information infrastructures and reasonably well defined policies. These are mostly the developed countries. They may, however, need harmonization of the systems and services as these grow and proliferate, and many parties from the public and private sectors get into the picture.

- Countries that have reasonably well developed information infrastructures but have not clearly stated national information policies. These may be newly industrializing economies or the developed countries that might not have identified a national information coordinating mechanism or do not have appropriate legislation.
- Countries that have a national information policy but a poorly developed information infrastructure. These are either developed countries or developing countries that have gone ahead formulating a legislative framework for the information field.

- Countries that have no information policy and very poorly developed information infrastructure. These are mostly the least developed countries.

One may note further certain features especially among the emerging economies, in informatics and telematics infrastructure and policies. For example:

(a) countries having policies on the use of computers and controlling such facilities at the national level;

(b) countries that have plans and policies to develop the national infrastructure for informatics and a domestic information industry e.g. computer literacy programs, advanced training in IT, software development and export, export of services, and local hardware production facilities (e.g. Brazil, China, India, Malaysia, Singapore); and

(c) countries mainly involved in the manufacture of IT components and equipment that are sufficiently competitive on the international market (e.g. Hong Kong, Korea, Taiwan)

These differences are not, however, permanent.

There are a large number of papers on the usefulness of IT in various sectors of the national economy. There is no need to repeat them here. However, as a background to the examination of policy issues later in this chapter, we may note that it was not until the mid-1980s when powerful, relatively inexpensive microcomputers and portable software became more widely available, IT began to make perceptible impacts in developing countries, office automation, management and administration, manufacturing and production, in libraries and information centres, etc. In Africa, for example, with the support of international organizations, use of IT in libraries and information centres had increased by the beginning of the 1990’s (UNITED NATIONS, ECONOMIC COMMISION FOR AFRICA; COURIER).

With telecommunications and networking providing access to a wide range and variety of information, information professionals on the one hand and policy makers, planners, and managers on the other, are realizing that any attempt at formulating national information policies must consider developments and policies not only in informatics but also those of telematics.
While the advantages to be derived from IT applications are being appreciated in an increasing measure, new apprehensions and issues are surfacing in developing countries. These and related policy matters are discussed later in this presentation.

SOME LESSONS FROM PAST EXPERIENCES

The programs and activities of UNESCO especially its General Information Programme (PGI) for assisting Member States develop national information policies and their implementation have achieved satisfactory results in some developing countries but ran into difficulties in others. Several papers and presentations in regional and international meetings have also highlighted the failures in formulating and/or implementing national information and informatics policies. MONTVILOFF summarizes and synthesizes the concepts and issues relating to national information policies and discusses the steps toward formulating and implementing such policies. The 1988 African regional conference, edited by AKHTAR (1990) provides an extensive critical review of the status and attempts to formulate information and informatics policies in the countries of Sub-Saharan Africa. Lessons learnt from these and similar exercises in other developing countries of the world are mentioned in brief below:

Low priority assigned to information matters in general and the absence of a national plan of action and commitment of public funds and resources to such program actions are not conducive to efficient national IS development. Low investment in information technology (IT) and poor integration of IT into the mainstream of the national economy. The unsupportive public sector culture may arise from poor commitment to public policy, politicised decision making, bureaucracy, secrecy, inadequate IT funding, and the "big bang" rather than pragmatic step by step approach to IT. On the other hand, the economic leap forward of Singapore is attributed to an appreciable extent on the implementation of a comprehensive National Information Technology Plan. The plan was issued in 1986 by the National Computer Board, established in 1980 to formulate and implement the country's IT policies. The policy and plan spelt out "specific objectives and set deadlines for training people, for creating an IT culture, enhancing the communications infrastructure; generating and supporting IT applications, fostering a world-class indigenous IT industry, that includes software, hardware, and computer services; and pioneering new information technology applications through R&D. In most of these objectives, the National Computer Board has either achieved or surpassed its goals." (NAISBITT, 1994)

Unregulated IT acquisition and implementation has led to various kinds of corruption and difficulties in the integrated use of hardware and software of different standards.

Absence of a formal overall national information policy can limit the commitment and involvement of the government in the
development of the national information infrastructure. This may lead to weak cooperation among government agencies, ministries and other state bodies and to a tendency among them in some cases to resist coordination. In turn, information systems develop in isolation, and IT and telematics applications across sectors become fragmented.

Information for decision-making being inter-disciplinary and inter-sectorial, its gathering and channeling to top management appear to be easier where conditions are created for effective horizontal cooperation among ministries and government agencies by the coordinating mechanism.

Cooperation based solely on the goodwill of the concerned parties, without an institutionalized mechanism for coordination, has not, in most cases, proved to be effective. Further, imposed coordination without clearly understood incentives has not been successful.

Horizontal information flow among departments, ministries and sectors through cooperative arrangements for the collection of information and data from different sources and for the exchange of such information often appear to be weak. In some cases where IT applications in public administration and other areas have been pursued, elitist attitudes have arisen in IT planning, implementation, and use.

Misunderstanding of the functions of a national coordination mechanism may also lead to resistance to coordination among the parties involved.

Inappropriate designation or placement of the national level mechanism for coordinating information systems and services in the country within the national government structure may result in limiting the possibility of achieving overall coordination.

Inadequate budget of the coordinating mechanism constraining its support for substantial information infrastructure development activities.

Inadequate staffing of the national coordinating mechanism may also constrain its effectiveness.

Coordinating mechanisms that give technical and financial support to other components of the national information system, for example for human resource development, R & D, etc., in the information field have generally been more successful than those that have tended to centralize all these activities.

