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A PROPOSED
NATIONAL INFORMATION POLICY
OF EGYPT

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EXECUTIVE SUMMARY

The document formulates a proposed statement of national information policies of the Arab Republic of Egypt, and it discusses some of their implications for planning. The long-range purpose of these policies is to provide a motivation for generic courses of action conducive to the optimal utilization of data and information as problem-solving resources in Egypt's social and economic development. An immediate function of the policy statements is to provide a set of principles for guiding the design, development and implementation of a nationwide system of information services now being planned by Egypt.

The document proposes that, as regards the management and utilization of problem solving knowledge (scientific, technical and economic information, or STI), it shall be the national policy of the Egyptian Government to:

1. Treat such information, and the information industry, as resources essential to the country's socio-economic development, and as potentiating elements of its national development.
2. Raise the perception of the Egyptian people regarding the value of STI, and increase their propensity and ability to apply this resource in the socio-economic development process.
3. Intensify the indigenous generation of scientific, technical and economic data and information, and encourage the creation of information products containing data and information generated by Egypt.
4. Manage the public resources of STI in a manner which will enhance their effective use in national development by all sectors of the society.
5. Promote the development, in the public and private sectors, of an information service industry utilizing state-of-the-art information and communications technologies to provide access to, and assistance in the use of, public information resources in Egypt and abroad.
6. Promote the development of adequate manpower for the information sector.
7. Participate in international programs which facilitate equitable exchange of information.

PREFACE

The design and implementation of an Egyptian system of scientific and technical information services, intended to support the country's socioeconomic development, is part of an Applied Science and Technology Program under a Project Grant Agreement between the Egyptian Academy for Scientific Research and Technology and the U.S. Agency for International Development. Phase I of the project (November 1979-December 1981) consists of a system analysis and design study.

The project is a collaborative effort of Egyptian and U.S. organizations. The Egyptian Academy of Scientific Research and Technology, with its National Information and Documentation Centre, is the Egyptian executive agency. Egypt-based activities are guided by an Executive Committee comprised of senior Egyptian experts and headed by the President of the ASRT. Technical assistance in Phase I is supplied by a team of U.S. consultants under a National Science Foundation contract (INT-7924187) to the Georgia Institute of Technology. Planning and project management assistance is provided by the U.S. National Science Foundation under a U.S. Agency for International Development Participating Agency Service Agreement.

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I. INTRODUCTION

The phrase "national information policy" has a range of meanings and connotations; consequently, formulations of such policies differ (Rosenberg, 1982).

Variations in meaning are mainly due to different interpretations given to the terms "information" and "policy." Thus to the scientific community, a national information policy deals with scientific and technical information (NATIS, 1976); to the mass communication community, with news and cultural information (McBride, 1979); and to the computing and telecommunications community, with data in electronic form (Rodriguez, 1978). Meanings of the term "policy" are often left vague if not undefined. An examination of some existing statements of national information policy shows them to be, in many instances, tantamount to descriptions of the structural, functional, and/or governance characteristics of public information services and systems in a given country; in these statements, policy thus becomes an instrument seeking to concretize or legalize a system design or plan.

1. The Concept of A National Information Policy

Fundamentally, a policy may be said to be a statement of a "course of action." Courses of action are, however, formulated with different levels of generality or specificity; and depending on these levels, a hierarchy of courses of action may exist, such that each level within the hierarchy is compatible with the next higher level, and conducive to its realization. Any course of action (level) within a hierarchy may be viewed either as an objective (in relation to a more specific course of action) or as a means (in relation to a more general course of action).

For our purposes it is useful to give each level a designation, so as to clearly specify its place in the hierarchy. The terminology used in this report distinguishes among four levels, respectively termed "goal," "policy," "strategy," and "program." Brief characterizations of these terms follow.

- o A goal is the overall ultimate desideratum sought. It is an enduring statement of an encompassing purpose toward which actions over an indefinite period of time and with indefinite resources are directed. (The suggested goal for the information domain is stated below.)
- o A policy is a statement of commitment to a generic course of action necessary for, or strongly conducive to, the attainment of a goal. It expresses a determination and an agreement to follow such a course in implementing the goal. Policies are temporal,

adapting to or changing in accordance with evolving political, economic, social and cultural conditions. (The subsequent chapters in this document discuss suggested policies for the information domain of Egypt.)

- o A strategy is a predetermined course of action, usually selected from a number of alternatives. Responsive to a policy, strategies are formulated through planning which takes into account the political, legal and administrative realities at any point in time. (The national system of scientific and technical information may be viewed as a strategic course of action conforming to national information policies of Egypt and partially realizing that country's goal in this domain.)
- o A program is a scheduled set of activities or tasks taken to implement a strategy. Consonant with a predetermined strategy, a program is the tactical action unit of the goal-seeking process. As such, it requires specific planning, budgeting, and organizational attention. (The development of an abstracting service of Egyptian literature is an example of such a program.)

The above levels of differentiation are not only relative but also arbitrary; for instance, a national information system can be viewed as a program or a strategy. The distinction is, however, helpful to convey the concept of "policy" as used in this document: a statement of generic principles for courses of action that are essential to the attainment of a national goal. So viewed, information policies will affect the selection of strategies for implementing major national information programs. Put differently, major national information programs presuppose the existence of national information policies.

Qualifying the notion of policy is less difficult than specifying or delimiting the meaning of the term "information."

In operational terms one can distinguish among four major categories of information: 1) personal information, the frequently private messages from, to, and about individuals; 2) organizational information, comprising internal messages generated by governments, corporations, agencies and other legal bodies and pertaining to their conduct of operations and plans; 3) news and entertainment information, the messages collected and distributed by mass communication media for the public at large; and 4) scientific, technical and economic information (often abbreviated as STI), a conglomerate of purposive messages pertaining to "technical" problem solving and decision making. Questions concerning the quality, generation, ownership, control, availability, distribution, and means of transmission of all these categories have become one of the more important subjects on national agenda, and many countries are preoccupied with attempts to formulate national policies that would guide their management of these information categories.

The object of the proposed national information policy is concern with problem-solving knowledge in the context of the country's social and economic development. The phrase used in this document, "scientific, technical and economic information" should be viewed as synonymous with problem-solving knowledge. Problem-solving knowledge typically encompasses results of basic and applied research, operating experiences in industry, data relevant to commercial and trade activities, and information pertinent to social services and programs.

