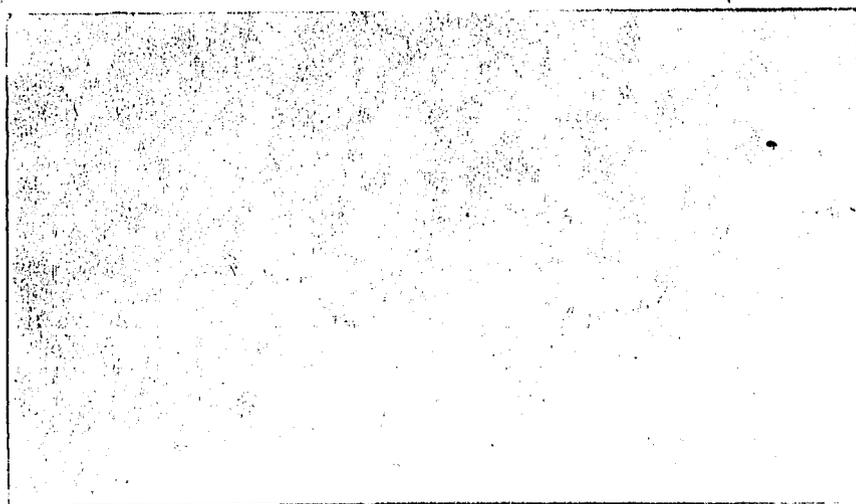


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**INFORMATION NEEDS AND USES
IN EGYPT**

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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 of Scientific Research and Technology and the U.S. Agency for International Development. Phase I of the project (November 1979 - October 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 Advisory 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 National Science Foundation under a U.S. Agency for International Development Participating Agency Service Agreement.

The publication of this report does not imply official concurrence of the sponsoring agencies with the views and opinions expressed therein.

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The data and descriptive materials that form the basis for the analyses and conclusions presented in this report were gathered by a task force of Egyptian experts organized under the direction of Dr. A.O. El-Kholy and managed by Dr. M.A.K. Madkour. The instrument used for data gathering was a survey questionnaire developed by Dr. D. McDonald of King Research, Inc. (U.S.) in collaboration with a team of Egyptian colleagues. Data processing and output reporting of the collected survey results were accomplished by the Cairo University Computing Centre under the direction of Dr. Ahmad Aziz Kamal.

Dr. A.M. Gad, Director of the National Information and Documentation Centre, reviewed the planning and progress of the user requirements survey and contributed to its direction. Mr. A.K. El-Duweini, in addition to serving as liaison officer for the Steering Committee, assisted in conducting executive interviews at several government and academic institutions.

The importance of the contributions of each member of the Steering Committee to the progress of this project is recognized and most gratefully acknowledged.

Special thanks are due Mrs. Nazli Madkour, Senior Economist on the staff of the Industrial Development Centre for the Arab States (IDCAS), for her development and direction of a separate survey of present and future information needs associated with Egypt's Five Year Plan for Socioeconomic Development.

The study reported here is an outstanding example of cooperation, dedication and effort on the part of the many people who were involved. The credit that may be deserved belongs to those who participated as information seekers and analysts, or as information providers and users.

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I. INTRODUCTION

The ultimate goal of Project STI is to provide a cost effective system for conveying specific useful information products and services to those who need them when they are needed. The basic purpose to be served is to support Egypt's continuing social and economic development.

There was a time in the history of nations when social progress was confined to a narrow segment of the populace. Economic progress depended upon the brawn of human muscles and on the leverage of primitive tools. In the present age of greater enlightenment, social and economic progress are seen as being closely intertwined and pervasive in effect. They are highly dependent upon the human intellect and upon the sharing of acquired knowledge and experience.

Sharing becomes possible when the discoveries of scientific and social research, technological developments, and accumulated wisdom are systematically communicated to others for their productive use. This is the process by which knowledge is converted to information. Project STI seeks to build on this base to serve the public interest.

Communications media used to transfer information come in a variety of forms. They include magazines, journals, books, manuals, reports and a host of other printed documents. Modern technology supplies other media as well: photographs, audio tapes, computer displays, microfiche, data banks and other items. A primary communications medium is the spoken word. It is the form that is the easiest and most frequently used between and among individuals. However, in a given circumstance, it may not be the most reliable or effective channel for conveying accurate or useful information.

The medium most suitable for a particular purpose depends upon the nature of the information that is to be conveyed, the needs and characteristics of the information user, and the purpose to be served by the information. For example, a matter of transitory interest that is relatively simple in content might be effectively conveyed by the spoken word. A computer display might be more useful for browsing purposes where the information seeker is searching for an item that might be found among a number of similar items. Documented information is especially important where a subject may be complex

and must be studied over a period of time. In another situation, tabulated data, rather than textual material, may better serve a user's needs. In short, information can be packaged in a variety of forms to meet a variety of user requirements. This is the essence of an effective information system.

It was with this in mind that the Users Requirements Survey, reported on in the pages that follow, was undertaken. Attention was focused on identifying who are, and potentially may be, the principal users in Egypt of organized scientific, technical, social, economic and related information. The geographical and occupational location of users was of concern. Important were the kinds of information needed, and what media were most likely to serve the needs best. But, the quest did not stop with these factors. It was equally important to know to what use the required information was to be put. The purpose was to get a clear idea of the values associated with the information, possible or potential sources of such information, and the necessary or desired characteristics of its contents. For example, information may be sought for its entertainment value; it may have significance in evaluating the relative condition of different entities (such as the comparison of scientific experiments conducted in different laboratories); or it might be of specific value in problem-solving and decision-making in myriad personal, professional, management, political or other situations.

But even after users are identified and needs defined, a serious question remains: will the information made available by the system be used and used to good effect? Two things must happen to ensure a favorable response. First, users must have confidence in the system's reliability, the timeliness and relevance to them of the information produced, the ease of access to that information, and its availability in a form that facilitates its use. In other words, the system must be easy to use, and it must consistently produce expected results.

Secondly, users must be trained and habituated to be information seekers and users. Humans are, by nature, processors of information. They are not, however, either naturally or expectedly users or communicators of information other than at a primal level. To the extent that they do use information, as suggested by the Inverse Affect/Use Rule (i.e., the greater the difficulty of acquiring or processing information, the less is the likelihood that it will be sought or used), they tend to re-use the information they acquired at an

earlier formative age from schoolbooks or from personal experiences that can be easily recalled from memory, or they use the next alternative.

People must be trained to be effective seekers, users and interpreters of new information. Research scientists, by reason of their education, the nature of their work and the traditions of their profession, are sophisticated information clients. At the opposite end of the spectrum are those whose jobs and life patterns tend to be routine and repetitive. These people related themselves more to accustomed surroundings than to new information. Between these two extremes are the managers, administrators, supervisors, professionals, technicians, students and others upon whom Egypt's socioeconomic development depends so heavily in the years just ahead. It is these people who should be the primary patrons and beneficiaries of the national information system.

The Users Requirements Survey was undertaken as the means by which the specifics of what has been outlined above could be identified. The premise upon which the survey was based was: Egypt's national information system must be designed to be responsive to the specific characteristics and needs of the intended users. It should follow from this that the system would then be used effectively and thus contribute most directly to the achievement of the nation's goals.

The chapters that follow combine the results of the Users Requirements Survey's three parts: (1) a sample analysis of socioeconomic sectors that together make up the national economy of Egypt; (2) a sample analysis of the major components of Egypt's Five-Year Plan for Socioeconomic Development; and (3) personal interviews with leaders of government and academic institutions at the ministerial and executive levels. The results are summarized, users are defined in general terms, their information needs are identified, and factors that may affect the user environment in the five years ahead are suggested. From these analyses, conclusions are drawn and recommendations are made relating to the design of an information system aimed at serving Egypt's goals.

II. INFORMATION USERS

People use information for a variety of reasons. For some it has entertainment value, such as in the reading of novels or attending stage presentations. Others use newspapers and other media to keep abreast of current events. Textbooks, reference materials and libraries are necessities for students. Information in all forms from all sources is essential in every aspect of industry, trade and commerce. It is fundamental to scientific and social research and also to technological development. It is the principal commodity that passes between governments and their citizens.

The information facilities that have evolved over time, or have been developed and now exist to meet the demands of the public for entertainment and awareness services, such as movies, radio, television, newspapers, magazines and books, are intended to appeal to a broad spectrum of people. Identification of specific users and their individual requirements in these instances is usually not attempted. Indeed, it may not be practicable to do so. Being a commercial enterprise, user satisfaction with mass appeal information services can generally be measured rather directly in terms of the revenues actually earned.

The situation is not quite the same in those instances where information is packaged for specific problem-solving or decision-making purposes. Rather than mass appeal, the intended audience in these cases is a person or a group of individuals with a particular need. There is a utilitarian interest in the information item. The purpose of seeking the information may be to add to one's personal store of knowledge, stimulate the intellectual process, acquire greater understanding of a matter of concern, find alternative solutions to a problem, or take advantage of the accumulated wisdom in determining the best choice to make in coming to a judgment or decision. Invariably, there is a direct correlation between the user, the information being sought and the purpose to be served by it. The better the nature and characteristics of this relationship are understood, the greater is the likelihood that any system designed to serve it will be satisfactory and effective.

It was with this in mind that a survey was undertaken to identify the actual and prospective user population in Egypt as a basis for the design of

a national STI system. The goal to be achieved in conjunction with that system is the realization of the country's socioeconomic objectives. Practical considerations dictated that the total user population could not actually be surveyed in the time that was available to the project team. Accordingly, a sampling plan was devised that included a statistically significant number of people who were actively engaged at various levels of organizational responsibility in different categories of occupations in the socioeconomic sectors that together constituted the core of Egypt's economy. Appendix I-A lists these sectors. Appendix I-B describes the design of the survey questionnaire and the data gathering approach that was used. The questionnaire is included as Appendix I-C.

The survey involved 1004 respondents to whom a two-part questionnaire was administered. In the first part individuals were asked to identify themselves in terms of their employment, occupations, positions and status as information users in connection with their work. The second part aimed at identifying the respondents' own information requirements and those of their colleagues with whom they shared common or similar work objectives. An attempt was also made to measure users' satisfaction with information products and services that were currently available; and to gain a sense of what was needed in terms of information products and services as an aid to improving their job performance and achievements. As an additional but separate effort, private face-to-face interviews were conducted by the principal investigators of this study with a number of senior managers and ministerial-level executives of various government departments and also of public organizations. The purpose was to gain further insight into and perspective on such matters as the following:

- o Managers' estimation of the value of information as a factor in the realization of their organizations' goals.
- o The support, encouragement and facilities provided to their subordinates for the acquisition and effective use of information in their work.
- o Steps to be taken to upgrade the information awareness of people in their organizations; also, how to identify and act upon their priority information needs.

- o Identification of the principal users in their organizations, their personal characteristics and job situations that make them distinguishable from other workers.

These executive interviews also afforded the opportunity to check out in a practical way the validity and significance of some of the initial data that, at the time, were beginning to flow in from the pilot testing of the survey questionnaire. Where necessary and appropriate, adjustments were made to avoid biasing any respondent's reply and to clear up any ambiguity in language or terminology used in the survey.

For the purposes of this study, users are defined as individuals who recognize the need from time-to-time to acquire information via documents, data or any other medium from any source that is beyond their immediate person, who do obtain it, and who put it to use in a practical way in an activity in which they are engaged.

Potential users are individuals who are only infrequently information users. Possibly because the activity in which they are engaged does not require the input of new information, they are not motivated to be users; they are not trained to take advantage of new information; or they lack necessary and suitable information resources and facilities.

Prospective users are individuals engaged in any kind of endeavor, job or level of work responsibility who may reasonably be expected to be information users, but for various reasons are not at present effective or systematic users. The challenge for any information system is to convert a prospect into a user.

Different people use different kinds of information at different times according to their individual needs and circumstances. The only qualification applied to the concept of information as the term is used in this report, therefore, is that information in whatever form it is obtained be applied productively toward the attainment of a desired objective.