Coordination and policy-making becomes more complicated when the government department under whose authority the coordinating agency is placed is also entrusted with operation of information
services.

It appears to be more advantageous to place the coordinating mechanism under the authority of a government department having responsibility for policy-making, such as the Prime Minister's office, since the choice of a ministry or structure which does not have any authority over the other ministries or structures limits the efficiency and effectiveness of coordination.

Successful examples show that the coordinating mechanism must be staffed with dynamic, motivated, well-trained specialists who are given the necessary status, responsibilities, and salaries to secure continuity and stability of the operation.

Successful examples of policy implementation show that the presence of documentation, library and information development and training activities in educational institutions, research units and the private sector are essential for the development of sound, stable national information systems and services as well as an information conscious society.

At the organizational level, lack of proper planning has led to poor matching of IT requirements with organizational needs; and use of inappropriate models for IT implementation.

Inadequate human resources - technical knowledge and skills for information handling, leadership in the management of change, and large illiterate population are persisting handicaps to be contended with in developing countries.

National efforts which have placed initial heavy stress on the hardware aspect of the national information system, at the expense or neglecting other important aspects, such as, manpower development, user needs, development of information resources, indigenous information, provision for document delivery, have encountered various problems. On the other hand, development of systems ignoring the emerging trends in IT and telematics miss the advantages to be gained from their applications especially in providing fast access to a wide range of data and information, even those in remote locations. The Bill of Rights on information and transfer of IT from the developed to the developing countries discussed by ROODE & DU PLOOY is noteworthy in this connection.

In the high tech information industry the new buzzwords are Information Superhighway and Global Information Infrastructure. These are an integral part of the US Administration's plan to establish a seamless web of communication networks, linking computers, databases, and consumer electronics enabling everyone, irrespective of one's geographical location, occupation, age, race or creed, to have access to a great variety and vast amounts of information when needed. The Global Information Infrastructure (GII) "will encircle the globe with information superhighways on
which all people can travel." The creation of this network of networks is seen as "an essential prerequisite to sustainable development, for all members of the human family." These networks "of distributed intelligence - will allow us to share information, to connect, and to communicate as a global community. From these connections we will derive robust and sustainable economic progress." (GORE). Developing countries while appreciating the global network concept are apprehensive on certain counts. Will the superhighway interconnect only the already affluent countries or those that have the wherewithal for effective participation, in other words, will the highway connect also the South? Will the technology be accessible and affordable to developing countries? Will the promoters take into account the local contexts, social and cultural value systems, and technological capabilities? Will local capacities to access and use information be enhanced? Will the gap between the haves and have-nots within a country and among countries widen or narrowed since more than half the population of the developing world have not used a telephone? Will the data flows in the networks be dominated and/or controlled by the developed information-rich nations? Can indigenous development messages from developing countries mounted on to the information highways? These and related issues have been subjects of recent seminars, conferences and papers (MIT'94; GILBERT ET AL; REGIONAL INFORMATION TECHNOLOGY & SOFTWARE ENGINEERING CENTER; WHITE).

There are few papers on strategies and practical steps for implementing national information policy proposals in developing countries. MONTVILOFF's handbook based on experiences in several developing countries is a useful starting point. However, one of the difficulties of governments and other authorities in the developing countries in accepting national information policy proposals or being able to evaluate the proposals with a clear understanding of what is involved during the legislative process or at implementation stages, arises because the policy elements and related issues may not have been clearly stated; and/or (2) the implications of implementing each policy component may not have been delineated. The latter case, for instance, may lead the concerned authorities to underestimate the commitment, budgetary provision, and various actions to be taken in implementing the policy. Hence, in this chapter, while suggesting basic elements for formulating national information policies mainly oriented to developing countries, as identified in the cited papers, we also provide notes on the implications of implementing each of the policy components.

SUGGESTED ELEMENTS FOR A NATIONAL INFORMATION POLICY

Goal of National Information Policy

Statement: The goal of the national information policy is to ensure:
(1) That information is recognized as a national resource by the national authorities (policy makers and decision makers) as well by all other sections of the society;

(2) That the effective and efficient use and applications of information contributes in significant ways to nation's social, economic, and cultural development and to the improvement of the quality of life of the people at large through the creation and evolution of a more informed society; and

(3) More specifically, the attainment of effective, optimal use of information as well as of the specialised and professional knowledge and expertise in all areas of human endeavour, both generated within the country and obtainable from elsewhere in the world, in making gainful decisions and in problem-solving at all levels and in all sectors of the society.

Implications for Implementation of Policy: To prepare and implement medium-term and yearly programs of activities for the development of a comprehensive national information system based on existing infrastructures, coordinating the various sub-systems and specialised systems and services, identifying and correcting deficiencies, filling in the gaps, and interacting productively with national and international information systems and programs.

To develop systems, structures and procedures for providing relevant, reliable and timely information and data at reasonable cost to decision makers, development planners, executives and administrators, researchers, engineers, technicians, and other professionals; to para-professionals, extension workers, farmers, entrepreneurs, the business community; and to those contributing in diverse ways to achieve national development objectives.

To ensure continuous and adequate support to the components of the national information system including human, financial and other infrastructural resources, administrative and institutional arrangements through public, private and other forms of financing and collaboration.

To ensure cohesiveness and sustained growth of the national information system and its components in conformity with the country's development objectives and its political, social and cultural characteristics and government structure, adapting the national information system as these environmental elements evolve and change over time.