One important characteristic of the concept of problem-solving information, as used in the proposed national information policy, is its public nature. It is recognized that some institutions charged with the governance of society or the security of a country may have a need to gather and process data and information whose content is confidential and/or whose availability is restricted. It is not the intent of the proposed national information policy to stipulate the nature of such information activities and systems. The policy is intended to address itself to non-confidential information; the latter may be "public" (i.e., a resource of unlimited availability) or "proprietary" (i.e., a commodity restricted in availability).

2. Goal of National Information Policy

The above elaboration of the concept of policy requires us to formulate an overall goal that a national information policy is to serve and support. We propose the following goal formulation for Egypt:

THE GOAL OF THE NATIONAL INFORMATION POLICIES, STRATEGIES AND ACTION PROGRAMS IS TO ATTAIN OPTIMAL UTILIZATION OF SCIENTIFIC, TECHNICAL AND ECONOMIC INFORMATION OF BOTH DOMESTIC AND FOREIGN ORIGIN, AS A DEVELOPMENT RESOURCE, FOR THE ECONOMIC AND SOCIAL GROWTH OF THE ARAB REPUBLIC OF EGYPT.

3. Policy Implementation

This document proposes seven national information policy statements covering, respectively, the development of the national information sector; utilization of information; management of national information resources; information products; the information service industry; information sector manpower; and international information activities. The nature of each policy statement is briefly expounded, and some of its major implications for national planning are outlined. While the concepts embodied in these seven statements could be recombined in other ways, so as to contract or expand the number of policies, it is intended that in toto they address all major considerations relevant to the stated goal.

The carrying out of the principles embodied in policy statements is accomplished through a variety of instruments, ranging from mandatory to

voluntary. Policy is promulgated by individuals and organizations having appropriate mandates (such as the President, the Parliament, ministries and their agencies, and professional organizations) in the form of laws, decrees, executive orders, statutes, standards and similar instruments. No attempt is made in this document to specify the venues for implementing the national information policy in Egypt; that task is a prerogative of the Egyptian government and the professions dedicated to the country's economic and social development.

Hopefully, the Egyptian information profession will cause to have the policies proposed in this document officially adopted and endorsed by the Government. Once adopted, it is hoped that appropriate authorities in Egypt will consider regulatory and other measures needed to assure the promotion of and compliance with these policies. The major areas of action requiring attention are identified in this document under the headings "Implications for Planning."

II. POLICY REGARDING DEVELOPMENT OF NATIONAL INFORMATION SECTOR

1. Policy Statement

IT SHALL BE THE NATIONAL POLICY OF THE GOVERNMENT OF EGYPT TO TREAT SCIENTIFIC, TECHNICAL AND ECONOMIC INFORMATION AND THE INFORMATION INDUSTRY OF EGYPT AS RESOURCES ESSENTIAL TO THE COUNTRY'S SOCIO-ECONOMIC DEVELOPMENT, AND AS POTENTIATING ELEMENTS OF ITS NATIONAL DEVELOPMENT PLANS.

2. Discussion

From early history on, the application of technology, however primitive, has been used to extend and magnify man's physical strength to modify his living environment. Simultaneously, the employment of technology has been responsible for major developments in human civilizations. Thus the agricultural revolution, in which ancient Egypt played an important historical role, was based on the substitution of the growing of grain for the pursuit of game; the plow and flail were instrumental in the shift from a nomadic life to a social life. During the nineteenth century, industrial revolution supplanted agriculture in the northern countries as the basis for economic growth; for reasons such as a lack of natural resources and accumulated capital, Egypt has benefited from this revolution only modestly.

Many sociologists and economists see the advent, in the second half of the twentieth century, of another era in which the dominant activity centers around the generation of knowledge and around its massive utilization for increased agricultural and industrial productivity, at reduced rates of consumption of other resources. While information and its technology are expected to have great impact on the production sector, they are increasingly being also applied to sociocultural fields of human endeavor: health care, education, welfare services, business and finance, housing, land use and similar sectoral administrative programs organized by governments for improving the quality of life of their citizenry. In such areas, information systems are used for the dual purpose of handling the cognitive information generated by the sectoral field, and in the planning, management and monitoring of public administration of sectoral programs.

This era offers Egypt and other countries the possibility of leapfrogging a century or more of economic development, and of sharing with industrialized countries the application of innovative knowledge-based technologies. Central and paramount to this historical transition is the ability to gain access to and learn to exploit man's knowledge resources. For this reason, countries are placing ever-increasing emphasis on the acquisition and processing of scientific, technical and economic information, and on

the application of this knowledge in virtually all walks of life. A new phenomenon is emerging in these countries -- an "information sector," the heart of which is the new "information industry." The latter are the information service organizations in both the public and the private sectors.

As empirical evidence is beginning to relate the generation and application of information and its technology to productivity in the production and service sectors, and through productivity to economic growth and hence to quality of life, the husbanding of problem-solving knowledge and the nurturing of the information industry as essential and basic national resources for socioeconomic development are emerging as major priorities of national governments. Enlightened governments, recognizing the role which problem-solving knowledge and information technology play as a developmental resource, are assuming responsibility for the embodiment of this role through the establishment of national information programs. The close association of information with national economic growth, with programs designed to raise the standard of living, and with improving the management of governmental agencies, renders it natural for governments to undertake the responsibility for stimulating, through appropriate programs and actions, the development and growth of national information sectors, and for the husbanding of national resources of problem-solving knowledge.

3. Implications for Planning

A number of issues and desirable actions arise as a result of the above policy.

In order to have national leaders and planners embrace the concept of problem solving knowledge as a national resource that merits national planning, the areas of concern need to be defined operationally in terms of categories of concrete issues that can receive the appropriate attention of the government. Such categories are, roughly, those addressed under the six remaining policy statements in this document: national proclivity for use of problem solving knowledge; indigenous production of information; management of the country's information resources; development of an information service industry; information manpower preparation; and international issues. Ideally, the government should resolve to address all of these categories of issues, and do so through multifaceted strategies and programs that cumulatively fit under one conceptual umbrella and strive for one overall goal.