The principal findings in the user identification part of the survey are detailed in the pages that follow. The 1004 questionnaires that were administered were apportioned among organizations that were classed as being in the Productive, Higher Education or General Services sector groups. The

questionnaires were distributed as follows: 432 (43%) to the Productive group, 282 (28%) to the Higher Education group, 290 (29%) to the General Services group. (Note: on this and the following pages of this report, percentage figures enclosed in parentheses indicate the relative proportion of the survey data that pertains to the indicated item, response, question or other factor.)

Measured in another dimension, the organizations that comprise these groups were by their nature Central Government (52%), Public (35%), Private (5%), Joint Venture (4%), Foreign (3%), and Local Government (1%). As shown in the table that follows, they accounted for a total of almost 2.4 million employees. Just less than 285,000 (12% of the total) were university graduates. The remaining 2.1 million had a secondary education or perhaps even less formal schooling.

SURVEY SAMPLE: EMPLOYMENT OF UNIVERSITY GRADUATES
AND NON-GRADUATES BY TYPES OF ORGANIZATIONS

ORGANIZATIONS	GRADUATES	%	NON-GRADUATES	%	TOTAL	%
Central Government	153,000	54.0	564,000	27.0	718,300	30.0
Public	117,200	41.0	1,474,600	71.0	1,591,800	67.0
Private	6,400	2.0	17,400	0.9	23,800	2.0
Joint Venture	3,900	1.5	11,000	0.6	14,900	0.6
Foreign	2,100	0.8	4,400	0.3	6,500	0.3
Local Government	1,600	0.7	2,100	0.2	3,700	0.1
Totals	284,200	100.0	2,073,500	100.0	2,357,700	100.0
%	12		88		100	

Note: All numbers have been rounded off to the nearest 100.

The majority of graduates was employed in Central Government (54%) and Public (41%) organizations. Private companies accounted for 2%, Joint Ven-

tures 1.5%, Foreign 0.8% and Local Government 0.7% of the graduates. Their distribution by sectors was: Productive group 39%, General Services group 38%, Higher Education group 23%. For non-graduates, it was Productive group 69%, General Services 27%, and Higher Education 4%.

Fundamentally all users and their needs are important. They all merit careful attention. From a practical and realistic point of view, however, in undertaking a design effort of the proportions of a national information system it is essential that appropriate priorities be established. This is especially true where, as now, available time and financial, physical and human resources are limited. It is reasonable, therefore, to focus on the constituencies and needs of the Central Government and Public sectors, since these account for 95% of current and prospective users. Furthermore, if the needs of this majority are taken care of, there is a high probability that most of the requirements of other users will also be accommodated.

Egypt's national information policy, as it may develop in the future, is not expected to rest upon the uncertain comfort of statistical probability. The Foreign and Joint Venture sectors are small but they are also economically significant. The availability of information in these areas will have an important bearing upon the success of business activities in this part of the economy. Local Government also involves a small segment of the user population. However, the importance of local institutions may necessitate special efforts to develop greater information availability in this area. These are examples of larger issues that will command the attention in the future of those executives who will be directing the operations of Egypt's national STI system.

In identifying their job assignments, 28% of the survey respondents claimed responsibility for managing departments or other organizational entities. About half (53%) of the university graduates and two-thirds of the non-graduates held jobs as managers.

Those who conducted scientific, social or economic research comprised 20% of the survey sample. Another 12% were engaged in engineering development. In this category, 17% of the graduates and 14% of the non-graduates were classed as scientists or engineers.

People in the teaching profession were 16% of the sample. In this case, 16% of the graduates and only 2% of the non-graduates held jobs in this field.

The other job tasks in the survey sample were technical, economic or social programs planning (12%), consulting and advising (6%), and others not classified (6%). In these areas, 15% of the graduates and 17% of the non-graduates were employed.

To summarize, 84% of the people who comprise the total survey sample occupy executive, management, research, engineering and teaching positions. These are the individuals who may be expected to justify the development of, and benefit directly from, a national STI system. In order to get further insight into the characteristics of users and prospective users, data were collected on the level of education attained by managers, professors and teachers, scientists and engineers, consultants and advisors. Of the total sample, 46% had a first level collegiate (bachelor's) degree. Master's, doctorate or other post-graduate degrees were held by 42%. The remainder of the sample (12%) presumably had lesser levels of secondary or vocational school education. Among those who held advanced degrees were professors and teachers (44%), managers (34%), and scientists and engineers (14%). Two-thirds of all managers earned at least the bachelor's degree. From this it may be concluded that, although job pressures may tend to make managers less habituated as information users compared with other professionals, they may nevertheless be expected to be at least intellectually receptive to the concept for the greater good of their organizations.

When asked if information was essential or important in their jobs and in those of their associates, 56% of all respondents said "yes." Managers were the most favorably inclined (60%). The affirmative response of the others was: Scientists 57%, Consultants 57%, Professors and Teachers 52%. An indication of greater support might have been hoped for, especially from those engaged in teaching. One may speculate, in the absence of any more conclusive data, that the answer given reflects some frustration with the information resources that are currently available. There may also be some pessimism as to the outlook for the future. On the other hand, the recognition of the importance of information given by managers is encouraging.

In addition to data gathering by means of the survey questionnaire, a number of personal interviews were conducted by the principal investigators of this study. Meetings were arranged with executives and managers of government agencies, laboratories and public sector organizations. The objective was to plumb in greater depth some of the problems alluded to in the questionnaire. Particularly important were managers' views as to the significance of acquiring and applying new information in fulfilling job responsibilities. Among the chief conclusions of these conversations were the following:

- o Egyptian workers have the intelligence, dedication and capability to succeed in their work.
- o The availability of information products and services, and access to books and other resources, while improving, has been limited up to the present time.
- o As a result of this fact and their education and training that has been conditioned by it, a generation of managers, professionals, government administrators and others has grown up and is at work seriously handicapped by the lack of information. The scope of their possible achievements is limited by their limited work perspectives. These people do not expect to have wide-ranging information resources available to them. Therefore, they do not attempt to seek or use new information. They succeed in their work pragmatically to the level of their expectations, lacking awareness of what has been achieved elsewhere that might be of use to them. They do have a sense of self-esteem, and rightly so, for what they do accomplish. But, because of their sense of frustration, they are not motivated to reach out to higher, riskier levels of achievement.
- o There is general recognition at the executive level that Egypt's social and economic development requires knowledge and application of the broad scope of technologic progress in the world to its own needs.
- o Greater importance and use will be accorded information products and services when a reliable and suitable access system is demon-

strably in place and functioning. There is no doubt that a fundamental relationship exists between information availability and achievement of the nation's greater goals.

To summarize, the survey has indicated that Egypt has a substantial number of prospective and potential information users. Most of them are employed in the Central Government and Public sector groups. In terms of the size of the user population, the following sectors are especially noteworthy:

<u>Productive Group</u>	<u>Higher Education Group</u>	<u>General Services Group</u>
Mining & Metallurgy	Biomedical Sciences	Finance & Banking
Foodstuffs	Pure Sciences	Mass Media & Tourism
Building & Construction Materials	Engineering, Math. & Computer Sciences	Transportation
Petroleum & Petrochemicals	Arts, Social Sciences & Humanities	Justice, Social Affairs & Public Order
Textiles	Law, Political Science & Economics	Public Health
Chemical ceutical	Agricultural Science	Public Utilities

Within these sectors those who have the greatest need for information are the ones whose jobs entail managing, planning, research, development and teaching.

The next chapter goes further into the details of information requirements and problems associated with gaining access to information.

III. INFORMATION NEEDS

In measuring the information needs of people engaged in important work in Egypt, those who were surveyed were asked to think not only of themselves, but also of their organizations. In other words, they were asked to comment on the information requirements they believed to be characteristic of individuals in their organizations who performed functions and tasks similar to their own. They were thus encouraged to be even more analytical and careful in the responses they made. By expanding their point of view in this way, they were also led beyond their own immediate needs, and they provided a certain sample size multiplication factor. There was, of course, some possibility that their answers for the group would be slanted toward their personal bias. However, the survey results that finally emerged reflect a pattern of consistency that justifies credibility.

Overall, reports of scientific, social and economic research and development programs and results were regarded by the survey respondents as being the most important or essential to their current needs (78%). Running a close second were education and training materials relevant to the individuals' fields of study or work (70%). Needed almost as much were information and data related to program planning, policy formulation and management decision-making (61%). There seems to be a distinct quantitative division in the responses between the need for future-oriented and problem-solving information, and information that is related to current operations and pragmatic applications. In the latter segment, operational experiences derived from organizations and individuals in the same or similar industries or activities were given a lower priority (49%). Descriptions of current manufacturing and production processes, equipment, standards and techniques were somewhat similarly regarded (45%). Of least interest or requirement were economic, financial or demographic data used in trade or commerce (32%).

These overall results were analyzed further to determine what types or kinds of information were most important to each of the occupational categories into which the survey respondents fell. As might be expected, managers required information for planning, policy-formulation and decision-making. Along with this, research and development reports were high on their list. Scientists' and engineers' prime requirements were for research and

development reports and technology notes. People in the teaching profession pressed their need, first of all, for research and development reports and education and training materials. Those employed in advisory and consulting positions regarded planning and decision-making information and reports of research and development most important to their needs. People classed in the "other" job category claimed that their greatest need was for education and training materials and information on current operating experiences.

In each of the job categories, education and training materials, information on current operations experience, and management information, if not regarded as critical, were nevertheless considered to be important to individuals' needs. Data on trade and commerce were consistently rated as being of less importance.

Those who reported the most difficulty in obtaining the kinds of information they needed were managers, people engaged in research and engineering programs and professors and teachers. The other job categories were represented in a significantly smaller proportion. But they constituted that same proportion when the sample was asked if the information needed were easy to come by. It seems reasonable to assume from this that people engaged in planning, advising and in comparable jobs are not among the most active information users.

The most difficult kind of information for those in all of the job categories to obtain, by far, was reports of current scientific, social and economic research and development programs. Standing next in order of difficulty were relevant education and training materials, and information required for management planning and decision-making purposes. In other words, the kinds of information that were generally regarded as being the most important or essential were the most difficult to obtain. Information of a practical or operating, experience nature, descriptive information about products and manufacturing and data for trade and commerce were reported as being somewhat less difficult to get. However, in view of the relatively low interest level evidenced for this type of information, it is reasonable to assume that generally less effort was expended to acquire it.

An important part of the survey was the attempt to discover what were the practical problems the respondents had in trying to get the information

they needed and requested. Their replies were illuminating! More than two-thirds of the responses cited these as the major problems: (1) it takes too long to obtain what is needed; (2) the requested information is said to be not available; (3) the information is out-of-date by the time it is obtained (and thus has lost much of its practical value). The expense of acquiring information and the language in which it appears are not regarded as significant problems. A small but noteworthy number of respondents did acknowledge that they were unfamiliar with information systems and thus had some acquisition problems.

As to job categories, people employed as managers, research scientists and teachers reported having the most difficulty in acquiring the information they needed at the time they needed it. Those engaged as engineers, planners, advisors and in comparable jobs reported less difficulty in each of the problem areas. Again, the assumption may be made that these people are not more skillful than information seekers. On the contrary, they are less active as information users.

When asked what sources of information are being used at the present time to meet their needs, respondents indicated that sources within their organization were used almost as frequently (36%) as those located elsewhere in Egypt (39%). Sources outside of Egypt were also called upon a substantial number of times (20%). Only in a relatively few cases (5%), where a serious attempt was made to locate a source of information, was it indicated that no source was available.

Across all job categories books, monographs and scientific and technical journals were universally regarded as the most necessary and important sources of information. Next in order were proprietary technical reports, university dissertations and theses, and publicly available technical reports. Regarded as being of least importance as information sources were trademarks, radio, patents, audiotapes and records, and television. Between these extremes were product catalogs, handbooks, standards, directories, and publicly available abstracting and indexing journals. Trade publications, data banks and library accession "tools" were not highly regarded.