Information for National Development

Statement: The policy will be to treat information and data, specialised knowledge and expertise as well as the information industry in the country as resources essential to socio-economic development and as potentiating elements in its development plans.
Implications for Implementation of Policy: Ensuring that the national information policy is integrated into the national development policies, both overall and sectorial, and that the national information system planning is made an integral part of the national development plans and strategies so that available information, data and services remain relevant to the development planning needs.

Instituting appropriate programs and activities at national and institutional levels to demonstrate to and sensitize decision makers and planning staff in the national leadership with a view to accelerating the emergence and acceptance of the concept that data and information are essential national development resources and that a healthy information-, informatics-, and telematics-industry can contribute significantly to national economic growth and of itself to the national product.

Adopting appropriate methods and procedures so as to ensure that within the broader context of the political philosophy and government structure of the country, the government and its component institutional structures have important roles to play and can make significant contributions to national information infrastructure development, including the formulation of policies on information, informatics and telematics, and systems planning and their implementation, monitoring, coordination, and provision of support.

Supporting measures and programs to identify high level technical staff in government ministries, departments, and other corporate entities that liaise with and assist, decision makers, policy makers and top-level executives and to orient them to the information and data sources pertinent to their respective areas of activity, to effective methods of accessing and utilizing the information sources, services and products, and to ensure that the national/sectorial information sources and services are effectively linked and made easily accessible and conveniently usable to such officials.

To give priority consideration to include an information component with a separate budget line in all sectorial and/or the national and sub-national development plans and programs so as to contribute to the achievement of the overall objectives of the national information policy.

To formulate appropriate policies, strategies, regulations and programs that would attract and facilitate the private sector to take part and contribute to the development of the national information infrastructure, systems and services.

National Coordination of Information Systems and Services
Statement: The policy will be to establish a national body for implementing the national information policy and coordinating and harmonizing the activities of the information infrastructure, systems, and services in the country.

The coordinating body (hereafter referred to as the National Information Policy Coordinating Body) should be placed as high as possible in the government structure, with a view to ensuring its effective functioning in implementing the national information policy, coordinating and harmonizing information resources, systems, services, projects and programs in the country. The objective is to minimize unnecessary duplication of effort and wastage of resources in the development and operation of the national information systems and to maximize the benefits to be derived from the services provided by the systems to the people at all levels in the country.

Implications for Implementation of Policy: Creation of a National Information Policy Coordinating Body (NIPCB).

Formulating and implementing appropriate legislative, regulatory, administrative procedures and measures for providing financial support and conducive to the sustained growth of the NIPCB.

Structure and Functions of the NIPCB

Coverage: The NIPCB will be concerned with the development of the national information system of the country and, therefore, will cover all matters related to the sustained development of the national information infrastructure, systems and services. (see Working Definitions).

Position in the government structure: The NIPCB should be placed as high as possible in the government structure, e.g. in the Office of the Prime Minister or the Cabinet, or the Office of the President or of the Chief Executive of the State, depending upon the structure of the government of the country.

Structure: The NIPCB will have three main functions:

- A policy making and decision function, entrusted to an Inter-ministerial Group;

- An executive function, entrusted to an Executive Directorate;

- An advisory function, entrusted to an Advisory Committee.

The Interministerial Group, (IG) under the chairmanship of the head of the office under whose authority the NIPCB is placed, will mainly be concerned with matters of policy and decisions thereon, and advising the national government on all matters.
relating to information systems and services.

It should be composed of ministerial level representations from the relevant sectors, services and political entities, such as, education, science and technology, industry, economics and planning, telecommunications, mass media, manpower, statistics, and culture. It should meet at least twice a year to review the activities of the NIPCB, consider new policy proposals, budget and programs of the Body; establish priorities and deal with all major policy issues concerning the development of the national information system.

The Executive Directorate (ED), constituting the executive arm of the NIPCB, should be headed by an Executive Director of the rank and status of Secretary to Government, and supported by competent professional staff and administrative and secretarial staff.

The ED will consider and implement projects, programs and activities relating to system development and networking, with the education and training of professionals and users, norms and standards; and in general, implement, in collaboration with appropriate organisations, the plan of action and the yearly programs for the developing the national information system.

The Advisory Committee (AC), a technical body, will have 12 to 15 persons who are experts in different areas of information, informatics and telematics, and representatives of information user groups, academic and professional organisations, also other appropriate nongovernmental organisations, and the information industry.

The AC will advise and assist the ED in ensuring effective implementation of the policies and decisions of the IG regarding the development and management of the information infrastructure, systems, services and activities in the country.

Functions of the NIPCB: Elaborating the national policy on information systems and services and preparing revisions when necessary and formulating strategies for the implementation of the policy components.

Ensuring that the national information policy and national information system plans are supportive of and integrated or incorporated into the national development plans and programs.

Supporting measures to identify the priority areas of the national and sectorial development plans that need information systems and services to be developed on a priority basis.

Translating the national information policy into action plans, by formulating a national plan to be implemented through yearly programs and activities for developing various components of the
national information system, in collaboration with appropriate institutions and organizations in the public and private sectors.

Coordinating, promoting and monitoring the information activities, systems and services, programmes and projects in the country in collaboration with appropriate organizations, both governmental and nongovernmental, within and outside the country. Ensuring harmonization of the components and their activities; assessing the performance of the different components, correcting deficiencies and filling in gaps.

Assigning responsibility to different organizations, and corporate entities in the country regarding the building-up and sharing of data and information resources, creation of databases, developing information manpower, setting up and interconnecting information and data systems and services, etc.

Promoting and supporting appropriate sectorial information systems, specialized sub-networks and services.