Prior to beginning to formulate any such national plan, Egypt will need to reach a consensus regarding the optimal and desirable role of government in the national information domain. The range of options is considerable: at one extreme, governments can assume entire responsibility for the design, operation and management of information programs, systems and services; at another extreme, governments can place that responsibility fully in the hands of institutions in the public and the private sectors. The government's role is not independent of the country's political philo-

sophy, its level of development, and its tradition of governance. In countries with an economic system that encourages free and private enterprise, the current trend appears to be away from total dominance of information activities by government, and at least partially toward stimulating non-governmental institutions to participate in the planning and operation of information-related functions. Since, however, many such functions are at least temporarily deficit-prone, governments retain partial or full responsibility for their fiscal support, regardless of who carries them out.

The agreed-upon role of the government will determine, in turn, the form of the organizational model that Egypt will adopt for formulating and carrying out the strategies, plans and programs in the information domain. The forms of such models range widely from a fully centralized form at one extreme, to laissez-faire at the other extreme. In developing an Egyptian organizational model, two considerations are important. First, some of the categories of issues identified above need to be approached and treated from a systems viewpoint -- namely, those dealing with the management of information resources and with the development of some information services; other issues do not fit such a mold. Second, the organizational model for national information programs needs to be compatible with the overall governance structure of Egypt. The likely effect of these considerations in Egypt is to render the highly centralized organizational model, in which all planning and programming is vested in a single agency or institution, inappropriate.

A related consideration is that of the governance of the agreed-upon organizational model of the national information plan and program. The principal factor is the degree and duration of control, supervision, monitoring, coordination or stimulation that the Government needs to exercise over some or all elements of the national plan and program. In a centralized organizational model whose functions are operated by the government, such governance form is likely to be relatively authoritarian. In contrast, a predominantly coordinating and cooperative form of governance is appropriate for decentralized organizational models whose elements include non-governmental, public or private, institutions. For the latter form, attention has to be given to incentives that stimulate and reward collaboration, and that compensate for however slight losses of autonomy of the participating organizations. A broad, open channel of advisory input from all constituencies of the information sector to the governing mechanism is essential.

In summary, adopting the policy of viewing problem-solving information and the information industry as development resources commits the Government of Egypt to courses of action that increase and optimize the utility of these resources. A desirable manifestation of this commitment is some form of a "national" information plan and program that identifies the course of action and the implementation strategies.

III. POLICY REGARDING THE UTILIZATION OF INFORMATION

1. Policy Statement

IT SHALL BE THE NATIONAL POLICY OF THE GOVERNMENT OF EGYPT TO RAISE THE PERCEPTION OF THE EGYPTIAN PEOPLE REGARDING THE VALUE AND UTILITY OF SCIENTIFIC, TECHNICAL AND ECONOMIC INFORMATION, AND TO INCREASE THEIR PROPENSITY AND ABILITY TO APPLY THIS RESOURCE IN THE PROCESSES OF ECONOMIC AND SOCIAL DEVELOPMENT.

2. Discussion

Perhaps the greatest obstacle to be faced in bringing information to bear on Egypt's socioeconomic development is the paucity of user groups trained and accustomed to independently search for and apply information in the solution of problems. The paucity is not unique to Egypt; most other countries, including some highly industrialized ones, share it (Unesco, 1981). The problem has complex dimensions.

An extreme cause of the lack of a propensity to seek and apply problem-solving knowledge can be ignorance of the fact that knowledge also exists in recorded form, apart from the content of one's memory. A recent survey of information users in Egypt (Sarason, 1981) provided no evidence that this cause holds for Egypt; thus given that Egyptian problem solvers are aware of the existence of recorded information, other reasons must exist for its non-use.

One reason appears to be related to the problem solvers' perception of expected value of data and information. A problem solver will tend to seek out and use information if its expected value is greater than the effort/cost associated with its acquisition and use. There are reasons to believe that a large percentage of Egyptian problem solvers assign recorded knowledge an index of expected value that is always lower than the anticipated effort/cost associated with its acquisition and use.

Raising the problem solver's perception of the expected value of information would seem, superficially, to be a matter of demonstrating to him logically or empirically that in a large number of situations the actual value of knowledge is indeed higher than he believes. The perception of value of data and information is, however, usually related to the perception of the value of the problem-solving activity itself, and of its goal. This is a highly subjective perception, the index of which depends on what rewards or benefits -- of whatever kind and to whatever beneficiary, individual or public -- one expects that the activity might produce. If these benefits are considered desirable, the problem solver is encouraged to invest greater personal effort (and hence possibly produce "better" problem solutions); if they are not desirable or none exist, he will pursue a

course of action involving least effort/cost on his part. A personal perception of the utility of or potential benefits from the problem-solving activity thus appears to be a prerequisite for successfully demonstrating the value of problem-solving knowledge.

An even more basic issues that underlies the ability to improve a problem solver's propensity to use information is his attitude to change. If change is not desirable to him, or if the value set held by his culture leads him to oppose change, any reward for better solutions may go ignored. Propensity for seeking and using information is thus ultimately related to the attitudes which individuals and societies attach to the notion of physical and mental change. Where the parameters which influence information value are so deeply embedded in such attitudes, modifying the propensity will very likely require and cause a perturbation of a country's socio-cultural structure. A decision to seek such a modification in this environment must be made with the highest judiciousness and forethought.

3. Implications for Planning

The ultimate significance of information in a social setting is its usefulness in problem-solving and decision-making, which accounts for its indispensability as a resource in social and economic development. Increasing the proclivity for using information in problem-solving is thus essential for all countries seeking to accelerate their development. The task requires strategies that correspond to the causes of the current paucity of this property.

Some 50 percent of Egyptian problem solvers surveyed in the study mentioned above indicated that they were aware of the value of problem-solving knowledge, and attributed their non-use of it to temporal reasons such as lack of information resources in Egypt, cumbersome methods of accessing it abroad, inadmissible delays in delivery, and high cost. When these constituencies of potential users -- managers, physicians, practicing professionals, etc. -- are further categorized according to their probable intensity of information use (e.g., foreign-educated researchers are highly inclined to use information), appropriate training programs can be tailored for each category. These programs will have a marketing slant; and they presuppose the existence of information resources, and of services for their access and delivery. A relatively high rate of early success with these users can be anticipated.

A far more time-consuming and less cost-effective, but at least as important, effort should be contemplated to alter the attitude to problem-solving information currently exhibited in Egyptian education. The paucity of instructional resources, human and informational, has forced Egyptian education to conform to a single, didactic model of learning which emphasizes rote memory and exercises solving stereotyped problems. Consequently, generations of individuals produced by Egyptian institutions of higher learning tend to rely, in problem solving, mostly on their memory.