The national social and economic sectors that were the most frequent users of the various information sources were:

Foodstuffs

Mining & Metallurgy

Other General Services organizations

Biomedical Sciences

Public Health

Arts, Social Sciences & Humanities

Textiles

Chemicals & Pharmaceuticals

Petroleum & Petrochemicals

Engineering, Mathematics & Computer Sciences

The sectors that reported the least frequent use of information sources, in descending order:

Sports & Recreation

Communications & Telecommunications

Justice, Social Affairs & Public Order

Education

Housing

Paper & Printing Materials & Equipment

Other Productive Organizations

Commerce, Management & Business Administration

Finance & Banking

Law, Political Science & Economics

Despite a general recognition of the need for information in industry, business, public, government and social affairs, its actual use is a fragile matter. If it is too difficult to obtain, it will not be sought. If it is in a form that is too inconvenient to use, or if its substance is too difficult to interpret, it will not be used. If people are too frequently faced with such problems in getting and using information, their unresolved frustration will convert them into non-users.

Perhaps the greatest frustration of all is experienced when a request is made for some specific information that is known to exist and may be available, but it takes too long for the item to be delivered. Finally when it does arrive, it is no longer needed. This kind of experience drives the frustration level up at least one more notch.

The survey delved into this problem to see how serious it was, and to get an idea of what remedial action might be appropriate and useful. The people who are, and may be, expected to be the chief clients of the national information system: managers, scientists and teachers, testified to the difficulties they experienced in obtaining needed information. In personal interviews, managers and other executives confirmed that they and their subordinates indeed did suffer a continuing frustration of a high level in trying to get required information. They acknowledged that the quality of their work declined directly as a result. They pointed out that the morale of their employees, especially their professionals, was seriously affected. Regardless of how competent and well motivated they are to start with, continuing frustration wears down their resolve. After a while their incentive to excel is blunted and creativity and innovativeness dwindle.

The greatest problem that must be dealt with is that it takes too long a time to obtain information. Most keenly felt is the problem of getting timely delivery of current and relatively recent issues of scientific and technical journals. Next most frequently mentioned were proprietary technical reports, books and monographs, and manuals. In the middle ground were university dissertations and theses, standards, product catalogs, directories and handbooks.

There was general dissatisfaction in all of the job categories surveyed with the quality of the information delivery system that had to be depended upon at the present time. Particularly those who managed departments, conducted scientific, social or economic research, and taught students complained of specific problems. The information that they needed either was not available or it was known to exist but could not be obtained. Often the source of the requested information was not known and it was reported that it was too difficult or not possible to locate the information. Thus, too frequently when people did make an effort to get and use information, the inadequacies of the present supply system stymied them.

In telling of their frustrations, the intentions of the respondents were not to indict librarians or other information specialists. Rather their message was, they realize that they must keep abreast of world-wide technological progress and they need a system to help them.

When information users encountered problems in obtaining the materials they required, about half of them (actually 51%) turned to others within their organizations for assistance. Within this group people engaged in development, design or operation of products, processes or machinery (69%), and in planning technical, economic or social programs (54%) were the ones who most often sought such help. It was previously noted that these individuals were not among the most active information users. Thus, it may be assumed that when they do recognize that there is a problem they cannot resolve with their personal resources, they may become information seekers. Managers (46%) and teachers and professors (41%) were less likely to turn to others within their organizations for assistance in resolving information problems. One may speculate that persons in these positions may not feel entirely comfortable in asking for such help. Or, being in a position to be knowledgeable about their organizations, they may know that the information they seek is not available there.

When assistance was requested from within the respondents' organizations, most of the time (51%) it was the individual's supervisor who was approached. Less frequently (31%) was help sought from colleagues or coworkers. Least of all (18%) were subordinates or others asked.

There was a somewhat greater inclination (56%) to look outside the individual's own organization for help in resolving information problems. Most characteristically, those engaged in research (70%) sought outside help. Teachers were similarly inclined (46%). Managers, planners and advisors were in the middle ground. Those engaged in product and process development -- i.e., engineers and technicians -- were less active (39%) in getting help from sources outside their organizations.

When outside help was obtained, most often (55%) it was by means of face-to-face contact; that is, in meetings, in private conversations and in other personal encounters. Use of the mail services to acquire assistance was resorted to considerably less frequently (26%). Telephone communication was depended upon even less (13%).

The survey respondents were asked if they consulted printed or other sources of record to resolve their information problems. About half (54%) answered affirmatively. Again, people involved in research (62%) and teach-

ing (58%) were most inclined. In this case, engineers and technicians followed closely behind (51%). Planners, advisors and managers were at or below the 50% mark.

Most frequently mentioned as information sources consulted, in order, were books, product announcements, manuals, journals and technical reports. For managers and engineers, technical reports and books were noted as their primary resources. Journals and books were what researchers and teachers resorted to most often. Manuals and product announcements were the chief sources for planners and advisors.

Within the list of economic and social sectors, those that made the most use of available sources of current information were:

- Engineering, Mathematics & Computer Sciences
- Pure Sciences
- Biomedical Sciences
- Electrical & Electronics*
- Chemical & Pharmaceuticals*
- Agricultural Sciences
- Arts, Social Sciences & Humanities
- Mining & Metallurgy*
- Law, Political Science & Economics
- Commerce, Management & Business Administration

It is to be noted that seven of these ten sectors are in the Higher Education group. The other three (marked *) are in the Productive group and are sectors that are experiencing an expanding rate of technological progress. They are also sectors of high economic importance to Egypt's future development. Among the sectors that are the least users of currently available information sources are:

- Sports & Recreation
- Furniture & Leather
- Mass Media & Tourism
- Culture & Religion
- Transportation

Following the same pattern that was previously indicated, managers, researchers and teachers in the high use sectors were those to whom information sources were the most important in meeting their work responsibilities.

The final question in the user needs survey asked the respondents to consider the work that they would be engaged in during the succeeding twelve months. With this in mind, what types of information would be essential or most important? As a class, managers were most responsive to the question. People engaged in research and teaching were also helpful in expressing their opinions. Those in the other job categories seemed not to have formed very conclusive ideas on the subject.

There was general agreement that the type of information that would be of the least value in the future, as at the present time, would be economic, financial or demographic data such as might apply to commerce or trade (10%). Reports of scientific, social and economic research and development (23%) and education training materials in relevant fields of endeavor (21%) would continue to be the most important overall. Information to support planning, policy formulation and management decision-making (13%) was regarded as also being important for the future. Descriptions of current manufacturing and production processes, equipment, standards and techniques (14%) followed closely. Operating experiences from organizations and individuals in the same or similar industries or activities (14%) were rated equally.

Policy and decision-making information, research reports and educational materials were most highly regarded as needed for the future by managers and other executives, researchers, advisors and those in the teaching profession. Planners included manufacturing information on their list. Engineers and technicians put greater emphasis on product and process data, practical reports of operating experiences and on reports of scientific and technical research and development.

In all job categories there was recognition of the necessity to apply the latest available information effectively in meeting the challenge of Egypt's continuing development. How this might relate more specifically is explored in the next chapter where the information needs of the Five-Year Plan for Socioeconomic Development are discussed.

IV. FUTURE FACTORS

Egypt's Five-Year Plan for Socioeconomic Development was chosen as the medium for assessing the nature and trend of the country's future requirements for scientific, technical, sociological and economic information. The inherent imperfections, uncertainties, inconsistencies and instabilities of that Plan, and indeed of any similar plan of any other country, are well known and understood. The Five-Year Plan is not, and is not intended to be, an exact or immutable document. Clearly, it must be used with judgment. Any decisions based on it must be tempered with caution.

It is recognized that the Plan is a complexity of "hopes and wishes," politicians' dreams, responses to social pressures and economic necessities, reflections of opportunism, a roadmap for national progress, or all of the above. Nevertheless, in the absence of any better, more precise, more coherent or more authoritative document it serves adequately as a pragmatic tool to be used to learn something more about the nation's probable future information requirements.

Thirty projects were selected from the Plan as a sample to be studied in detail so as to formulate at least a qualitative idea of user needs for information within the next five years. Appendix II-A summarizes the methodology employed in constructing the sample and gathering relevant data. The projects chosen for the sample were taken from among those of the highest national priority. Collectively, they fairly represent the objectives and character of Egypt's most critical social and economic sectors. The projects that comprise the study sample are listed in Appendix II-B. Appendix II-C contains the questionnaire that was developed as the basis for data gathering in the survey that was conducted.

In order to put the projects in proper perspective and gain insight into their inter-relationships and the scope of the subject matters covered, the sample was arranged according to sectoral classification, as shown in Appendix II-D. Of the total sample, 17 projects were in the Production area, and 11 of these were in the Industry sector. Six projects were classed as Distribution. The remaining 7 were in the Services area. Fundamentally, all of the projects centered on one or another of three main objectives: (1) the

well-being of the populace through the availability of food, housing, health services and transportation; (2) manufacturing of basic needs; (3) the supply of materials and energy essential to industrial requirements.

A further analysis was made of the sample projects in terms of their sponsorship by government ministries or agencies, and the operating responsibility held by organizations charged with their implementation. A table that sets forth this information is presented in Appendix II-E. It also defines each project's stated objective. Clearly, the responsibility for decision-making, planning and organization of the work that is to be done, as well as monitoring project progress, cuts across the entire structure of the government. Particularly heavy management and supervision burdens are carried by the ministries of Land Reclamation, Industry and Mineral Wealth, Development and New Towns, and Electricity and Energy.

Appendix II-F details the current phase of each project, its status, and the nature of the effort being undertaken. The indicated time schedule for the starting and completion of each project, and the intended goals to be achieved are also presented. In order of frequency of mention, these project goals are as follows (words in parentheses refer to Project Goals column headings in Appendix II-F).

1. Add to the nation's production base (Prod)
2. Increase job opportunities for the people (Jobs)
3. Make positive contributions to the benefit of society (Societal)
4. Improve the "Value Added" basis of domestic production (Value)
5. Avoid importation and loss of foreign exchange by substituting domestic production of needs (Subst)
6. Expand exports and foreign trade (Export)
7. Establish new domestic industries and manufacturing capabilities (Indus)
8. Other, including development of foreign investment incentives

Without question, these are laudable and critical national goals. They leave no doubt that the projects must be supported fully to ensure their suc-

cess. It is particularly noteworthy that there is a fine balance among them as to their present standing. Of the total sample, 11 projects are in a feasibility study phase and 11 are already in the construction phase. Four of the remaining eight are in Research, three are in Development and one is in Design. More than half of the Production projects are in the feasibility phase. The others are: Construction - 4, Development - 2, Design - 1, and Research - 1. Five of the six Distribution projects are in the Construction phase; the other is in Development. The Services projects are divided as follows: Research - 3, Feasibility - 2, Construction - 2.

Eighteen of the 30 projects are classed as New undertakings. Seven are in the process of expanding their scope of activities, three are continuing at their present rate of effort, and two are being brought to completion. As to the technical nature of the sample projects, 11 claim to involve the application of New Technology. Another 10 are in the process of increasing the level of effort and technical sophistication being applied (upgrading the effort). Four are changing the direction of the technical effort and the technology employed, and 4 others are continuing in the same pattern as at present. One remaining project is identified as a recycling rather than a new technology effort.

The factors cited above begin to bring into focus future requirements for information. More than half of the projects in the sample are in an early stage when decisions have to be made as to the directions in which they must be guided. The majority of the sample entails new and expanding social and technical efforts. To this same degree the projects involve what is described as New Technology, or a redirection in order to take advantage of more modern technology.

Appendix II-C takes a closer look at the technologies that underlie the projects, their availability in Egypt, and any identifiable impediments to their use in the project work. Where personnel indicated that a technology was available to them, it was understood that they were satisfied with the quality and format of the relevant information. In those cases where the answers given indicated that the technology was only "partly" available in Egypt, the delivery of needed information and other factors related to that were judged to be inadequate to present requirements and were likely to be even more of a problem in the future. Where the applicable technology was

not available, the success of the projects and the attainment of their goals were in serious jeopardy. The most frequently mentioned barriers to the effective application of the technologies underlying the projects were lack of skilled manpower trained and experienced in the fields relevant to the projects. To a lesser degree there was a lack of appropriate equipment and machinery. In a number of cases it was recognized that the present state of the art in Egypt was not yet up to the level required to make the most effective use of the applicable technology. In other instances the non-availability of data, and restrictions imposed by contracts and patents limited the use of applicable technologies.