Formulating legislative and administrative procedures as may be necessary to secure resource inputs - human, financial and other infrastructures - for the development and operation of the national information system components.

Formulating and implementing regulatory, legislative and administrative mechanisms relating to information provision, accessibility and flow, cooperative arrangements and resource sharing and the information industry.

Developing norms and standards for the development and for assessing the performance of the components of the national information system, e.g. whether all sections of the society are being reached and sustainability of the services; and undertaking measures for the correction of inadequacies identified and for continuously improving the management of the information systems and services.

Assisting in the formulation of norms and regulations for the prevention of copyright, patents and other violations as applicable to all information source materials, databases, etc., and software piracy.

Examines, in collaboration with appropriate national and state bodies, rules and regulations relating to customs, duties and other impositions on the import and export of information, informatics, and telematics products and services, with the view to amending those that are not conducive to the development of the national informatics and telematics industries and provision of affordable information services.

Supporting research and development in information science, informatics, telematics, archives management, norms and standards,
and training of information specialists and users; and supporting dissemination of research results for application in operational activities. The findings of research can help modify existing policies or formulating new ones in information, informatics, and telematics fields.

Coordinating activities of various organizations at national and sectorial levels involved in the implementation of national information policies. In decentralized development planning with multisectorial and multilevel objectives (individual, household, village, district, state, national), it would be necessary to ensure that information structures and authority structures are properly integrated and effective flow of information among all the parties involved (SUNDARAN).

Advising those concerned with national data collection on a large scale to support socioeconomic planning (e.g. population, agricultural production, etc.) that it is more cost-effective to collect and process reliable basic data than attempt collecting a wide range of data on many indicators and variables that may be used infrequently. In an information-intensive planning process any deficiency in the data collected will be more accentuated, and this will be the case in developing countries where resources and expertise for large scale data collection and processing are inadequate. Further, once the basic statistics have been made available the return on any additional investment to collect data on other infrequently used indicators will be marginal. In regard to data on/from rural areas in developing countries, approaches such as rapid rural appraisal, optimum ignorance and imprecision, etc., may be adopted with advantage.

Supporting cooperative and collaborative operations and programs with regional and international information systems and agencies so as to enrich the national information activities on the one hand and providing inputs (information, data, expertise) to the regional and international systems, services, programs and activities on the other.

Budget

The NIPCB should be allocated adequate funds. Apart from maintaining the ED and convening of the meetings of the IG and of the AC, the major items of expenditure in the NIPCB's program would be support to the development of sectorial information systems, systems interconnection and networking, education and training of information specialists and users, and research and development projects in the information handling, informatics and telematics mentioned above.

Provision of Access to Information

Statement: The policy will be to support the organization, networking and management of public information resources, and
where possible private sources as well, in such ways as would ensure easy access, effective distribution to and use by all types of users wherever they may be located, of pertinent data and information; developing for the purpose information networks, resource sharing programs, information services and document delivery arrangements, to different user groups to satisfy their respective information requirements; and adoption of appropriate techniques and strategies of resource management with a view to achieving high quality and cost-effective information and data services.

Implications for Implementation of Policy: Formulation of criteria, guidelines and procedures for the allocation of public funds and mobilization of private resources for the planning, development and management of information systems and information resources in the country.

Encouraging and supporting a wide variety of information providers so as to ensure open, fair and competitive market for making information and information products accessible to all.

Endorsing the fundamental principle of freedom of access to information and information sources bearing in mind the necessary constraints on such freedom in relation to such considerations as national security, personal and/or corporate privacy, social and cultural morals, proprietary rights and administrative efficiency.

Comprehensive regulations and measures should be formulated to ensure that the privacy of all people is protected. Personal data collected for specific purposes should be limited to the minimum necessary. Individuals should have the right to examine and correct data files about themselves. Transaction data should remain confidential. Sharing of information about an individual should be allowed only with the consent of the individual.

Intellectual property rights and protection should be made applicable to all types of information carrier media including electronic media. An equitable balance should be ensured between the rights of those responsible for the ideas, invention, or innovation embodied in an information source and other copyright owners and needs of information users. Copyright owners should receive fair compensation. (AMERICAN LIBRARY ASSOCIATION).

Formulating criteria for and allocating responsibility among institutions in the country for building information resources, databases and data banks, and for the provision of appropriate information services nation-wide in selected areas of priority and specialization.

Encouraging the formulation and adoption of resource-sharing principles, modalities, tools and cost-sharing within sectors and at national and inter-sectorial levels. Network access costs to
individuals, libraries, non-profit groups, government agencies, and
the challenged should be fair, affordable, stable over a period of
time, and independent of geographical location.

Supporting appropriate models for the intellectual and
geographic organization of information sources and services for
ensuring comprehensiveness of coverage, operational feasibility,
compatibility, networking, resource-sharing, data exchange and
systems interconnection.

Implementing legislative measures, adopting administrative
procedures for the national registration/disposition of all data
and information sources and materials generated in the country
whatever be the recording medium (see also Indigenous Information
and Information Products)

Formulating and implementing criteria for the importation of
foreign information sources, including databases, of relevance to
national development needs. (See also Information Technology and
International Activities)

Developing appropriate infrastructures for providing access to
relevant external information sources, through online services
and other computer-mediated communications, including electronic
mail, electronic data transfer, contact with experts, etc.

Establishing and implementing procedures for identifying
non-traditional transborder flow of problem-solving
information/data, technology and knowledge - for example, via
consultants, import of goods and services, training of nationals
abroad, multilateral
and bilateral agreements, through multinational companies and
regional, international and other organizations and agencies in the
country, etc. Adopting effective means of institutionalizing the
systematic flow and access to such information in the country.