It is obviously unrealistic to assume that the basic philosophies and practices of Egyptian higher education can be modified on any but a long-term basis, and that highly different approaches to problem-solving education can be quickly institutionalized so as to habituate students to a multiplicity and even redundancy of information inputs.

A possible start is to introduce effective information services gradually into selected classroom and laboratory environments in the form of seminars, demonstrations, and short courses aimed at acquainting faculties and students with the universe of information available to them, and providing practical instruction in modern access techniques. Prime candidates for such training are faculties of technical professions and management. The degree of success of this strategy will depend in part on the enlightenment of educational administrators and on their willingness to reward faculty members and students who introduce and demand more intensive interaction with information resources.

Increasing the problem solvers' awareness of information resources and "user training" is a topic perennially emphasized by international and professional agencies, some of which have developed useful guidelines (Wilson, 1981). Nevertheless, progress has been barely noticeable except when a government conscientiously underwrites a nontrivial -- and not inexpensive -- program.

IV. POLICY REGARDING INFORMATION PRODUCTS

1. Policy Statement

IT SHALL BE THE NATIONAL POLICY OF THE GOVERNMENT OF EGYPT TO INTENSIFY THE INDIGENOUS GENERATION OF SCIENTIFIC, TECHNICAL AND ECONOMIC DATA AND INFORMATION, AND TO ENCOURAGE THE CREATION OF INFORMATION PRODUCTS CONTAINING DATA AND INFORMATION GENERATED BY EGYPT.

2. Discussion

Developing countries are, understandably, preoccupied with the desire to access the rich repositories of problem-solving knowledge being maintained by highly industrialized countries. The long-term objective of these countries, to decrease their dependence on these repositories, can be attained partly by importing information and harboring it domestically, and partly by stimulating the production and husbanding of indigenous data and information. The latter are of fundamental importance to each country, economically and culturally.

From the economic viewpoint, indigenous information is not only the product, and sometimes the only product, of the activity of highly skilled manpower but also an end result of a major investment of fiscal resources. The value of new information -- the principal product of the country's research effort -- considerably exceeds its utility to the scientific community; for example, recent studies of agricultural and manufacturing industries have established that the rate of productivity increase of these industries or their firms is directly related to the amount spent on research and development (Mansfield, 1980). In this sense it is thus not only the quality but also the quantity of new knowledge produced by a country that is related to indigenous development, a relationship that motivates governments to seek higher investment of financial and human resources for scientific research, as well as more effective management and performance of such research.

Presently, each nation's attention focuses on solutions of problems in social development: providing better housing and transportation, improving the quality of life in cities and villages, equalizing education and job opportunities, preserving the environment. It has become a truism that timely and relevant information positively affects the quality of solutions that are sought not only by scientists but by broader strata of the population: policy-makers, executives, administrators, technologists, developers, managers, entrepreneurs, educators, and numerous other professionals. Problem solving in these areas often draws less on the formal results of scientific research than it does on reliable, decision-supporting data relevant to the problem and its characteristics. A new national facility,

socioeconomic and demographic data banks, is evolving in many countries to serve decision makers in the production and service sectors. The data banks typically cover population and vital statistics, housing and environment, income expenditures and standard of living, agriculture and animal husbandry, industry, prices, employment and labor conditions, health and nutrition, and education and culture. Data quality and completeness are major considerations in the development of this resource.

One reason for intensifying the generation of indigenous data and information and their packaging into products is their value as articles of trade. Whereas developing countries invariably import much larger quantities of recorded information than they export, the trade benefits are more than monetary. The ability of Egyptian libraries and other institutions to obtain subscriptions or copies of foreign publications has depended to a considerable degree on exchange for domestic information products. Other important random examples of benefits of information export include repatriated profits accumulated by experts working abroad, income from patent and technology licenses, and reverse technology transfer. Today and more so in the future, carefully packaged, high-quality information products constitute attractive goods, as foreign countries seek to establish industrial and service operations in Egypt, and as their interest in Egypt, its affairs, and its markets increases.

Stimulating the generation and improving the husbanding of domestically produced problem solving knowledge has also cultural effects. Prestige for Egyptian science, economy and the information industry is only one of these. A frequently quoted study has suggested that "leaving to others . . . the responsibility for organizing the 'collective memory', while being content to dig into it, is equivalent to accepting cultural alienation" (Nora, 1978). Consider also the issue of national language: as recorded information is increasingly being printed and distributed by computer, the machine is forcing a standardization on English as the language used. Concerned with this trend, non-English speaking countries are pressing for national programs for publishing in vernacular languages and, by extension, for adapting information technology to operate on and with such languages.

3. Implications for Planning

A variety of actions is indicated to implement the spirit of this policy.

With respect to primary information, the national information policy overlaps with the national science policy, to the extent that both share concern with the output of science, data and information. Typical science policies are more preoccupied with issues of quality of information than with maximizing the informational output of research. Egyptian research administrators should therefore also perceive the role of science to be that of a generator of messages which constitute one source of the country's information stores and products, and devise and institute stra-

tegies and procedures that strengthen Egyptian science in this respect.

Uppermost among these is coping with the problem of delay in entering the data/information into the public domain information channels. At present research results generated in Egypt reach the public, both domestic and international, with delays which drastically reduce their value; indeed, media communicating such information in a timely manner are virtually absent in Egypt. Unless Egyptian contributions to problem solving knowledge are reported more promptly, Egyptian scientists will continue giving priority to publishing in foreign media, and the fruits of their work will go largely unexploited at home.

The avenue of action to be urgently pursued is to improve the publishing process of the journals issued by the Egyptian Academy of Scientific Research and Technology and by Egyptian scientific and professional societies. Such improvement can be obtained only by the application of computerized text processing and composition techniques. It must be recognized that the use of this technology will require modifications of the publishing process, and hence the cooperation of both scientists and editors; yet those responsible for the guidance of Egyptian science must recognize the inevitability and urgency of this step.

At the same level of urgency is another critical characteristic of Egyptian output from problem solving activities: the sporadic nature of the reporting practices. While data are not available to determine the level to which public sector problem solvers document and publicize their findings, the general absence of guidelines suggests strongly that with the possible exception of academic research, much if not most of the output of problem solving is unrecorded, unknown, or unavailable to potential user audiences.