It is evident, however, that the success of the sample projects does not rest on the availability of new scientific discoveries or technological breakthroughs. Where "New Technology" was called for in the sample survey, the reference is to a technology which may not be generally available in Europe, Japan, the United States or elsewhere in the world. But, in some instances the needed information is, in fact, resident in Egypt. It may be unused or unusable because data files are unorganized or not fully indexed. Files may be incomplete, too difficult to access, or potential users may not know where to go for the information or assistance they need. These factors of user frustration, along with the lack of trained manpower, experience and equipment which were mentioned previously, constitute significant limitations on the effective implementation of Five-Year Plan projects.

Although the Five-Year Plan may be to some degree incomplete and subject to change as previously mentioned, it is nevertheless instructive to note that, where amounts of funding have been indicated, the sample projects represent a national investment in the future of more than three billion Egyptian pounds. This figure is indicative of the order of magnitude of the effort; the needs of all of the Plan projects are yet to be determined. These details are contained in Appendix II-H. Also shown there are the "partnership" arrangements between government and other participating agencies involved in cosponsoring each project, and the additional information or support needs that have been identified.

The principal conclusions drawn from this study of a sample of Egypt's Five-Year Plan for Socioeconomic Development are presented and discussed in the section that follows. They highlight critical areas of consideration

that must be taken into account in planning for the country's future.

1. A prime requisite is information that supports decision-making.

A major share of the sample projects are in the feasibility study phase. By extension it may be fairly assumed that this is also true of the majority of all projects in the Five-Year Plan. Thus, the Plan itself is at a stage where important decisions must be made as to, for example, technical objectives to be achieved, levels of effort to be made, appropriate funding, time schedules, staffing, manpower mix and facilities and resources to be applied. A major consideration is an estimate of the probable success of each of the undertakings before any commitment is made to starting a project.

These are difficult decisions. Mistakes can be costly in terms of wasted time, money and human effort. In the best of cases there is no one clearly superior or correct answer to be attained. What must prevail is wisdom, experience and judgment that balances the problem at hand with the experiences and achievements of others who have faced the same or similar design situations. This is where access to relevant information becomes essential.

A mechanism is needed to make available the information that can help the decision-making and planning process in all of its stages. The pay-out could be better decisions arrived at more quickly, and thus faster project starts with greater certainty as to the directions to be followed.

2. Information of a practical, readily applicable nature is most important.

It is evident that, while the Five-Year Plan projects cover the spectrum of knowledge from basic research to the paving of roads, the specific goals to be achieved are essentially uncomplicated and pragmatic. The greater share of the effort is directed toward the Industry and related sectors that comprise the Productive segment of Egypt's economy. It follows from this that if in designing a national information system a choice of alternatives would have to be made, the Plan would be served best by the availability of information of the type that could be put to use most directly. That system should make it possible to gain access to the needed information in the most timely fashion supplying not only locally generated documents and data, but also that from around the world. Specific responses should be provided to

specific queries.

An ancillary to this may be joint venture arrangements. As a formal part of such projects, provisions should be made by the partners involved to supply and share required information, thus accomplishing an effective transfer of technology.

3. Information on project management techniques can contribute significantly to Plan progress.

The management of complex projects has developed its own "technology" in recent years. Advanced techniques and methodologies, some computer-based, have been reported on in technical journals and in specialized monographs in several countries. Some of the topics touched on deal with the kinds of matters that are as yet to be decided in some of the Plan projects. One item, for example, is project funding and budgeting. Another is precise time scheduling and progress monitoring. The benefits that may be realized from these management techniques include the opportunity to apply prompt corrective action as may be warranted and better predictability of project results. This is the kind of information all project managers should have.

4. A positive education and training program is needed to create a new pattern of information awareness and use.

The sample survey disclosed a significant lack of understanding among project personnel of the functions and benefits of an organized, effective information system. There was substantial skepticism that such a system could actually be of help to them in their carrying out their work responsibilities. The following observations made by survey interviewers describe some aspects of the project environment.

- o Decisions are most often made on the basis of orally transmitted directions and on archaic information, perhaps first learned from school textbooks, that is used over and over again uncritically.
- o Project managers are doubtful that new, useful information can be obtained. They are not inclined to make the effort to get new information for themselves, and they do not encourage their staffs to

make such an effort. They tend not to make information they use in their own operations available to others outside their organizations. They are skeptical that new information would be of much help to them anyway. At the very same time, however, they do acknowledge that there is a great deal of good information available elsewhere in the world that comes from ongoing research and technical development. If it could be accessed they would like to have it, they could make good use of it, and it would probably make an important difference in the quality of their own operations. But they are resigned to the situation in which they are at the present time. In other words, these people are saying they are frustrated in trying to cope with their work environment and are not highly motivated to seek a change.

- o The present state of information availability is discouraging: information resources are not well managed, files are disorganized, documents are often misfiled or lost or otherwise not obtainable, the flow of information from known sources is unreliable. The result is that people do not expect to find the information they need. After a period of frustration, they get out of the habit of being information users.
- o Administrative obstacles often tend to hinder the flow of information to users.
- o Problem-solving seems to be handled on an ad hoc basis. Advance planning in starting up a new project is not consistently followed. An initial search of the literature to avoid duplication of effort or to take advantage of knowledge and experience gained elsewhere is generally not practised.

The picture that emerges from the above comments, perhaps somewhat overdrawn but nevertheless indicative, is one of frustration. But it also draws the outlines of an opportunity to take action to bring about improvements that can contribute importantly to the fundamental objectives of the Five-Year Plan. The conclusions presented above along with those discussed in the next chapter are some of the "future factors" that must be considered in the design of Egypt's national STI system.

V. CONCLUSIONS

The data produced in this study are inherently consistent and clear in their implications. They are broadly representative of the larger environment from which they have been drawn. Moreover, they parallel to a substantial degree the results obtained from comparable user requirements studies made in other countries in recent times. This confirmation provides a high level of confidence in the present survey findings. Accordingly, it has not been necessary to apply weighting factors to the data or to engage in complex statistical analyses in formulating the major conclusions presented below.

1. There is a pressing need for a comprehensive, coordinated information system in Egypt.

Egypt does not have such a system at the present time. It has individual services, such as university libraries. But these have not been designed or organized, staffed or equipped with the purpose of catering to the multifaceted needs of a broad information user population.

That there is an insistent need now for a comprehensive system is clear from an analysis of present activities of the organizations that make up the sectoral components of the nation's economy. The requirements of the Five-Year Plan projects add emphasis to the situation. Egypt is reaching out aggressively across a wide spectrum of new technologies to meet the challenge it has set for itself in attaining its socioeconomic development goals. New information, much of it accessible from other countries, is needed to advance the state of the art here. The scope runs the gamut from basic research to, for example, the installation and repair of factory machinery. Subjects of interest touch on every aspect of human endeavor.

Because the scope is so broad and pervasive, the system that is needed must be particularly well organized and managed if it is to be both cost effective and satisfactory in its operations. Whether the design finally decided upon calls for close integration or a wider decentralization, a prime feature must be the provision of effective coordination of the interdependent parts of the system.

2. Positive action is needed to reawaken user interest in new information.

A majority (56%) of user requirements survey respondents acknowledge that information is essential or at least important in their work. But a significant number said it was not important. Almost half of the professors and teachers answered in this vein.

The study of the Five-Year Plan showed many of the projects dependent upon "New Technology" and, hence, upon new information. But in discussing their needs with survey respondents, interviewers were frequently faced with a skepticism that information could be useful.

These contradictions were pursued further for a rational explanation. The answer seems to be that a generation of managers, professionals, government administrators, teachers and others have grown up and are at work handicapped by the lack of adequate information resources. They have become accustomed to being frustrated. They no longer expect to have valid sources of information made available to them. As a result, many of them have ceased to seek for or use new information. They succeed in their work to a level that may be limited by knowledge they have personally gained or by the experiences of their immediate coworkers. Nevertheless, their potential for achievement, given a broader base of information to work with, is so much more.

One of the government ministry executives who was interviewed summed up his outlook this way: "Greater importance and use will be accorded information products and services when a suitable access system is demonstrably in place and functioning." In anticipation that such a system will be forthcoming in a reasonably short time, it seems appropriate that a cognizant Egyptian authority begin now to plan for a general education and training program for users to break through their present malaise and stimulate a new sense of intellectual enthusiasm.

3. The primary target user group is made up of university graduates employed in Central Government and Public organizations.

Although only 12% of the people in the requirements survey sample were university graduates, there is a high probability they as a class constitute the largest share of actual and prospective information users. More than half of this group holds executive or managerial jobs. Another 33% are scientists, engineers, professors or teachers. The remainder occupy other professional positions. Almost all (95%) of the graduates are employed in

Central Government agencies or by Public sector organizations. These are the people who may be expected to benefit the most from the availability and use of a national information system.

This conclusion is supported by studies of user behavior made in other countries which have frequently indicated that non-graduates, as a group, tend to be non-users or infrequent users of organized information products and services. It is equally evident that a college education will not, per se, guarantee a confirmed user. Nevertheless, graduates are more likely to be employed in jobs where recourse to new information is or should be essential to the work. Graduates, also, are more likely to move ahead faster to jobs of greater scope and influence. Therefore, it is reasonable to consider this group as constituting, now and in the near future, the preponderant segment of information users.

4. The target sectors are those in the Production, Higher Education and General Services areas.

In terms of size of the production of actual and prospective users, the following sectors merit priority consideration in the delivery of information products and services by a newly established national information system:

<u>Production Group</u>	<u>Higher Education Group</u>	<u>General Services Group</u>
Mining & Metallurgy	Biomedical Sciences	Finance & Banking
Foodstuffs	Pure Sciences	Mass Media & Tourism
Building & Construction	Engineering, Mathematics, Transportation	
Materials	& Computer Sciences	
Petroleum & Petro- chems	Arts, Social Sciences & Humanities	Justice, Social Affairs and Public Order
Textiles	Law, Political Science	Public Health
Chemicals & Pharma- ceuticals	& Economics Agricultural Science	Public Utilities

These sectors also encompass many of the areas of interest of the Five-Year Plan. However, most of the Plan projects have specialized information requirements. Therefore, their needs merit particular attention in considering the design of a national system.

5. Research reports and educational materials are the most desired kinds of information.

In the list of the kinds of information the survey respondents considered to be of prime necessity, standing first were reports of scientific, social and economic research and development programs and results. Education and training materials in relevant fields of activities were next in line. A close third was information on program planning, policy formulation and management decision-making. In addition, scientists and engineers and those engaged in the conduct of Plan projects gave a high score to documents and data related to operational experiences associated with technologies that were the same as or similar to those with which they were involved. They also desired descriptive information on production processes, equipment, facilities, standards and advanced manufacturing techniques.

The media regarded as the most important for the transfer of these kinds of information were currently published books, serial journals, proprietary technical reports and graduate dissertations and theses. Product catalogs and up-to-date handbooks, manuals and directories were also identified as important information sources. However, these items were also said to be the most difficult to obtain either regularly or when needed on a special request basis. In other words, the kinds and sources of information that were most important to getting the job done were most often the least available.

The major problems users had to contend with were: (1) it takes too long to get the requested information, (2) information that is requested is often said to be not available, (3) because of the long wait, when requested information finally does arrive it often is no longer useful. It is especially noteworthy that the cost of obtaining information and the foreign language in which documents may be published are not considered to be significant problems.

6. Future needs parallel and extend from current information requirements.

This study has not disclosed requirements that are vastly different from current needs. Putting it another way, steps taken now to strengthen and improve the availability and quality of information products and services to support current productive, higher education and general services re-

quirements will at the same time lay the basis for meeting the needs that will be developing in the next five years. The same kinds of people (i.e., executives, managers, scientists, engineers, teachers and others) will still need the same kinds of information (i.e., policy and decision-making data, research reports, education and training materials, etc.). The scope of their subject matter interests, however, will be broader.

What should be different is a greater awareness and use of information. To accomplish this users should be able to specify their needs more explicitly, and the supply system should be able to respond more promptly and satisfactorily. The medium of response may be not only the customary printed document, but also the electronic technology of up-to-date information systems. The resources called upon to meet the needs may be those of Egypt as well as those of the region and the rest of the world.