Supporting R & D and pilot projects in information handling,
informatics and telematics applications with a view to developing
new methods and/or adapting existing technology for improving
user-friendliness, efficiency, and effectiveness of information
systems and services in the country.

Supporting projects and programs for the creation, updating
and maintenance of tools that facilitate identification, selection
and location of information and data sources and materials in the
country, including databases, information and data systems and
services, ongoing projects, software packages used, specialised
equipment, teaching aids, compilations of profiles of specialists
or experts, institutions, contractual arrangements and technology
transfer agreements, directories, inventories, union catalogues,
and lists, etc.; and to institute appropriate measures that would
facilitate the collection, recording, exchange and processing of
such information from all the appropriate institutions, agencies, programs and projects.

Indigenous Information and Information Products

Statement: With a view to maximizing the utilization of national potential and capacity for social, economic, cultural, industrial and technological development, the policy will be to intensify and strengthen the indigenous generation of scientific, technical, socio-economic and educational data, information and materials; widen their range, types and coverage to improve the quality of information materials, sources, services and products that carry such data and information whether in documentary or other forms.

Implications for Implementation of Policy: Stimulating, promoting and supporting the generation, recording, publication, protection, preservation, dissemination of the nation's scholarly creative and professional output and their documentation and bibliographic control through the implementation of appropriate legislation and administrative measures. Particular attention will be paid to recording of oral history and similar forms of transmission of information on traditional and rural technology, culture, handicrafts, medical and health practices, etc., common in many developing countries.

Supporting programs and measures in the public and private sectors for upgrading and improving the quality of information and data generated and of the primary, secondary and tertiary documents and other recording media including electronic forms and databases that carry such data and information.

Provision of support to the indigenous publishing industry and other components of the information and informatics industry of the country, the components to be supported being selected through appropriate and agreed upon criteria in conformity with the overall national information policy and national development objectives.

Providing resources to appropriate institutions and through legislation and/or administrative measures, for facilitating pre-publication documentation (e.g. cataloguing-in-publication, keywords, abstracts, etc.) of all information materials produced in the country and ensuring their coverage in national and sectorial databases and bibliographical tools produced within the country and appropriate ones abroad.

Providing support to appropriate institutions, projects and programs in the country through legislative and administrative measures to improve the collection and recording, validation, processing, organisation, computerization and timely distribution of numerical/statistical data and images needed for preparing information products and systems to support development planning,
decision making, execution and management of development programs and activities.

Promotion of Use of Information

Statement: With the view to maximizing the effective and efficient use of information, information sources, systems and services by all sections of the society, thenational policy will be to raise the perception of people on the value and utility of information in their respective activity areas; to continuously strive to increase people's propensity and ability to apply this resource in problem solving, to keep themselves continuously updated and well-informed in their respective areas of interest and concern; and to improve the quality of life in general.

Implications for Implementation of Policy: To encourage, stimulate and support appropriate institutions and organizations in the country to design and develop necessary programs, courses of training, and projects; and to contribute resources for the periodical study and analysis of the information needs and information-seeking behaviour as well as attitudes to information use of persons falling within their respective areas of concern.

To encourage, stimulate and support programs and projects of institutions and organizations in the country designed to educate children in the use of information and information materials and products, sensitise decision makers and policy makers and persons who can influence the former on the value and usefulness of value added information products, and orient information users in the effective and efficient use of specific information systems, services and products. The overall objective is the orientation of the perception and attitudes of people regarding information and to enhance their capacity to use information, sources, and systems, and services effectively.

Coordinating and harmonizing this aspect of the national information policy with the relevant elements of the national education policies and plans as a whole and within the different disciplines/sections of the technical and professional education (for example, engineering/technical education, medical education, training of managers, executives, researchers).

Mobilizing resources and supporting national, regional and international organizations, governmental and nongovernmental, for sponsoring user sensitization, user orientation and user education programs.

Supporting measures that stimulate the effective use of data and information especially by decision-makers and their support staff as well as people at the 'grass-roots' through the use of specialised information products and services and communication methods and media (visual and audio-visual, folk media, etc.)
Supporting the production and dissemination of learning and teaching materials tools, kits, computer-based systems, audio and audio-visual systems, etc. useful in user sensitization and user education programs. Promoting cooperation and collaboration among appropriate institutions in the production of such materials and devices.

International Information Activities

Statement: The national policy will be to interact with and participate in global, international and regional information systems, networks, programs, and activities that are conducive to the development of the national information systems and services.

[See also: Informatics and Telematics]

Implications for Implementation of Policy: Factors affecting national information policy vis-à-vis regional and international cooperation in information systems, networks and programs include:

(See also Introduction and Background)

- national social, political, economic, and cultural characteristics, ideologies, attitudes and considerations;
- developments in informatics and telematics;
- emerging international and regional cooperation and coordination programs e.g. regional alliances of nations;
- orientation and emphasis in international and regional relations and their information support.
- role of international governmental and non-governmental organisations;

Within this framework, the practical strategy should be:

Encouraging active participation of information personnel and institutions, in both the public and private sectors in the country, inappropriate regional and international meetings where useful exchange of information and experience on developments in information systems and technologies, and related subjects, take place. Such exchanges contribute to technology transfer, human resources development, etc.

Encouraging and supporting as may be necessary the inputting of data and information generated/published in the country into relevant regional and international information systems, networks and cooperative programs.