Egypt should therefore introduce strategies and media for more systematic capturing of the fruits of indigenous problem solving. The most recent approach in industrialized countries is to build public computerized databases that contain, for each problem, a brief description of its nature and of the solutions developed; the database of such descriptions in a given field, e.g. urban administration, can then be queried by anyone working in that domain. Another, time-honored medium of communication is the technical report, which has gained international acceptance as a rapid medium for reporting and distributing results of applied research and development. Because it bypasses the peer review process used by scientific journals, the quality standards of technical reports may not be as high as those of the science journals; their primary function, however, is to disseminate as rapidly as possible the results of problem solving in development to homogeneous communities of interested individuals. In introducing such media of communication Egypt has the opportunity of specifying the characteristics of their content, style, format, and other standards.

Responsibility for the collection of socioeconomic and demographic data in Egypt is in the hands of the Central Agency for Public Mobilization and Statistics (CAPMAS). Such data are generated through two processes: systematic collection using various statistical techniques, and accumulation as byproducts of administrative activities. A major problem of data collection in Egypt, as elsewhere, is control of data quality -- defects in the data sets, and data gaps; and the lack of use of the available data. As Egypt moves toward the establishment of a network of public information services it may consider these to become also the conduits for data collection, organization, evaluation and dissemination. A public inventory of national databanks, to be maintained by CAPMAS and made available to national information services, should provide information on the availability of different types of data, their periodicity, sources of data generation, and explanatory notes regarding coverage, time lag, quality, and levels of aggregation and disaggregation.

The information industry thrives on producing "secondary" information tools in printed and electronic form: catalogs, directories, bibliographies, indices, and compilations of different contents and usage. While much of this activity should be fostered by the private sector, the public sector may need to initiate key large projects. One notes, for example, that with the exception of entries in the National Library book catalog (resulting from the Book Depository Law) and of a few sporadic bibliographies, there is no Egyptian registry or index of the country's contribution to the scientific, technical and economic literature of the world. Early attention should therefore be given to the compilation, production, and wide dissemination of a periodic publication (an abstracting journal) that systematically collects, organizes and publishes annotations of contents of Egyptian periodicals, technical reports, theses and dissertations, patents, and indigenous data banks. The intellectual production of the country should be captured in machine-readable form and in the language of the publication, so that specialized bibliographic products meeting specific needs can be produced on demand. Compatibility with major international bibliographic databases is highly desirable, thereby making the Egyptian database exchangeable internationally.

V. POLICY REGARDING THE MANAGEMENT OF NATIONAL INFORMATION RESOURCES

1. Policy Statement

IT SHALL BE THE NATIONAL POLICY OF THE GOVERNMENT OF EGYPT TO MANAGE THE COUNTRY'S PUBLIC RESOURCES OF SCIENTIFIC, TECHNICAL AND ECONOMIC INFORMATION IN A MANNER ALLOWING THEIR EFFECTIVE USE IN NATIONAL DEVELOPMENT BY ALL SECTORS OF SOCIETY.

2. Discussion

Problem solving information generally falls into two categories: unclassified and classified. The management of these two categories is governed by different considerations and policies. The policy statement in this section is intended to apply to unclassified information.

The view of problem-solving knowledge as a national resource implies concern with its cost-effective management. In the sense used here, national information management strives for two objectives: to provide within the country's borders information resources that are, in some defined senses, useful and adequate for the country; and to assure that these resources are husbanded cost-effectively in a manner that makes them available to the widest strata of information users. The policy prompts the formulation of procedures and practices that tend to optimize the acquisition, availability, and use of national information resources.

It is a truism that knowledge has value only when used or applied. However, the nature and extent of the use of a particular information item are not fully predictable; thus specifying "adequacy" of national information resources only in terms of volume of records is insufficient (with the possible exception of research literature in academic disciplines), partly also because the latent value of information resources changes dramatically with circumstances (e.g., in case of international hostilities). For these reasons, as well as for financial limitations, national programs also use the criterion of information relevance to essential and priority endeavors, such as socioeconomic development.

Provision of information resources relevant to priority national programs and activities involves consideration of different physical information carriers, each of which has idiosyncratic characteristics. Some media may not be produced indigenously (for example, the technical report as a public information carrier is produced by Egypt in insignificant quantities); others (for example, the exodus of professional manpower to foreign countries) require unique management strategies. Strategies for capturing domestically produced natural language information typically include the enactment of depository laws which guarantee that one or more copies of each physical carrier shall be deposited at specified locations. Different

strategies, widely varying as to the extent of governmental control exercised, are used in the procurement of information from abroad. Some of these are by now traditional (for example, foreign currency appropriations to national, public and academic libraries); others are more recent (for example, debriefing of nationals returning from attendance at foreign conferences, meetings and exhibitions).

The second objective of this policy aims at making national information resources as available as possible to the broadest clientele of users, particularly in subjects and activity areas identified as having high national priority. Because of the inevitable dispersal, institutional and geographical, of national information resources, systematic procedures need to be formulated that allow problem solvers to locate efficiently the data and information they need. Modern information technology and systems increase by several orders of magnitude the volume and range of data and information available to problem solvers; this aggravates the problem of physical access, as only a small fraction of these resources is available to a person in his immediate vicinity. National resource sharing programs, the object of which is to make copies of locally held materials available nationally through protocols such as interlibrary loan and photocopying, have thus become indispensable in all countries but particularly those with modest information resources.

3. Implications for Planning

The above policy invites Egypt to consider and implement a comprehensive and systematic approach to the management of the country's national information resources.

A long-term national program is needed to address the development and maintenance on domestic soil of adequate resources of recorded information. Egypt, not being an information-rich country, will be well-advised to institute planning in the development and building of its information resources. Of first importance is the systematic gathering and registration of information carriers produced within Egypt; for this purpose Egypt may wish to review its depository laws and regulations, and to extend them to other types of materials and media such as technical reports, research projects, databanks, computer programs, and other carriers that contain data and information of a public, unclassified nature.

Of no lesser importance to Egypt is the need to motivate the acquisition of foreign information resources such that their totality on Egypt's soil is consonant with the information needs of the country's national social and economic plans. Prudent -- and difficult -- choices have to be made in suggesting priorities and emphases for the acquisition of information resources, regarding both the subject area and the type of materials. Serious consideration should be given to the implementation of administrative devices conducive to the building and maintenance of strong, low-duplication national information resources, including long-term foreign

currency subsidies for strengthening carefully defined collections of selected libraries and data centers. Levying domestic tariffs on import of problem-solving knowledge is counterproductive. Explicit recognition should be given to non-traditional transborder flows of problem-solving knowledge (via consultants, technology transfer, foreign training, and travel abroad), and effective means devised and institutionalized for systematizing and intensifying the flow of such information to Egypt. Agreements for provision of documentation and other relevant information should be a standard clause in contracts with multinational corporations and with foreign subsidiary operations in Egypt. Debriefing of Egyptian nationals attending, at public expense, certain foreign events such as conferences may be an effective way of collecting current and relevant data provided the product of debriefing is made further available. Science, trade and education missions and attache offices at Egyptian embassies in information-rich countries can become, if so desired, highly effective document and data input nodes.