VI. RECOMMENDATIONS

The recommendations that stem from the findings and conclusions drawn from this study are basically straightforward. They are achievable utilizing currently available technological resources. Their timely realization will provide a sound basis, now and for the future, for the attainment of the nation's essential goals.

1. Establish a system by which users can gain access promptly to required information.

This system should be a primary link between users at their place of work and sources of information wherever they are located. The effect will be to increase the store of knowledge available to the individual, and also to lengthen his reach to touch others around the world engaged in the same or similar kinds of work. The impact will be to advance the state of the art to the leading edges of the technologies essential to Egypt's socioeconomic development.

2. Focus the initial system design upon immediate needs, but provide the basis for a logical expansion of coverage and scope.

To start with, the system network should connect priority users with Egypt-based information sources. Those users have been previously identified as being managers, scientists, engineers and teachers in selected Productive, Higher Education and General Services sectors and in Plan projects. The initial sources to be used in the system include the National Information and Documentation Centre (NIDOC), university libraries and similar agencies. The link to the users is made up of appropriate communications channels, computer control and related equipment, and terminal devices selected for their system and human factors compatibility features.

The design must be considered, however, as accomplishing two objectives at the same time: (1) provide a working system for the initial users, and (2) lay the foundation for an expansion of the system, when that is determined to be timely and cost justified, to other users in other geographical locations and to other information sources outside of Egypt. Typical of such outside

sources are databases maintained by private enterprise organizations and by institutional organizations, such as technical analysis centers and inter-governmental bodies.

3. Guide the development of the system by means of a comprehensive national information program.

Once the basic system design is decided upon and the starting point is agreed to (that is, the initial users to be served and the initial information sources to be made available are identified), further system development should be scheduled and executed in accordance with an overall plan. New subscribers (users) should be acquired and their information needs should be profiled. New and additional information sources should be brought into the system if, when and where justified by a demonstrated requirement. Information user education and training curricula should be developed and implemented in appropriate settings to keep the spirit of intellectual inquiry alive and stimulated.

Research and technological developmental activities in Egypt and abroad should be monitored to discover at an early stage newly emerging kinds of information that the system might be called upon to supply in the future.

Information technology itself should be closely studied, and the quality of the system's performance should be continuously reviewed to ensure that the nation's needs are supported at a high level of capability.

Each of these aspects of performance should be provided for as individual components that together constitute an integrated approach to Egypt's national STI system.

Egypt's Economic SectorsProductive Group

Agriculture
 Textile
 Petroleum & Petro-
 chemical
 Chemical & Phar-
 maceutical
 Paper & Printing
 Materials/Equip.
 Foodstuffs
 Mining & Metallurgy
 Building & Construc-
 tion Materials
 Furniture & Leather
 Electrical & Electronic
 Other Productive

Higher Education Group

Arts, Social Sciences &
 Humanities
 Pure Sciences (1)
 Biomedical Sciences (2)
 Engineering, Math. &
 Computer Sciences
 Agricultural Science
 Law, Political Science
 & Economics
 Commerce, Management
 & Business Administration
 Other Higher Education

General Services Group

Housing
 Transportation (3)
 Communications & Tele-
 communications
 Mass Media & Tourism
 Public Health
 Justice, Social Affairs
 & Public Order
 Public Utilities (4)
 Finance & Banking
 Culture & Religion
 Education
 Sports & Recreation
 Other General Services

(1) Includes Physics, Chem-
 istry, Geology, Botany,
 Zoology, Astronomy.

(2) Includes Medicine, Den-
 tistry, Pharmacy, Veter-
 inary Medicine.

(3) Includes Marine
 Transportation

(4) Includes Irrigation,
 Electricity, Water,
 Waste Disposal.

INFORMATION USERS REQUIREMENTS SURVEY

Survey Questionnaire Design and Methodology for Data Gathering

The information requirements survey was designed to be administered to executives, managers, research scientists, engineers, consultants, advisors, professors and teachers and other professionals employed in business, industry and government. The survey approach was a structured personal interview. That is, trained interviewers met face-to-face with selected knowledgeable people and used a questionnaire as the interview guide and as the instrument for gathering data in a standardized format.

The major components of the questionnaire were the following:

1. Respondent's occupation and primary job function or task
2. Education level
3. Types of information essential, important or not important to the job
4. Types of information easy to obtain
5. Difficulty in obtaining needed information
6. Relative importance of various information sources (media)
7. Usual source of information currently obtained
8. Information sources that usually take too long to obtain
9. Description of a specific recent work situation or problem in which information was needed
10. Information sources consulted to resolve the situation
11. Information subject areas consulted
12. Future requirements for types of information

In administering the questionnaire, the initial data recorded for each respondent included:

1. Name and title of person interviewed, and name of interviewer
2. Name of respondent's organization, name of the parent organization if any, and organization's mailing address
3. Telephone and Telex numbers of respondent's organization

4. Name and title of organization's executive officer
5. Number of employees in organization
6. Type of organization, i. e., Central Government, Public, Private, Joint Venture, Foreign or Local Government
7. Major sector group, i. e., Productive, Higher Education or General Services; and socioeconomic sector classification

For the purposes of this survey, "information" was defined in very broad and inclusive terms in order to emphasize subject matter content and application usefulness rather than limiting the respondents' point of view to just physical entities such as books, journals, bibliographic indexes or other library "tools". The concept was extended to any fact in any form needed for work purposes that was not currently known or certain to the individual. Furthermore, a distinction was made between information sources (documents and data in any medium in which information is recorded, stored or transmitted) and information types (kinds of information that are relevant to user needs).

The list of information sources includes:

1. Books, monographs
2. Scientific and technical journals
3. Trade magazines
4. Dissertations, theses
5. Handbooks
6. Directories
7. Product catalogs
8. Product announcements
9. Manuals
10. Patents
11. Trademarks
12. Government documents
13. Standards
14. Norms
15. Technical Reports (publicly available)
16. Technical Reports (proprietary)
17. New acquisitions lists
18. Bibliographies
19. Abstracting/Indexing journals (public)
20. In-house abstracting bulletin (circular)
21. Bibliographic database
22. Numeric database
23. Audiotapes and records
24. Television
25. Radio

The list of information types includes:

1. Reports of scientific, social or economic research and development
2. Descriptions of current manufacturing and production processes, equipment, standards and techniques
3. Operational experiences from organizations and individuals in the same or similar industry or activity.
4. Economic, financial or demographic data used in trade or commerce.
5. Information and data to support planning, policy-making and management decision-making
6. Educational and training materials relevant to respondent's field of study or work

Description of Respondent Selection Procedure

The survey was made of individuals employed in and representative of specific organizations that were actively engaged in the socioeconomic sectors that comprise the essence of Egypt's economy. Since the selection of individuals for interviewing was dependent upon initially identifying the critical organizations, that part of the selection process is described first.

In planning the survey with the guidance of the Project Steering Committee and the Central Agency for Public Mobilization and Statistics (CAPMAS), it was recognized that, in order for the results to be meaningful, data would have to be obtained from each of the 31 socioeconomic sectors determined by the project team members to be essential to the continuing development of Egypt. These sectors are listed in Table A

along with the initial estimate of the number of organizations populating each sector, and the number of organizations in each sector proposed to be included in the survey.

The estimate of the number of organizations populating each sector was based on the expert opinions of the Egyptian team members and also upon a detailed review of the following Egyptian and regional directories:

1. Research Centres
2. Companies and Institutions
3. ABC
4. IDCAS Survey
5. Cairo Telephone Index
6. Directory of Government and Public Sector Organizations
7. IDCAS Library and Documentation Centre Directory
8. Guide to Industrial Information Sources
9. Guide to Egyptian Academicians
10. Arab Consulting Firms
11. NIDOC Directory of Scientific and Technical Libraries

The second column of figures in Table A presents the number of "parent organizations" initially specified or targeted to be included in the survey. The total of 405 entities was distributed across the 31 sectors in a way designed to ensure that the most significant libraries and other relevant information sources would be covered. A representative cross-section of each of the sectors was also desired in terms of contribution to the Egyptian economy, size, complexity and operational activity of the organizations, diversity of occupations, technological dependency and other critical parameters. The basic criterion was, the information requirements data generated by the survey must be representative and indicative of the individual sectors, and of Egypt as a whole.

Names and addresses of the organizations proposed by the Egyptian project team for inclusion in the target survey sample were listed and forwarded to CAPMAS for concurrence and final selection. The number of organizations that was ultimately decided upon and were, in fact, interviewed is listed in the third column of Table A under the heading "Actual Sample Size". The discrepancy between the sizes of the Target Sample and the Actual Sample is explained by several factors. In some cases, organizations that appeared in the planning stage to be likely survey candidates turned out to be less so when on-site visits were made. In other cases, only part of the questionnaire could be administered and that incomplete data, accordingly, was rejected. The wishes of organizations that preferred not to be included in the survey were, of course, respected. In some instances, the data gathered was aberrational compared with that of comparable organizations; where differences could not be rationalized, that data was excluded. To a lesser extent, administrative, processing and related errors account for some of the differences.

Selection of Individual Respondents to the Information Requirements Survey

Following the selection of a target organization and its agreement to participate in the survey, a project team member called upon the person designated as the one to contact. It was explained that the Information Requirements Questionnaire was designed to obtain data about the experiences, judgements, opinions and recollections of individuals relative to their needs for information in their work. Questionnaires would be administered to three individuals in each of the organizations included in the survey. Those selected for interview should not be employees engaged in the organization's publishing or printing department. Preferably, they should be chosen by the contact person, or by another senior executive, as being the most representative of the nature and character of the organization's activities.

Typically, the team member who would conduct the interviews would ask the contact person to name three individuals in his organization who could knowledgeably discuss the types of information and the information sources they use and need in their jobs. In order to get a broad perspective, the individuals should be selected from among the following job categories (only one person from a particular category):

- o Executive or manager
- o Consultant, advisor or assistant
- o Scientist or engineer
- o Professor or teacher
- o Middle management person: supervisor, foreman, technical specialist or equivalent

As a general rule, the designated contact person was not to be one of those interviewed unless the individual insisted. Interviewers were instructed to try to avoid awkward situations with a remark such as this: "I have been instructed by my supervisor that the questionnaire is not to be administered to the head of an organization or to its chief executive. The reason for this is that we are seeking a broad range of opinions about information requirements particularly from the working level where those requirements most often arise. The types of information discussed in the questionnaire may not be relevant to those who spend a majority of their time in higher level management or top executive positions."

If the contact person insisted that he be interviewed, the project team member was instructed to administer to him one of the questionnaires scheduled for that organization. It was to be strongly urged, however, that the other two interviews would be conducted with others of the organization who best met the survey criteria.

All interviews were to be administered in privacy, in full confidentiality, and in accord with the highest professional ethics. There would not be, for example, any group interviews. If an explanation of this procedure was asked for, interviewers were instructed to emphasize the need for the meetings with respondents to be in a place where quiet reflection and discussion would be possible.

If there were still a problem in conducting the interviews in private, the team member was instructed to state, "The reason for conducting these interviews in private is to allow the respondent to reply to the questionnaire as accurately and as candidly as possible. We will not identify any individual's name or organization in the survey report. All data will be merged, and what will be reported on are the significant facts that emerge from the totality of all the data." If after this statement was made, private interviews were still refused, then no interviews were to be made at that organization. The incident was to be reported to the survey supervisor. A substitute organization might then be selected.

Upon the completion of each interview and the recording of the data pertinent to that meeting, the survey document was immediately turned over to the project team supervisor. The data were reviewed for completeness and accuracy. If there was a substantial question about any item, the interviewer was instructed to make a return visit to the respondent to remove the ambiguity. It was in this initial stage that provisions were made to protect the anonymity of the respondents.

The survey documents were then turned over to the Cairo University Computing Centre for data processing and output reporting. The report matrixes had previously been specified by the project team analysts so as to ensure that the most sensitive and definitive indication of information requirements would be exposed. The output data that resulted, and which are the basis of this report document, are arithmetic in nature. No weighting factors have been applied. The percentages, quantities and other numerical data reported are accurate and significant within the limits imposed by the nature of the survey instrument, the interview process and methodology, and the data gathering, processing and reporting techniques used.