Ensuring that relevant international standards and norms, and regulations and procedures, tools and guidelines (e.g. those
developed by Unesco, ISO) are made available and applied widely in the information systems and services in the country. National contributions to the formulation of such norms and standards are also to be encouraged.

Encouraging and supporting the utilization of scientific, technical and economic knowledge emanating from other countries with a positive attitude to the acceptance and use of such information and knowledge.

Pursuing cooperative activities with institutions in other countries, developed countries and developing countries. Such activities may include joint research projects, academic exchange and training programs, in informatics and telematics, and in the distribution of financial and other resources. In this connection South-South cooperation should receive particular attention.

Supporting the country's participation in inter-governmental and international agreements that facilitate information flow and access to information sources especially from developing countries. In this connection, inter-country and international laws and regulations relating to transborder data flow, copyright, trade mark, patents, and trade laws and regulations covering the import and export of information materials (conventional and non-conventional) databases, and other information industry products should be respected. The corresponding national laws, regulations and conventions should be examined and harmonised so as to remove barriers to the inflow and outflow of development communication messages, useful technologies, innovations, and expertise without compromising national laws and regulations relating to privacy, confidentiality and copyright.

Information Manpower Development

Statement: The national policy will be to promote and support the development of personnel adequate in quality and in number for the design and development and efficient and effective management, and operation of information resources, systems and services, including the informatics and telematics aspects, in the country.

Implications for Implementation of Policy: Formulating and implementing a national information manpower policy that supports and is in harmony with the national information policy, national education policies, and national labor laws and policies.

Instituting measures to recognise in the public and private sectors the technical and professional character and level of knowledge and skills required to design, operate, manage and develop modern information systems and services.

Supporting measures and programs for the periodical survey of
market requirements of different categories of information professionals, paraprofessionals and others and for obtaining feedback from employers and employees of the adequacy of the knowledge and skills available to meet the changing needs.

Supporting measures to establish job classifications schemes, pay plans and status for information professionals of various categories, stipulating the types and levels of responsibility, qualifications necessary, and salary range for each job category, especially in the public sector, with the view to attracting and retaining for the information management functions adequately qualified, competent, and motivated personnel.

Instituting measures including technical assistance programs for increasing the opportunities for the education and training of professional, technical and supporting staff and for improving their career prospects in the country. (See also International Information Activities).

Periodically assessing the curricula and training facilities available in the country for various categories of information personnel, providing support for their updating and modernisation and the training of teachers in information science, informatics, telematics, and archives management; instituting in selected institutions of higher education and universities graduate and post-graduate programs in information studies.

Encouraging and supporting the establishment and development of national professional associations in the fields of library science, information science, archives management, informatics, telematics and related disciplines, with active participation of professionals from both the public and private sectors.

Informatics and Telematics

Statement: The national policy will be to support experiments and pilot projects to stimulate optimal utilization of emerging informatics and telematics technologies for data, text, and image processing; information and data transfer, networking, computer-mediated communication, mass media etc., with a view to improving the quality, comprehensiveness, reliability and management of information systems and services in the country; facilitating access to, delivery and use of information; and to give adequate consideration and resolution of problems that may arise from the application of such technologies.

[See also: International Information Activities]

Implications for Implementation of Policy: Formulating and implementing criteria and guidelines for supporting experiments for testing, application and adaptation to suit the local context
of informatics, telematics and related technologies for improving the information systems and services in the country.

Periodical reviewing of policies, strategies, programs, and activities relating to the applications of informatics, electro-optic, and telematics technologies, recommending changes so as to facilitate access to and exchange of information at affordable cost by all sections of the community.

In some countries, there are separate policies relating to each of the areas library and documentation, archives management, informatics and telecommunications, while other countries are attempting to formulate comprehensive policies integrating all these domains. It should be noted that the government ministry/department concerned respectively with libraries, informatics and telecommunications is in most of the countries distinct. So also those concerned with the import/export of various informatics and telematics technologies and products. And since elements in one domain affect elements in the other domains, one finds elements of policy of common concern formulated in separate sets of policy statements. It will help implementation of information systems and services if at the policy formulation stage the functions, and interests, of the different parties concerned with libraries, information technology, telecommunications, trade, customs and taxation, etc. are taken into account.

With the increasingly global nature of electronic information networks, sovereignty can be viewed no longer as simply a matter of physical borders and political allegiances, but also includes considerations of access to, control over and the extent of dependence and reliance on external information sources.

The primary concerns of developing countries include the following:

- in most developing economies the issues relate to accessibility to the different levels of society the emerging informatics and telematics technologies at affordable cost;

- the information content and messages that flow into the country and what the country is able to mount on to the networks and highways; are the incoming messages appropriate to the development needs of the country; does the country have the means and capacity to capture the indigenous innovations, technologies and ideas and place them on the networks? As mentioned earlier, IT should strengthen development communication systems enabling people in developing countries, more particularly those at the grass roots, to receive and disseminate development messages.
- the direction of information flow should not only be North to South, but also South to North, and South to South;

- the difference in the level and patterns of development and the related social and cultural attitudes, practices, and conventions in general and with particular respect to information recording, processing, seeking, and use; will the new information technologies be or can be adapted to be compatible with these differences?

- availability of appropriate local infrastructure - human resources, expertise, and skills; level of technology development - informatics and telematics, and other information facilities.