As part of the national information plan/program, an explicit model for the geographic and intellectual organization of the national information resource should be constructed. Egypt has outgrown the need for a single national document/data center; nor can it afford, however, the laissez-faire alternative of an entirely uncoordinated distribution of public information collections. In choosing and implementing the organizational model for national document/data resources, major considerations include its comprehensiveness (the need to allocate responsibility for all major categories of information/data resources), operational feasibility (the ability of a given institution to handle the technical aspects of organizing the resources and making them available to the public), and compatibility (in terms of common approaches and standards for the technical processing and handling of the resources, so as to facilitate access to them).

Efforts to manage information resources on a national level are futile, however, unless they are easily accessible and generally available to the public. Underlying this truism is a requirement for a national philosophy and atmosphere that view problem-solving knowledge as a social and national good, and encourage its exploitation by the broadest strata of the population. A necessary condition for realization of these desiderata is "information resource sharing" -- procedures and facilities for making data and information holdings available on a national basis, through telecommunications, photocopying, interlibrary loan and other means. The limiting obstacle to this approach -- the disinclination to cooperative action among institutions and individuals in the information and library field of Egypt -- must be faced resolutely.

Resource sharing, while considerably more economical than unplanned duplication of information resources, is not without costs; these include not only costs for the delivery service but also for the development of tools that make resource sharing possible: collaborative acquisition and cataloging projects, and devices to locate materials (union lists and ca-

talogs). Fair, constructive, and durable nationwide solutions to the problem of costs distribution are mandatory. Insofar as information users are concerned, costs should be standard within each category of users, and should encourage purposeful use of information resources.

VI. POLICY REGARDING INFORMATION SERVICE INDUSTRY

1. Policy Statement

IT SHALL BE THE NATIONAL POLICY OF THE GOVERNMENT OF EGYPT TO PROMOTE, IN THE PUBLIC AND PRIVATE SECTORS, THE DEVELOPMENT OF AN INFORMATION SERVICE INDUSTRY UTILIZING STATE-OF-THE-ART INFORMATION AND COMMUNICATIONS TECHNOLOGIES TO PROVIDE ACCESS TO AND ASSISTANCE IN THE USE OF PUBLIC INFORMATION RESOURCES IN EGYPT AND ABROAD.

2. Discussion

The term "information services" describes functions and organizations involved in some way with the manipulation and processing of raw data and information, and with facilitating their use by intended audiences. Traditional examples of information services extend from the management of records at the ancient library of Alexandria to the husbanding of recorded literature in uncounted libraries of the world. The industrial revolution brought about a demand for more dynamic information services, the central feature of which was more intensive analysis of the content of records and their matching with specific requirements of the technical staffs of industrial enterprises. The "documentation services" of these enterprises were extended by the middle of the 20th century to encompass most of the volume of verbally recorded information generated by global research and development activities.

Since the information processing capabilities and memory of humans have changed very little over millennia, an individual's ability to cope with the nearly exponential increase in recorded information continues to prompt information services to develop more refined means of analyzing the information store and, particularly, of interpreting and adapting its contents to the problems being solved. The introduction of automation in information handling was a major step toward the facilitation of new service capabilities; data and information could not only be efficiently located and retrieved from their vast and bulky repositories, but they could be further processed by techniques of analysis, reformatting, repackaging, aggregation, modeling, and instantaneous reproduction and distribution to meet highly specific requirements of individuals and their organizations. Recognition of the utility of these functions has stimulated a growth of new information service organizations dedicated to the manipulation of this resource and to the improvement of methods and techniques for such manipulation. This new "information industry" is comprised of services organizations in both the public and the private sectors.

The importance of the information industry is twofold. On the one hand, it is an economic entity by itself, providing services that many beneficiary individuals and organizations are prepared to buy and pay for. In contrast to the traditional, passive, library-based information services which rely on public subsidy or corporate overhead, some more dynamic elements of the new information industry are now competing in the marketplace. On the other hand, the information industry is the kernel and driving force of the non-production component of the economy sometimes called the "information sector." The latter is comprised of a labor force whose activities depend on and consume data and information, e.g., the white collar workers in administration and education. A primary problem facing the information sector (which comprises between 20 and 50 percent of the total labor force of most countries) is its productivity, and many countries view the information industry as being the key instrument for improving it.

Central to the modus operandi of the information industry is information technology. Whereas earlier the use of this technology required highly advanced skills available in only a few countries, and whereas the technology was very expensive, at its present level of development it is accessible relatively economically to most countries, and it can be used by organizations and individuals who do not possess the previously required technical expertise.

These facts and developments provide a strong impetus for governments to promote the development of a national information industry, and to encourage this industry to utilize prudently modern, cost-effective technologies for information processing and communication.

3. Implications for Planning

For the purposes of this policy, a general distinction is made between the generally passive function of information management services such as traditionally provided by libraries (and addressed by the previously stated policy regarding the management of national information resources), and user-oriented information services whose primary purpose is to respond to specialized needs and requests of individual problem solvers requiring the assistance of an information professional and/or the use of an information system. The present policy is intended to apply to the latter function.

Early in its resolve to stimulate and aid the development of a national information services industry, the Egyptian Government will wish to formulate a position regarding the respective roles of the private and the public sectors. In principle, market-oriented economies favor the development of a healthy information industry in the private sector, with services based on market demand, competition improving service quality, etc. It is unlikely, however, that the private sector is either prepared or able to deliver a full complement of services needed by a country's problem solvers and decision makers, particularly in countries where the markets for information services are poorly defined or non-existent. In such situations it

is the responsibility of the government to provide, or preferably stimulate the development of, public-sector information services. While endorsing and facilitating the private initiative of independent service organizations, the government should ensure the organization and viability of services that are needed but cannot be provided through private initiative and investment.