To maximize the prospect that the survey results would be accurate and significant, all interviewers were put through an intensive training session. They were instructed in the questionnaire, interviewing techniques, data recording procedures, and the entire purpose and rationale of the user requirements survey. The numbers of organizations and individuals interviewed are shown in Table B.

Table A. Sector Classification of Egyptian Organizations Proposed For Inclusion in the Information Requirements Survey

Sector	Estimated Organization Population	Target Sample Size	Actual Sample Size
PRODUCTIVE SECTORS			
1. Agriculture	47	15	11
2. Textile	55	15	13
3. Petroleum & Petrochemicals	81	15	12
4. Chemical & Pharmaceuticals	44	20	18
5. Paper & Printing Materials & equipment	11	10	6
6. Foodstuffs	99	30	26
7. Mining & Metallurgical	65	30	25
8. Building & Construction Materials	27	15	10
9. Furniture & Leather	32	20	11
10. Electrical & Electronic	48	15	8
11. Other Productive Sectors	36	15	7
	<u>595</u>	<u>200</u>	<u>147</u>
HIGHER EDUCATION SECTORS			
1. Arts, Social Science & Humanities	84	20	18
2. Pure Sciences	42	15	10
3. Biomedical Sciences	80	30	24
4. Engineering, Math, & Computer Science	39	15	13
5. Agricultural Science	31	10	9
6. Law, Political Science & Economics	12	5	7
7. Commerce, Management & Business Admin.	22	5	6
8. Other Higher Education Sectors	14	5	9
	<u>324</u>	<u>105</u>	<u>96</u>
GENERAL SERVICES SECTORS			
1. Housing	34	10	5
2. Transportation	45	10	6
3. Communications & Telecommunications	4	4	3
4. Mass Media & Tourism	34	11	9
5. Public Health	8	8	8
6. Justice, Social Affairs & Public Order	20	10	10
7. Public Utilities	10	10	10
8. Finance & Banking	87	10	10
9. Culture & Religion	13	10	9
10. Education	6	6	6
11. Sports & Recreation	1	1	1
12. Other General Services Sectors	24	10	24
	<u>286</u>	<u>100</u>	<u>99</u>
Total	<u><u>1205</u></u>	<u><u>405</u></u>	<u><u>342</u></u>

Table B. Information Requirements Survey Sample, By Socioeconomic Sectors

Sector	Number of Organizations Contacted	Number of Interviews Conducted
PRODUCTIVE SECTORS		
1. Agriculture	11	32
2. Textile	13	38
3. Petroleum & Petrochemicals	12	35
4. Chemical & Pharmaceuticals	18	54
5. Paper & Printing Materials & Equipment	6	16
6. Foodstuffs	26	78
7. Mining & Metallurgy	25	75
8. Building & Construction Materials	10	28
9. Furniture & Leather	11	33
10. Electrical & Electronic	8	24
11. Other Productive Sectors	7	19
	<u>147</u>	<u>432</u>
HIGHER EDUCATION SECTORS		
1. Arts, Social Science & Humanities	18	54
2. Pure Sciences	10	30
3. Biomedical Sciences	24	72
4. Engineering, Mathematics & Computer Science	13	38
5. Agricultural Science	9	26
6. Law, Political Science & Economics	7	19
7. Commerce, Management & Business Administration	6	17
8. Other Higher Education Sectors	9	26
	<u>96</u>	<u>282</u>
GENERAL SERVICES SECTORS		
1. Housing	5	14
2. Transportation	6	18
3. Communications & Telecommunications	3	9
4. Mass Media & Tourism	9	27
5. Public Health	8	24
6. Justice, Social Affairs & Public Order	10	30
7. Public Utilities	10	30
8. Finance & Banking	10	21
9. Culture & Religion	9	26
10. Education	6	18
11. Sports & Recreation	1	3
12. Other General Services Sectors	24	70
	<u>99</u>	<u>290</u>
Total	<u><u>342</u></u>	<u><u>1004</u></u>

A. Please state whether or not your work involves the following job functions. Are you a:

1. Manager or executive?
2. Consultant, advisor, or assistant?
3. Scientist or engineer?
4. Professor or teacher?
5. Other (describe):

- A. 1.
2.
3.
4.
5.

B. In which one of these job functions do you spend most of your working time?

Enter:
1 for Yes
2 for No

C. From the following list, please tell me which on the following tasks describes your primary job:

1. Manage a department of other organizational entity?
2. Plan technical, economic, or social programs?
3. Conduct scientific, economic, or social research?
4. Develop, design, or operate products, processes, or machinery?
5. Advise, assist, or consult with others?
6. Teach students?
7. Other (please describe):

B.1.
Enter number

C.1.
Enter number

D. What is your present educational level?

1. Ph.D., Master's or other advanced degree?
2. Bachelor's degree?
3. Other

D.1.
Enter number

E. In the next seven questions, please try to think of organizational, rather than solely your personal, information requirements, that is to say, of information requirements you believe to be characteristic of persons in your organization who perform functions similar to the ones you perform (as indicated in A and B above).

- E.1.
2.
3.
4.
5.
6.

Please look at the list of information types and give the code numbers of those which are:

1. Essential or critical to people like yourself in your organization.
2. Not essential or critical but still important.
3. Not important.

Enter 1,2, or 3

F. Of the essential or important information types, please tell me the code numbers of those which are easy for your organization to obtain, and second, the code numbers of those which are difficult to obtain when needed.

(1 = easy, 2 = difficult, 8 = don't know, 9 = not essential or important)

- F.1.
- 2.
- 3.
- 4.
- 5.
- 6.

G. If any of these essential or important types of information are difficult for people in your organization to obtain when needed, please tell me the reasons why they are difficult to obtain. Is it because the information is:

- 1. Too expensive?
- 2. Not available in a form you can use?
- 3. Not available in a language you can work with?
- 4. Out of date by the time you get it?
- 5. Takes too long to obtain?
- 6. Or is it because you don't know how to obtain the information?
- 7. Other (describe):

- G.1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.

Enter:
 1 = Yes
 2 = No
 8 = Don't know

Are there other types of needed information which are difficult to obtain but which are not on the list?

H. For each of the information sources (on "List of Information Sources") please tell how important the information contained in the source is to you and others in your organization. Is it

- 1. Essential or critical?
- 2. Not essential or critical but still important?
- 3. Not important?

Enter 1,2, or 3

- H.1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

(H. - continued)

- H.11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.
- 21.
- 22.
- 23.
- 24.
- 25.

1. Now, for those sources of information which are essential or critical to your organization, where do people usually have to go to obtain them?

Are they usually available:

- 1. In your organization?
- 2. Elsewhere in Egypt?
- 3. Outside Egypt?
- 4. Not usually available

- | | |
|--------------------------------|--------------------------------|
| 1.1. <input type="checkbox"/> | 1.11. <input type="checkbox"/> |
| 1.2. <input type="checkbox"/> | 1.12. <input type="checkbox"/> |
| 1.3. <input type="checkbox"/> | 1.13. <input type="checkbox"/> |
| 1.4. <input type="checkbox"/> | 1.14. <input type="checkbox"/> |
| 1.5. <input type="checkbox"/> | 1.15. <input type="checkbox"/> |
| 1.6. <input type="checkbox"/> | 1.16. <input type="checkbox"/> |
| 1.7. <input type="checkbox"/> | 1.17. <input type="checkbox"/> |
| 1.8. <input type="checkbox"/> | 1.18. <input type="checkbox"/> |
| 1.9. <input type="checkbox"/> | 1.19. <input type="checkbox"/> |
| 1.10. <input type="checkbox"/> | 1.20. <input type="checkbox"/> |
| | 1.21. <input type="checkbox"/> |
| | 1.22. <input type="checkbox"/> |
| | 1.23. <input type="checkbox"/> |
| | 1.24. <input type="checkbox"/> |
| | 1.25. <input type="checkbox"/> |

Enter 1,2,3, or 4

9 = not essential or critical

J. Finally, for those information sources which are essential or critical to your kind of work, which do you feel currently take too long to obtain?

- J.1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.
- 21.
- 22.
- 23.
- 24.
- 25.

1 = takes too long
2 = does not take too long
3 = not essential or critical

K. Thank you. Now, I would like to shift from information needs of your organization to a specific incident in which you personally had a need to seek information in your work. Please think of a significant situation or problem that arose in your work during the past few months, in which you needed to seek assistance or information. Please describe this situation or problem briefly.

K.1
Enter code number for problem type or leave blank.

- L. Did you seek assistance or information from other individuals employed by your own organization?
1. Yes (continue to M)
 2. No (skip to N)

L.1
 Enter:
 1 = Yes
 2 = No

- M. From whom in your organization did you seek this assistance or information?
1. Your supervisors or superiors?
 2. Your colleagues or coworkers?
 3. The people whom you supervise or teach?
 4. Other (describe) _____

M.1.
 2.
 3.
 4.
 Enter:
 1 = Yes
 2 = No
 3 = not applicable

- N. Did you seek assistance or information from individuals not in your organization?
1. Yes (continue with P)
 2. No (skip to Q)

N.1.
 Enter:
 1 = Yes
 2 = No

- P. How did you contact these individuals?
1. Face-to-face conversation
 2. Telephone
 3. Mail
 4. Other (describe) _____

P.1.
 2.
 3.
 4.
 Enter: 1 = Yes
 2 = No
 8 = No response
 9 = Not applicable

- Q. Did you consult any printed or recorded sources of information to help you solve this problem?
1. Yes (Continue with R)
 2. No (Skip to S)

Q.1
 Enter:
 1 = Yes
 2 = No

R. Looking over the list of information sources, say which sources you consulted.

- | | | | |
|-----|-------------------------------------|-------|--------------------------|
| R.1 | <input type="checkbox"/> | R.13. | <input type="checkbox"/> |
| 2 | <input type="checkbox"/> | 14. | <input type="checkbox"/> |
| 3 | <input type="checkbox"/> | 15. | <input type="checkbox"/> |
| 4 | <input type="checkbox"/> | 16. | <input type="checkbox"/> |
| 5 | <input checked="" type="checkbox"/> | 17. | <input type="checkbox"/> |
| 6 | <input type="checkbox"/> | 18. | <input type="checkbox"/> |
| 7 | <input type="checkbox"/> | 19. | <input type="checkbox"/> |
| 8 | <input type="checkbox"/> | 20. | <input type="checkbox"/> |
| 9 | <input type="checkbox"/> | 21. | <input type="checkbox"/> |
| 10 | <input type="checkbox"/> | 22. | <input type="checkbox"/> |
| 11 | <input type="checkbox"/> | 23. | <input type="checkbox"/> |
| 12. | <input type="checkbox"/> | 24. | <input type="checkbox"/> |
| | | 25. | <input type="checkbox"/> |

Enter:

- 1 = Yes
- 2 = No
- 9 = Not acceptable

S. Thinking back over all the sources of information or assistance you consulted, which of these sectors best describe the subject area(s) of the information you obtained?

- | | | | | | |
|--------|--------------------------|--------|--------------------------|-------|--------------------------|
| S.1.1. | <input type="checkbox"/> | S.2.1. | <input type="checkbox"/> | S.3.1 | <input type="checkbox"/> |
| 2. | <input type="checkbox"/> | 2. | <input type="checkbox"/> | 2. | <input type="checkbox"/> |
| 3. | <input type="checkbox"/> | 3. | <input type="checkbox"/> | 3. | <input type="checkbox"/> |
| 4. | <input type="checkbox"/> | 4. | <input type="checkbox"/> | 4. | <input type="checkbox"/> |
| 5. | <input type="checkbox"/> | 5. | <input type="checkbox"/> | 5. | <input type="checkbox"/> |
| 6. | <input type="checkbox"/> | 6. | <input type="checkbox"/> | 6. | <input type="checkbox"/> |
| 7. | <input type="checkbox"/> | 7. | <input type="checkbox"/> | 7. | <input type="checkbox"/> |
| 8. | <input type="checkbox"/> | 8. | <input type="checkbox"/> | 8. | <input type="checkbox"/> |
| 9. | <input type="checkbox"/> | | | 9. | <input type="checkbox"/> |
| 10. | <input type="checkbox"/> | | | 10. | <input type="checkbox"/> |
| 11. | <input type="checkbox"/> | | | 11. | <input type="checkbox"/> |
| | | | | 12. | <input type="checkbox"/> |

Enter: 1 = Yes
2 = No

T. Consider work you will be doing over the next twelve months. Which of the categories on the list of information types will be:

1. Essential or critical?
2. Not essential but important?
3. Not important?

- T.1.
2.
3.
4.
5.
6.