In this context, the national policy should address issues such as the following to initiate action for finding appropriate solutions:

- problems relating to accessibility at affordable cost the accelerating innovations in IT;

- lack of adequate local and national infrastructure and an information industry;

- lack of expertise to effectively and efficiently assess, evaluate, manage and use IT;

- effect of IT on aggregate employment and related social and political issues;

- possible control and censorship of information by national governments or other entities;

- issues relating to freedom of access and publication of information;

- assault on privacy and confidentiality of information whether it relates to an individual or to corporate entities including the government;

- data security;

- sovereignty and conflicts *vis a vis* nation states;

- intellectual property and business law related matters;

- legislation regarding software production, distribution, and use;

- copyright legislation for machine-readable databases and for computer programs and software; how can the
integrity of IT-based systems be safe-guarded against illegal and unauthorised use?

- transborder data flow and trade in information across national boundaries;

- costing and pricing of data and facsimile transmission; introduction of videotex;

- the pace of developments in IT leaves too little buffer time for national authorities and managements to understand, assimilate and assess their likely impact on the social, political, economic, and technological fabric of the country.

As already indicated, informatics and telematics have become important and decisive issues in inter-country interactions and cooperation. Another significant aspect is the need to take into account the private sector including transnational corporations involved in the production and distribution of hardware and software and provision of expertise in the country.

In this connection, a developing country, needs to take into consideration additional policy issues such as the following:

- Does the country have adequate access to external information sources; on the other hand, is there an undue dependence of the country on external sources and, if so, how can it be corrected?

- How can the economic value of external information be weighed against trade imbalances and other national concerns?

- How should economic efficiency arising from effective information service be balanced against national concerns such as maintenance of national jurisdiction and reduction of vulnerability caused by imbalances in the country's information trade?

- Do international arrangements (e.g. those of OECD, GATT/WTO) provide an appropriate environment for growth of national information systems and services in developing countries;

- Are the controls on the ownership of the country's information industry appropriate and adequate? for example, franchise for the provision of commercial communication services;

- Should the import/export of certain types of data and information and information products be regulated?
Hence, the national policy on information should cover two major aspects, namely,

- to prevent the erosion of the country's economy, laws, and policies (and thus national sovereignty) by new information and communication technologies and transborder data flow; and

- to determine the extent of economic and political vulnerability caused by the country's heavy reliance on external information and information products and to take steps to reduce such dependence, if necessary.

With each new application of IT, new economic, social and political tensions may surface. While some of these may be solved by market forces, or common sense, many more requiring new policy level decisions will arise.

In societies with forms of government deemed authoritarian IT poses both opportunities and challenges. For instance, in some countries governments have traditionally tended to censor certain types of information. This may be politically motivated, but it can also be due partly to an altruistic desire to protect the citizens from degrading influences on their culture and value systems by the messages flowing in via the media, communication systems, etc. Nationalism may be another motivation for filtering and selective dissemination of information to people.

Many developing countries are trying to cope with major social and economic problems of illiteracy, population growth, health, nutrition, inadequacy of resources for development programs, weak infrastructure, management capacity, etc.

Libraries and information services in many developing countries have not been able to convincingly demonstrate the value of information/information products in finding solutions to these problems faced by decision makers, development planners and executives. Further, the new information technologies tend to disturb conventional institutional structures, information flow patterns, and interactions among individuals and institutions.

IT calls for new perspectives and change in attitudes as well as strategies and balanced approaches to derive optimal benefit from its applications in developmental efforts. But, for many a developing economy such changes at the higher levels of decision and policy making will take some time and in the meantime IT gallops ahead and its negative aspects continues to loom large.

The level of use of information and data partly depends on the level of R and D activities, planning exercises, industrial and business activities, etc., in a country. Hence, even though it may be technologically possible to access more information
in/from developing country, the information may still be under-utilized due to the low level of R and D and other activities mentioned. Again, available information may be under-utilized because users may not be adequately aware of its availability or because of their inadequate familiarity with or their inability to use, IT-based systems. This calls for effective measures for information use promotion, marketing of information products and services, and user sensitization and orientation.

In science and technology much of the information required by researchers and other specialists in developing countries is produced, documented and disseminated in the technologically advanced countries. The acquisition of such information sources, databases, or access to them requires substantial amount of hard currency and foreign exchange facility both of which are serious handicaps in most developing countries. And except in the newly industrializing economies, there is little that a developing country can offer in exchange for the imported information.

With the expected large investments in developed countries, particularly in the USA, from private and public sources in the global information infrastructure development as an integral part of the information superhighway plans and programs, there will begreat opportunities as well as challenges to developing countries - to the government, the private sector, the information industry and information professionals - to act judiciously to ensure that a wide range of appropriate information is made accessible and delivered at affordable cost to all sections of the community, without prejudice to the national concerns mentioned above.

India - An example

India is an example of a large developing economy and a democracy attempting to leap-frog into the information age. The country's potential in IT resources and capabilities has been noticed and availed of in other industrialized countries as well as developing countries. Following the launching of the economic liberalisation policies and programs of the Government of India three year ago there has been significant growth in the IT and telematics industries in the public, private and joint sectors, in investments, exports, human resources development, etc. Data bases, networks, and computer mediated communications have sprung up in various sectors.

Recently, commissioning India's first information highway linking 14 cities with high-speed satellite earth stations set up by the National Informatics Centre/Department of Electronics (NIC/DOE), the Commerce Minister said it would usher in an era of paperless trade, help exporters and enable India to derive the benefits of global competitiveness. The information highway is superimposed on the existing NIC network (NICNET) which already has 700 earth stations linking 500 centres. While data on the existing
network flows slowly, the information highway will be able to transmit voice, video, data, and multimedia information at a speed of 2.2 million bits per second, which means that a 100 page document can be transmitted in a mere second.