A plan will typically be formulated that specifies the functions of public information services to be developed over a period of time, a structural model for organizing and managing these services, and methods of generating and allocating appropriate financial resources for the plan implementation. The resulting national system of user-oriented information services is related to the national system of information management services and its organizational model; it is unlikely, however, that the information management and the user-oriented service functions will be performed by the same set of organizations. The former favor a relatively high degree of centralization; the latter should be located as close as possible to the ultimate users (and eventually integrated with their problem solving processes). It is essential for both systems of services to collaborate and to coordinate their operations.

In the approximate order of complexity, the functions to be performed by this system of information services are: referral to information sources, particularly human experts; provision of access to computer-based reference databases (databases whose contents point the user to the ultimate data or information source), and delivery of the information media so identified; provision of, and assistance in, access to "source" databases (containing the actual data/information sought) which, typically, requires a higher degree of information-related skills; and analysis, synthesis and interpretation of problem-solving information and in its application to problem solutions. The last function requires professional knowledge of the problem domain as well as advanced information skills. Successful implementation of information services also demands investment in support and management functions: marketing, staff training, and evaluation. User feedback and participation must be secured.

The Egyptian Government should be deeply concerned that both service providers and clients have access to and work with modern information processing and communications technologies. Since neither the service providers nor their clients are initially likely to be sufficiently familiar with the characteristics and options of these technologies, the Government will wish to take upon itself the function of a sympathetic advocate of prudent acquisition, and an advisor in the cost-effective application, of these technologies. In particular, information service organizations should be encouraged and induced to utilize microprocessor-based equipment capable of functioning in both self-standing and networking mode, transportable systems and applications software, and database facilities for handling both data and natural-language information.

As the viability and versatility of information services depend to an ever-increasing degree on telecommunications, the development of a national information industry is unthinkable without a parallel, or preceding, amplification of Egypt's telecommunications facilities, so as to link information services cost-effectively with the wealth of resources available from domestic and foreign data repositories. Given that a "fairly strong correlation" has been noted to exist between the inflow of information from abroad and national development (Pool, 1979), providing Egyptian information services with high speed digital data links must have very high priority.

VII. POLICY REGARDING INFORMATION SECTOR MANPOWER

1. Policy Statement

IT SHALL BE THE NATIONAL POLICY OF THE GOVERNMENT OF EGYPT TO PROMOTE THE DEVELOPMENT OF ADEQUATE MANPOWER IN THE INFORMATION SECTOR.

1. Discussion

The Alexandria Library placed an enduring imprint on the Western world: books, like museum objects, exist to be preserved and conserved. Ever since, librarians as conservators have been enslaved to the security of their charges.

The information revolution, largely made possible by technology, requires an entirely different set of talents. The function of the information profession has become a highly dynamic one -- to promote and mediate the application of knowledge, in whatever form or medium, in an almost infinite variety of problem solving and decision making situations. In support of this function information professionals design, build, and operate highly complex, technology-based "information systems" -- complexes of data, devices and procedures which facilitate, and indeed make possible, effective information services.

The information professional must, as a minimum, possess qualifications from the following areas: a problem-solving subject specialty; knowledge of information resources, human and inanimate, relevant to the subject field; and operation of information processing and communications equipment. More senior information professionals require command of an engineering field -- the analysis and design of sophisticated information systems in which digital technology is used for automated processing of natural and artificial languages to perform information storage and retrieval, database management, decision support, and the like. At the most senior level, the information professional must -- in addition -- possess planning and management skills allowing him or her to successfully guide and direct long-term programs and teams of professionals in the design, development and operation of large systems. Invariably, executive level qualifications also require a high degree of political acumen and skills.

These qualifications bear little or no resemblance to the traditional custodial roles of librarians; rather, they resemble those required by technocrats and managers of industrial enterprises or high-technology service organizations.

The development of manpower qualified to assume the variegated functions presents a serious problem for the information sector, and virtually all countries experience difficulty in recruiting and training operators and managers of information systems. A major part of the problem is the lack in most countries of facilities for modern training in the management and use of information resources. An equally if not more problematic aspect is the lack of the professional and social identity necessary to render the new occupations visible and desirable, exacerbated by failure or unwillingness of manpower experts to understand the nature of the new information profession. As a result, it is often assumed that these professions can be integrated into an existing one, namely librarianship; and that the various characteristics of librarianship -- its standards of performance, its educational and training programs, and particularly its salary scales -- are also appropriate and generally adequate to accommodate the new profession. The consequences of this view are nearly disastrous: not only do most members of the library profession have little motivation to change their careers but, more importantly, the new profession is deprived of identity -- its key incentive for attracting a fresh, and suitably qualified, membership.

3. Implications for Planning

The first and essential step Egypt should take is to recognize the technical character and level of the skills required by modern information systems and services. A comparative analysis of the information professions with other professional job categories may be necessary, so as to establish the equivalence of the qualifications needed by some information professions with those for science and engineering. A healthy evolution of the information professions can then be accelerated by establishing for them governmental job classification schemes and pay plans which stipulate the level of responsibilities, the necessary qualifications, and the salary ranges for each job rank.

Planning of manpower development programs begins with a conceptual definition of categories of skills, professional and subprofessional, that are required, in the long run, by Egypt's information sector. The scheme is to include both traditional and new skills, and to cluster these according to kind and difficulty. Based on a survey of existing strengths of these job categories in Egypt, estimates can be developed of the immediate, medium and long-term personnel needs, presumably with the assistance of an appropriate manpower planning model. As a general guide, professional categories evolving in industrialized countries include personnel for performing the following information functions: managing information operations, programs, services or databases; preparing data or information for use by others; analysis of data and information on behalf of others; searching for data and information on behalf of others; information systems analysis; information systems design; information system operations; education and training; and information research and development.

Concurrent attention should be given to the task of assembling the minimum critical mass of individuals qualified to undertake the development of the initial information-management and user-service functions and systems in the public sector. Crash programs of short-term training will probably be required to strengthen the backgrounds of the individuals recruited for this central group. Along with these activities, plans should be laid to provide the necessary training of the operators and managers of the first systems. Short courses in Egypt, on-site training abroad, and short-term consultants/instructors working at specific sites are propitious strategies to prepare the technical and management staffs of these incipient operations.