Enter 1,2, or 3.

INFORMATION TYPES

1. Reports of scientific social or economic research and development.
2. Descriptions of current manufacturing and production processes, equipments, standards, and techniques.
3. Operational experience from organizations and individuals in the same or similar industry or activity.
4. Economic, financial, or demographic data used in trade or commerce.
5. Information and data to support planning, policy-making, and management decision-making.
6. Educational and training materials relevant to my field of study or work.

INFORMATION SOURCES

- 01 Books, monographs
- 02 Scientific or technical journals
- 03 Trade magazines
- 04 Dissertations and theses
- 05 Handbooks
- 06 Directories
- 07 Product catalogs
- 08 Product announcements
- 09 Manuals
- 10 Patents
- 11 Trademarks
- 12 Government documents
- 13 Standards
- 14 Norms
- 15 Technical reports (publicly available)
- 16 Technical reports (proprietary)
- 17 New acquisition list
- 18 Bibliographies
- 19 Abstracting/Indexing Journals (public)
- 20 In-house abstracting bulletin
- 21 Bibliographic database
- 22 Numeric database
- 23 Audiotapes and records
- 24 Television
- 25 Radio

EGYPT'S FIVE-YEAR PLAN FOR SOCIOECONOMIC DEVELOPMENT

Methodology For Sample Projects Selection and Data Gathering

A large share of the work described in the following pages was planned, conducted and supervised by Mrs. Nazli Madkour, Senior Economist at the Industrial Development Centre For The Arab States (IDCAS). She was assisted by members of the IDCAS staff.

Egypt's Five-Year Plan for Socioeconomic Development was selected for study inasmuch as it was an important indicator of the nation's most probable information needs for the future in its most critical sectorial components. The steps that were taken in carrying out the study were: (1) selection of projects from the Plan that were representative of the national economy in a number sufficiently large to be statistically significant but not too large as to be unmanageable in terms of the time and resources available to the study, (2) design of a questionnaire to be used as a guide in conducting personal interviews with senior project personnel, (3) gathering data on the nature of the projects in the sample and requirements for information by the people who carried project responsibility, (4) analysis of those data and the formulation of judgements and conclusions from that analysis. These steps are described in greater detail in the sections that follow.

Project Selection

A primary consideration was that all projects in the sample would be of the highest national priority and would be representative of the country's social and economic development objectives. Accordingly, the Plan was carefully studied. Its entire list of projects was reviewed and discussed with authoritative and knowledgeable persons. Critical factors by which individual projects, their content and objectives could be evaluated were identified. An important consideration was the current status of each project's plan, for example, how far along toward completion were those plans, and how firm was the commitment to fund and implement the project. A preliminary list of selection criteria was devised. These were reviewed with officials and other experts in government and in public and industrial organizations. From this activity and from further study the following parameters were taken as the guidelines for judging the acceptability of a project for inclusion in the sample:

1. Apparent national priority - as indicated by a study of recent speeches and pronouncements made by the President and other top government officials
2. Size of the financial investment in the project
3. Value to be added to the national economy by the results expected from the project
4. Quantity and quality of job opportunities created
5. Conservation of national resources: better use through development of greater productivity, or use of previously untapped resources
6. Application of new technology

7. Generation of exports
8. Avoidance of imports by stimulating domestic production of needs
9. Geographical dispersal of concentrated industry and populace
10. Utilization of rural electrical networks
11. Conservation of water resources and usage
12. Diversion of dependence upon oil to hydro-generation, gas, solar and other energy forms
13. Social betterment (improvement of health services, living conditions, infrastructure, etc.)

These parameters were applied to the total project list with special attention given to making sure that all areas of the nation's economic and social concerns were reasonably represented in the final sample. In view of the stringent time limitations that were imposed upon the study, it was decided that the sample could not contain more than thirty projects. A preliminary sample was then created and tested for significance, data availability, and relevance to the study's overall objectives. Some changes and adjustments had to be made before the final sample was decided upon. The list of projects that comprise the sample is contained in Appendix 11-B.

Questionnaire Design

The questionnaire used in this survey (see Appendix 11-C) evolved in a number of iterations and modifications. The initial design was aimed at identifying the inherent nature of the respective projects so as to disclose the types of information that would be necessary to their success. Additional questions were related to the technologies underlying the projects and the probable sources of information. The intent was to build up an information reference resource that would do two things: (1) indicate the probable direction of future research and development interest in Egypt and thus guide the design of the National Information System, and (2) provide insight as to what technologies will be of increasing importance in the country and thus lay a foundation for building up the information sources of the nation in terms of specific subject matter, documents and data so as to support the requirements.

The draft questionnaire was tested in preliminary interviews to ensure that its structure, content and language were clear and would accomplish the objectives of the study. Where necessary, adjustments were made. A relatively insignificant departure was made from the structure of the other questionnaire reported on in chapters II and III. In this instance, sector classifications conformed to the definitions issued by CAPMAS as being more directly in line with the details of the Five-Year Plan. These sectors are:

Production

- Agriculture and Irrigation
- Industry and Mining
- Oil and Oil Products
- Electricity
- Construction

Distribution

Transportation, Communication, Storage
Suez Canal
Trade and Finance

Services

Housing
Public Utilities
Other, including Public Health, Education, etc.

As to correlation between the sector definitions in this and the previous questionnaire, there was no significant difference in the reported results.

Data Collection

The questionnaires were used to guide structured interviews of senior project personnel that were conducted by trained professional members of the IDCAS staff. In each case, specific appointments were made with the persons who had previously been identified as the ones who were most informed about all aspects of their respective projects, and were most concerned with its successful outcome. Meetings were held in private circumstances between the interviewer and the project individual, and assurances were given that the confidentiality of the conversations would be respected. Factual data were recorded on the questionnaire form at the time of each interview, and any item of uncertainty was either clarified at that time or it was marked as being "uncertain". For example, information on project budgets and manpower requirements were uncertain in many cases, either because the project was still in a start-up phase or the project was subject to further review and redetermination.

Data Analysis

The completed questionnaires were reviewed for clarity and significance of the recorded data. Where it was considered necessary, a call-back was made to the project personnel for elaboration or additional information. The preliminary analysis that was made when the responses were all grouped together indicated several factors that could have an important bearing upon the ultimate design of the National Information System. These issues, along with the results of the further analysis that was made of the survey information, are included in the conclusions presented in Chapter V. Data derived from the questionnaire responses are organized and summarized in Appendices II-B through II-H.

EGYPT'S FIVE-YEAR PLAN FOR SOCIOECONOMIC DEVELOPMENT

Projects Selected for the Survey Sample

1. Potable Water Projects for Areas Other Than Greater Cairo, Alexandria, 3 Canal Zone Towns
2. Network for Connecting Gas to Houses in Cairo
3. Truck and Bus Project
4. Green Revolution Project - West Nubariya
5. Sugar Beet Production - West of Nubariya
6. Grain Silos Project
7. Erection of 8 Units for Soya Bean Oil Production
8. Doubling the Number of Graduates of Industrial Technical Schools
9. Research on Viral and Non-Viral Diarrhea
10. Consolidation of Health Services in Rural Areas
11. Clay Bricks Plant at Wadi El Hay - Helwan
12. Rehabilitation of Spinning and Weaving Company at Mehalla El Kobra
13. Manufacturing Cotton Scraps
14. Petrochemicals Project
15. El Dekheila Integrated Steel Project
16. New Valley Phosphate Project (Abu Tartur)
17. Erection of New Towns: Sadat City
18. Research on Area Development: Regional Planning for Red Sea Governorate
19. Solar Energy Collectors
20. Constructing and Paving Major Roads and Highways
21. Fisheries Project at Lake Nasser
22. Pre-Fabricated Housing at Tebbin Near Helwan
23. Quattamia Cement Project (East of Maadi)
24. Using Drainage Water for Irrigation
25. Extension of the Aluminum Smelter
26. Telephone Exchanges Project in Egypt
27. Constructing and Developing Gins
28. Asswan II Electricity Generation Project
29. Hydro-Storage Project in the Red Sea Governorate (Khashm Al Galala, Ein Sokhna, Suez)
30. Automatic Bakeries at El Nasr City - Balady Type Bread

EGYPT'S FIVE-YEAR PLAN FOR SOCIOECONOMIC DEVELOPMENT

SURVEY OF FUTURE INFORMATION NEEDS

I. PROJECT IDENTIFICATION

A. Sector:

- Production
- Distribution
- Services

B. Sub-sector:

Branch:

C. Project Name:

D. Responsible Government Ministry or Agency:

E. Operating Company/Contractor

Name:

Address:

F. Information Source

Name:

Position:

Address:

Telephone no.:

Name:

Position:

Address:

Telephone no.:

G. Project Description and Purpose:

1. Phase:

- Feasibility
- Research
- Development
- Design
- Construction
- Other (specify):

2. Status:

- New
- Continuing
- Expanding
- Completing
- Postponed
- Other (specify):

3. Nature:

- Up-grading
- Recycling
- Change of Technology
- New Technology

4. Schedule:

Month

Year

1. Start date
2. End date
3. Production starting date
4. Full capacity date

H. Project Goal(s)

- Job opportunities
- Production
- Value added
- Social benefit
- Export trade
- Import Substitutions
- Establish new product/industry
- Other (specify):

Unit	Value Quantity	Remarks

I. Finance:

1. Total Project Investment: L.E. _____
2. a) Local L.E. _____
- b) Foreign Equivalent to L.E. / _____
3. Period of Investment Years: _____

J. Other Agencies Involved:

1) Type:

- Government
- Public Sector
- Private Sector
- Joint Venture
- _____ Public
- _____ Private
- Foreign

2) Specify name(s) of other agencies involved in project, and briefly describe their participation.

II. TECHNOLOGY IDENTIFICATION

K. Technology:

1) Describe technology on which project is dependent:

2) Is above technology and related scientific and technical information readily available in Egypt?

Yes

No

Partly (describe)

3) If answer to 2 above is yes, or partly, where is that information obtainable?

4) What conditions in Egypt may restrict the use of this technology?

Contract conditions affecting technology transfer

Qualified manpower

Experience

Equipment

State-of-the-art

Available knowledge base

Patents, copyright

None

Other (specify):

5) Are alternate sources of this technology available?
Where?

6) Project Budget for:

1. Scientific/technical Information
2. Research/development
3. Education/training

Total

L.E.	No. of Years

% of Investment

III. FUTURE INFORMATION REQUIREMENTS IDENTIFICATION

L. Future Needs

1. New or additional research or development (specify):

To be executed locally?

To be made by country producing technology?