The info highway was set up at a cost of less than US$5.0 million. Twenty more cities will be connected by March 1995, at an additional cost of US$1.7 million. There are plans to connect eventually 70 commercially important cities to the information highway. It is expected that 2,000 exporters will be connected to NICNET in 16 months.

Telemedicine via the information highway will bring medical information to the doorsteps of barefoot doctors, and libraries of 2,000 educational and research institutions will be connected to the network in about a year.

The services provided on the info highway will be at half the cost provided by other agencies. Through the higher volume of subscribers and with a direct link to the international gateway, SPRINTNET, NIC has been able to bring down costs. Costs were also reduced because NIC developed the highway based on indigenous system technology and converted much of the hardware requirements into software.

A national telecom policy was recently announced. The DOE and Department of Telecommunications (DOT) in association with private sector industries are extending telephone links to rural areas. The Centre for Diffusion of Information Technology (CDIT), promoted by DOE is launching a pilot project with the help of Apple Computers to use hand-held computers for recording data and thereby developing a public health network. DOE plans to develop the existing Education and Research Network (ERNET) to function as an "information footpath", linking via computers, teachers and researchers in some 8000 colleges. DOE's "Impact Lab" project, supported by the World Bank and Swiss Development Corporation, aims to interface colleges with neighborhood industries via IT. Railways, banking operations, customs and revenue, and a number of other government departments are already computerized or in the process of being so.

Since 1985 the Government of India has been working on a new Telecommunications Policy to strengthen the telecom sector. The Seventh Five-year Plan (1988-1992) had identified this sector as one its top five development priorities. The formulation of guidelines and policies for the development of telecom industries has been assigned to the Telecom Commission set up in 1989. One of the elements of the new industrial policy announced in 1991 is the delicensed production of all types of telecom equipment and made available to the private sector. Thus, the production base for the telecom industry has been widened to include production units in central and state public sectors, joint sector, and the private
sector. Value-added services such as cellular phones, radio-paging, videotex, etc. has been opened to private sector including multinationals.

The new Telecom Policy was announced in May 1994, heralding the start of a new era in Indian telecommunications. For industry it offered new business opportunities and for the average Indian it meant faster telephone connection. The policy formulation was a result of the realization that telecom services of world class quality were a prerequisite for enhancing the country's global competitiveness and for attracting foreign investments. This was in conformity with and a prerequisite to, the government's three year old progressive economic liberalisation policy. The pressure to be competitive is forcing a number of Indian companies to look at IT and communications as an essential ingredient that will give their business the cutting edge.

The policy envisages that by the end of the Eighth Plan in 1997, telephones will be available on demand and all the 570,000 villages and in urban areas, a public call office for every 500 persons, as against the present telecom density of 0.8 per 100 persons. On 17 September, 1994 the Union Communications Ministry announced the norms for private sector participation in basic telephone services.

An agency called the Telecom Authority of India is being setup with responsibility for standardisation, ensuring technical compatibility among service operators, price regulation, fixation of access charges for private operators, sharing of revenues, and protection of interest of consumers as well as of the private operators, and resolving disputes among those providing services.

Under the new guidelines, pilot projects will be allowed in areas of low telecom density, but with high growth potential. The most recent technologies will be brought through these pilot projects. However, there are many things in India that should change, including the high cost of most online facilities such as access to INTERNET, incompatibility between local information network connectivity, and modem licensing.

New regulations regarding software piracy and amendments to the Indian patent law have been announced.

The information superhighway gets headline attention in the media for two reasons. One, the US administration is clearly committed to the success of the concept; second, the high tech industry sees tremendous business opportunities and potential in the convergence of information, telecom and media industries. The US administration has begun to look beyond the US and is pushing for a Global Information Infrastructure (GII) on the lines of the NII. Michael Schrage, research associate at MIT writes: "Silicon Valley may be the world's largest producer of computer software but
the second largest is Bangalore in India. Software engineers there - many superbly trained - do state-of-the-art programming for less than a quarter of Palo Alto type pay. What happens to American wages and employment when a GII makes it a snap to bid out a software development project in Bangalore?"

---

BIBLIOGRAPHY


CHAUDHRY, ABDUS SATTAR. 1993. Information Policies in Saudi


GORE, AL (Vice President of USA). 1994. Remarks (as Delivered) by Vice President Al Gore via Satellite to the International Telecommunication Union Plenipotentiary Conference, Kyoto, Japan. Washington DC: The White House, Office of the Vice


KINYANJUI, PETER; MORTON, AUGUSTA. 1992. The Role of Teleconferencing in Support of Distance Education: The Case for Developing Countries. In: International Conference on Distance Education 16th Annual Meeting; 1992 November 8-13; Bangkok, Thailand. 18p.


MOHAMMED, ZAKARI. 1994. Towards Bridging the Information Gap in Developing Countries: The Case of Nigeria. International


NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION (DOC),


41


SWANEPOEL, MARINUS. 1994. Getting in from the Cold: Connecting the New Democratic South Africa to the Global Information Community. In: NIT'94 (New Information Technology): Planning the Global Information Infrastructure; 1994 November 18-20; Alexandria, VA. 9p. NIT'94 papers are available from Dr. Ching-Chih Chen, GSLIS, Simmons College, 300 The Fenway, Boston, MA 02115. USA.


TOTEMEYER, A.-J., and others, eds. 1993. Coordination of Information Systems and Services in Namibia. Papers of the Seminar; 1993 February 25-March 5; Windhoek, Namibia. 280p. Seminar sponsored by the German Foundation for International Development, Bonn (West Germany), Education Science and