The long-term information manpower development plan of Egypt is likely to pursue two avenues. The first avenue consists of non-degree education programs intended to provide, and advance, the minimum job qualifications of the currently employed labor force. These programs may consist of standard courses offered recurrently by designated institutions and meeting the minimum level or levels of professional qualification in the various job categories. More advanced non-degree education can be provided through advanced or specialized seminars, courses, certificate programs, and similar activities. It is highly desirable to coordinate and continuously evaluate such offerings, particularly if they constitute requirements for promotion.

The second avenue of long-term manpower development is through formal degree programs. Ultimately, the information manpower development scheme of Egypt must be related to and synchronized with Egypt's system of higher education. The basic issue is the extent to which existing discipline-oriented degree programs -- applied computer science, information systems engineering, information services, documentation, and librarianship -- can accommodate, or be adapted to accommodate, education for information professions, and when new programs must be initiated. In either case, the difficult first step is to attract to such programs competent and stable faculties, initially perhaps supplemented by foreign lecturers. The absence in Egypt of suitable instruction materials and laboratories suggests, as one alternative, the possibility of establishing an instruction media center to be shared by the information related disciplines. It should be expected that the implementation of degree programs in Egypt will be embedded in the broader context of the country's national system of higher education, and in its virtues and deficiencies.

Because of the understandable inertia of formal education systems, the degree programs in the information field must be complemented by continuing education activities, organized partly within, partly outside the university environment. Continuing education offers excellent opportunities for the private, commercial information sector, as well as for public-sector agencies that will operate modern information facilities. In order to assure the integrity of the continuing education enterprise, early development of voluntary standards should be considered by professional associations in the information fields.

VIII. POLICY REGARDING INTERNATIONAL INFORMATION ACTIVITIES

1. Policy Statement

IT SHALL BE THE NATIONAL POLICY OF THE GOVERNMENT OF EGYPT TO PARTICIPATE IN INTERNATIONAL PROGRAMS WHICH FACILITATE EQUITABLE EXCHANGE OF INFORMATION.

2. Discussion

Information flows are inherently international; men have sought since prehistory to communicate their ideas and knowledge across space and time, and across cultural and linguistic barriers. Since the 17th century, international information flows have actually determined the viability of some of mankind's organized enterprises. An early example of these is science: progress in science and the reward system of its practitioners depend upon uninhibited dissemination of new knowledge, and upon examination of its validity. It is in full recognition of these principles that professional organizations worldwide foster the international exchange of new knowledge, and that Unesco and the International Council of Scientific Unions created the UNISIST program.

In our times, international flows of data and information play a similar role for global commerce and trade. The uninhibited transmittal and sharing of data regarding products, commodities, materials, services, prices, transportation, and markets constitutes the basic cornerstone of global commerce; the communication practices and systems affect the production sectors of literally all countries, and the contents of their messages and databases are as indispensable to national enterprises as they are to large multinational corporations. The significance of international dataflows is so high and its effect of such magnitude that it has now become an issue of international contention, as each country strives to assure itself of gaining equitable access to and benefits from this vast, global data traffic.

The impact of international information flows reaches even beyond global trade. Few themes stand out more sharply than the belief that information is indispensable to socioeconomic development; the measure of importance attached to this relationship is reflected, for example, in the numerous recommendations of the 1979 U.N. Conference on Science and Technology for Development. Accumulation of knowledge is, in the words of Nobel laureate A.W. Lewis, an indispensable element for the development process to occur, and unrestrained international flow of knowledge is a prerequisite to such accumulation.

Today's technological developments, particularly communications satellites, enormously enhance the global capability to transmit data and information; their capacity is such that they can sustain global mass communica-

tion of not only problem solving knowledge but cultural information as well. International exchange of all forms of knowledge will thus affect all aspects of national life. Direct broadcast satellites, capable of providing telephone, telex, television, data and database computing services at extremely low per capita costs and directly to virtually any point on earth, are of enormous potential particularly to developing countries; most governments currently struggle with the implications of this technology, and with policies and methods for harnessing it.

No country can thus afford not to participate in, let alone ignore, the international information scene. Being dependent on international information flows and inevitably constrained by their forms and practices is a strong incentive for each country to participate in the international dialog, so as to protect its interests and obtain maximum benefits. Conversely, each country makes a valuable contribution to mankind's pool of knowledge; this is a particularly desirable role for Egypt, as the leading nation of the Arab world.

3. Implications for Planning

It is incumbent upon the Egyptian government to monitor closely and to participate intensively in several categories of international information programs.

One such category is standardization and regulation activities. The capabilities and costs of international information facilities and services depend directly on international agreements on and the use of common technical standards. Similarly, effective and reliable use of communication channels such as the radio spectrum, satellite communications, etc. and of information media such as news services, is made possible by voluntary adherence to regulations formulated by international organizations and consortia. Notable among the groups that welcome Egypt's participation are CCITT, ISO, the UNISIST Working Group on Bibliographic Data Exchange, and other international non-governmental organizations working in the field of information-related standards. As the volume and type of data flows between Egypt and other countries increases, Egypt should find it propitious to participate in international regulatory discussions, such as those on transborder dataflow, which may in turn influence the formulation of domestic regulations.

The second category of international programs that deserve Egypt's attention are collaborative projects to develop and operate international information services and facilities. These projects provide potential sources of services, information, communication channels, as well as potential markets for Egyptian information and services. A number of such systems operating on a global or regional basis have been developed, or are planned, under the auspices of the European Economic Community, the United Nations and its specialized agencies, and other governmental consortia. International groups are currently also planning the development of new

communication facilities, such as Teletex and a narrow-band network for wire services.

The third category consists of a spectrum of support opportunities in the information field that are open to Egypt under the auspices of both bilateral and international programs and organizations. Diverse sources exist for the funding of educational and training missions in and outside of Egypt, and of information resource and service activities. Egypt would find it beneficial to monitor and disseminate information regarding these opportunities from a single clearinghouse. At the present time there is no systematic attempt being made in Egypt to either comprehensively track these opportunities or to coordinate their exploitation.

Finally, it seems highly propitious to increase Egypt's visibility at professional forums overseas. Successful development of national information services and their evolution are predicated on the ability of Egyptian professionals to have firsthand knowledge of international developments in the field, of technology trends, and of experiences learned by colleagues in other countries. Since much of the future innovations in the area of information systems and services will come from abroad, senior Egyptian information professionals must keep open wide channels of personal communication, via participation in working groups such as the International Federation of Information Processing Societies, International Federation of Documentation, International Federation of Library Associations; attendance at major international technical events in other countries; and organization of such events in Egypt.

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