2. What kind of new information is required to carry out this project successfully?

Reports of research in this technology from elsewhere in the world

Reports and data on application experience from elsewhere in the world

Information on alternative technologies

Other (specify):

3. Manpower

Specialization/Skill	No. of Workers	Availability %
- Management		
- Clerical		
- Engineers		
- Technicians		
- Semi-skilled		
- Non-skilled		
Total		

4. Training

Specialization/Skill	No. of Workers	Foreign Training	Local Training
		.	.
		.	.
Total			

5. Equipment:

a) Cost:

b) % of project total investment:

c) Local availability

1. Local equipment, tools, etc.

2. Local maintenance facilities

Yes	No	Partly %

6. Interviewer comments regarding future requirements:

Sector al Classification of Sample Projects

Sector/Sub-Sector/Branch	Project Number/Title
Production	
Industry	
Engineering - Automotive	3 Truck and Bus Project
Services	4 Green Revolution - West Nubariya
Food	5 Sugar Beet Production - West of Nubariya
Food	7 Erection of 8 Units for Soya Bean Oil Production
Materials	11 Clay Bricks Plant at Wadi El Hay-Helwan
Spinning & Weaving	12 Rehabilitation of Spinning & Weaving-Mehalla Al Kobra
Spinning & Weaving	13 Manufacturing Cotton Scraps
Metallurgy - Steel	15 El-Dekhela Integrated Steel Project
Metallurgy - Aluminum	25 Extension of the Aluminum Smelter
Cement	23 Quattamia Cement Project - East of Maadi
Mining, Benefication	16 New Valley Phosphate Project - Abu Tartur
Fisheries	21 Fisheries Project at Lake Nasser
Electricity	
Hydro-electric	28 Asswan II Project
Hydro-storage	29 Hydro-Storage at Khashm Al Galala, Ein Sokhna, Suez
Services - Solar Energy	19 Solar Energy Collectors
Housing	
Pre-fabricated	22 Pre-Fabricated Housing at Tebbin - Near Helwan
Petroleum	
Chemicals	14 Petrochemicals Project
Distribution	
Transportation	
Storage	27 Constructing and Developing Gins
Roads	20 Constructing and Paving Major Roads and Highways
Infrastructure	
Services	2 Network for Connecting Gas to Houses - Cairo
Storage	
Grains	6 Grain Silos
Construction	
New Towns, Services	17 Erection of New Towns - Sadat City
Supply	30 El-Nasr City, Fully Automatic Bakery Lines - Balady Bread
Services	
Infrastructure	
Potable Water	1 Potable Water Projects For Areas Other Than Cairo
Telephones	26 Telephone Centrals
Construction	
New Towns	18 Regional Planning For The Red Sea Governorate
Irrigation	24 Using Draining Waters For Irrigation
Health	
Rural Health	9 Research on Viral and Non-Viral Diarrhea
	10 Consolidating Health Services in Rural Areas
Education	
Technical Education	8 Doubling The Number of Graduates of Industrial Schools

PROJECT SAMPLE: SPONSORING AND OPERATING RESPONSIBILITY

Project Number/Description	Sponsoring Ministry	Operating Company
3 Manufacture of trucks, buses, diesel engines & parts	Industry & Mineral Wealth	El-Nasr Automotive Mfg. Company
4 Land reclamation and distribution; food production	Land Reclamation	Ministry of Land Reclamation
5 6000 tons/day sugar production facility with by-products	Land Reclamation	Ministry of Land Reclamation
7 Build facilities to produce oil and fodder for food use	Industry & Mineral Wealth	Public and private sector companies
11 Produce brick materials and finished products	Reconstruction & Housing	Misr Clay Brick Production Company
12 Improve productivity by replacing old machinery	Industry & Mineral Wealth	Misr Company For Spinning & Weaving
13 Conversion of scrap to thick weaving threads	Industry & Mineral Wealth	Delta Spinning Company
15 Build integrated steel plant - 8000 tons/year of rebar	Industry & Mineral Wealth	--not yet determined--
25 Increase smelting capacity to 166,000 tons/year	Industry & Mineral Wealth	Aluminum Company of Egypt
23 Establish a Portland Cement production facility	Industry & Mineral Wealth	Suez Cement Company
16 Phosphate production, export; develop New Valley area	Industry & Mineral Wealth	--not yet determined--
21 Create an integrated fish processing facility	Development & New Towns	Department of Fisheries
28 Increase power capacity by 270 megawatts	Electricity & Energy	--not yet determined--
29 Generate 600 megawatts of reserve power	Electricity & Energy	--not yet determined--
19 Solar energy demonstration project	Electricity & Energy	Qattara Project Authority
22 Provide housing for the New Towns: "15 May"	Development & New Towns	Pre-Fabricated Houses Company
14 Production of thermoplastics and ethylene	Petroleum	Petrochemicals Project
27 Build 12 new, and up-grade 42 existing cotton gins	Industry & Mineral Wealth	General Org. For Gin Modernization
20 Improve traffic flow and the transportation network	Transportation & Communications	General Org. For Roads & Bridges
2 Gas distribution system for Helwan, Maadi, etc.	Petroleum	William Press & Sons, Ltd.
6 Improve grain unloading, storage & distribution	Supply	DeLanreal Engineering Company
17 Create an integrated industrial city for 500,000 people	Development & New Towns	Development Authority: Sadat City
30 Increase bread production of uniform quality	Supply	North Cairo Flour Mills Company
1 Create a reliable and adequate water supply system	Housing & Reconstruction	General Org. For Potable Water
26 Build new, and up-grade present, replace old centrals	Transportation & Communications	General Org. For Communications
18 Upgrade the standard of living in the Red Sea Governorate	Development & New Towns	SAEC, Paris, France
24 Convert lost drainage water to land reclamation use	Irrigation	Drainage Research Institute
9 Learn the cause of Mirabes and control diarrhea	Health	General Dept. For Central Laboratories
10 Upgrade rural health services - pilot project	Health	General Dept. For Rural Health
8 Fulfill the labor requirements of the Five-Year Plan	Education	General Dept. For Technical Education

PROJECTS SAMPLE: PROJECT DETAILS

#	Project			Schedule		Project Goals*							
	Phase	Status	Nature	Start	End	Jobs	Prod	Value	Social	Export	Subst	Indus	Other
3	Feasibility	Expanding	New Technology	1974	1980		X	X			X	X	
4	Feasibility	New	New Technology	1979	1985	X	X	X	X	X	X	X	
5	Feasibility	New	New Technology	1982	1985	X	X	X		X	X	X	Investment
7	Feasibility	New	Technology Change	?	?	X	X	X			X		
11	Feasibility	New	New Technology	1979	1982		X						Investment
12	Construction	Expanding	Upgrading	1977	1982		X	X		X			
13	Construction	New	New Technology	1980	1981						X		
15	Development	New	New Technology	1979	1983	X	X				X		
25	Construction	Expanding	Upgrading	1977	1983	X	X	X	X	X			
23	Feasibility	New	New Technology	1980	1983	X	X	X	X	X	X		
16	Feasibility	New	New Technology	1981	1985			X	X	X			
21	Feasibility	New	Upgrading	?	?		X	X					
28	Design	Expanding	Same Technology	1980	1984		X		X				
29	Feasibility	New	New Technology	1982	1988		X	X	X				
19	Research	New	New Technology	1979	1982	X					X	X	
22	Construction	Continuing	Same Technology	1974	1978		X		X				
14	Development	New	Technology Change	?	1985	X		X		X	X	X	Investment
27	Construction	New	Upgrading	1974	1985			X					
20	Construction	Continuing	Same Technology	1978	1984	X			X	X			
2	Construction	New	Upgrading	1979	1983	X	X		X		X	X	Safety Storage
6	Construction	Finishing	New Technology	1977	1981			X					
17	Development	New	Technology Change	?	2000	X			X				
30	Construction	Expanding	Same Technology	1977	1980	X	X		X				
1	Construction	Finishing	Upgrading		1981	X	X		X				
26	Construction	Expanding	Upgrading	1980	1984	X	X	X	X				
18	Feasibility	New	Upgrading	1979	1980	X	X	X	X	X	X	X	
24	Research	Continuing	Recycling	1970	1984	X			X		X		
9	Research	New	Technology Change	1980	1983				X				
10	Feasibility	New	Upgrading	1978	1983				X				
8	Research	Expanding	Upgrading	1980	1985	X			X				

* See text for explanation of column headings

PROJECT SAMPLE: TECHNOLOGIES UNDERLYING PROJECTS AND AVAILABILITY IN EGYPT

Project Number/Technology		Available	Barriers to Use of Technology			
3	Automobile, truck and engine assembly and test	Partly	Technology transfer contracts and patent limitations			
4	Land reclamation, irrigation, drainage; food processing	Partly	Lack of qualified manpower, experience, equipment			
5	Sugar production from beets	No	X	X	X	
7	Chemical extraction of organic solvent	Yes	X	X	X	State-of-the-Art
11	Ceramic materials preparation and processing	Partly	X	X	X	State-of-the-Art
12	High speed, high efficiency, automatic machinery	Yes	None			
13	Open-end spinning (not applicable to fine spinning)	Yes	None			
15	Sponge iron produced by direct reduction process	No	X	X	X	Patents, database
25	Electric reduction of alumina	Yes	None			
23	Dry process with pre-calcination to conserve energy	Yes	X	X	X	
16	Underground mining and beneficiation of ore	No		X		State-of-the-Art
21	Japanese automated fisheries operations	No	X		X	State-of-the-Art
28	Hydro-generation systems	Yes	None			
29	Pumped storage, hydro-electric power generation	No		X		
19	Highly efficient semiconductor transducers	Partly	X	X	X	Patents, database
22	Automated construction processes	Yes	X	X	X	Database
14	Polymerization, cracking-oxychlorination, oxy-hydration	No		X		State-of-the-Art
27	Automation in storage and conveyance of cotton	Partly	X			
20	Paving formulations and specifications, standards	Yes	None			
2	Gas transmission facilities and equipment, welding	Partly	X	X		
6	Construction and automation techniques	Yes	X	X	X	
17	Urban planning, organization of infrastructure	Yes		X		Knowledge base
30	Integrated, automated barley processes	No	X		X	Knowledge base
1	Sedimentation pools used to double capacity	No	X			
26	Signal transmission, line switching	No	X	X	X	
18	Regional planning systems	Partly	X	X	X	State-of-the-Art
24	Water metering and analysis	Yes	None			
9	Microbiological research, virological research	Partly	None			
10	Health services delivery	Yes	X	X	X	State-of-the-Art
8	Curricula development, education methodology	Partly	X	X	X	Database

PROJECTS SAMPLE: CO-SPONSORS, POSSIBLE FUNDING, OTHER REQUIREMENTS

Project Number/Participating Agencies	Funding (£ million) For:			Information/Support Requirements
	STI	R/D	Educ/Train.	
3 Pub/For. Arab Contractors, Italian & German Co's.	8		1.5	Manufacturers' technical literature
4 World Bank. ULG Consultants Ltd.		2	1	Experimental station for applications problems
5 Govt. May contract with private company				
7 Govt/Pri. Joint venture to be established				International market prices for beans, oil, transportation
11 Govt/Pub/Pri.			.09	Geological survey and analysis techniques
12 Govt.				USAID loan of \$96 million
13 Pub. Delta Spinning Company			.05	Product quality control techniques and practices
15 Govt/For. Japan's JICA, Nippon Kokan, others	10		3.2	
25 Govt. General Organization for Industrialization	4	1.5		Production of alloys and high quality metals
23 For. AIO/IFC, H. K. Furgeson, Arab/Swiss Consultants	To be determined			Information support to be provided by consultants
16 For. Sofremines (France), Alsuisse (Switzerland)				Explore and test Abu Tartur ore
21 Govt/Joint. Joint venture with Japan's JICA				Socioeconomic study of fishermen's community
28 Pub.				--to be determined--
29 Govt/Pub. Arab Contractors Company				
19 Govt/Joint. French, German, U. S. companies				Basic research approach to be taken
22 Govt/Pub. Pre-Fabricated Houses Company	.1		.04	Production of pre-fabricated, pre-stressed concrete forms
14 Pub/Pri/For/Joint. Technology transfer to be arranged	To be determined			Broad scale joint research and development effort
27 For. IBRD to supply financing				
20 Govt/Pri. Engineering Syndicate		1		database, standards
2 Pri/For. World Bank, British Gas Corporation			6	Polyethelene technology, Cathodic protection
6 Govt/For. DeLaureal Consultants, Misr Concrete Co.		6		
17 Govt/Pub/Pri/For/Joint. Davad Crane Company	130			Environmental assessment and impact study techniques
30 For. Nabisco International Company				
1 Govt/Pub/Pri/For/Joint.				Additional Research and Development to be decided
26 Govt/Pub/Joint.				
18 Govt/Joint. SAEC, others to be determined				
24 Govt/For. Netherlands Aid Agency			.05	
9 Govt/For. Govt labs and hospitals, Houston Med. Ctr.			.6	
10 For. USAID to provide financial assistance				
8 Govt/For. England, Germany, UNDP				Detailed labor market statistics and requirements

Note: Govt = Government agency; For = Foreign
 Pub = Public Sector; Pri = Private Sector
 Joint = Joint venture
 STI = Indicated funding for Scientific and Technical Information
 R/D = Indicated funding for Research and Development activities
 Educ/Train = Indicated funding for Education and Training activities
 Where funding, in millions of Egyptian pounds, is indicated, amounts are tentative and not necessarily committed.