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PROJECT EVALUATION

SCIENCE AND TECHNOLOGY INFORMATION (STI)

Applied Science and Technology Research Project
(Project 263 - 0016)

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PREFACE

The Science and Technology Information (STI) project was started with the goal of establishing, in Egypt, an improved capability to draw on the world's storehouse of scientific and technical knowledge, to add to this storehouse Egypt's own major contributions, and to focus this information on Egypt's social and economic development through new information management systems.

This was a great undertaking. As the responsible Egyptian Agency, the Academy of Scientific Research and Technology (ASRT), undertook the development of an STI network. In this effort, ASRT emphasized two ideas. First, the sharing of information for development within Egypt, and eventually between Egypt and other developed and developing countries. Second, the coordination of information in ways that makes it most useful to individuals and institutions who are trying to solve development problems. The project sought to support the regular exchange of information between the scientific and technical communities of Egypt and the United States, as an important aspect of the partnership between these two countries to support social and economic development.

At the time of this evaluation, the project had already demonstrated substantial success. What began as an innovative experiment had become a reality. During 1983 and 1984 alone, almost 2,000 Egyptian scientists and engineers had gained access to major world sources of scientific and technical information. The project was still Egypt's only mechanism for making information systematically and widely accessible to its scientists, engineers, students and managers of development and production programs. Egypt could be confident in moving quickly to ensure that this young system would become more firmly rooted in Egyptian soil and would continue to flourish.

A striking feature of the project was that its implementation was accompanied by a large element of sincerity of purpose, enthusiasm and goodwill. These qualities carried over into the work of the evaluation team. Major contributions to the evaluation were the knowledge, insights and practical reflections of Dr. Mohamed Kamel, President of the Academy of Scientific Research and Technology; Dr. Mokhtar Hallouda, Director of CAPMAS and Chairman of the Executive Committee; Dr. A.S. El Nokrashy, Director of Foreign Programs, ASRT; Dr. Mohamed Madkour, Director of Al-Ahram OMIC; Dr. Sherif Arif, Project Officer of USAID; and Dr. Vladimir Slanecka, Chief-of-Party for the Georgia Institute of Technology Contract. All added materially to the value of the study. The team also wishes to acknowledge with deep appreciation the assistance of the managers and staffs of the STI network, the training staff of Al-Ahram, and members of the Executive Committee.

The American member of the evaluation team, Mrs. Nena Vreeland, of AID in Washington, wishes to express her special

ingly of their time and effort, and who were fine companions in this work: Dr. Ahmad el Kawazini, Professor, American University at Cairo; Dr. Hamed Ellozy, Manager, IBM Cairo Scientific Center; and Dr. Adel Gohar, Project Officer, USAID.

EXECUTIVE SUMMARY

The Science and Technology Information "project", a component of the larger Applied S&T Research project, had a fairly long gestation period. Actual implementation of a network of information services, to provide better access to scientific and technical information from international as well as Egyptian sources, began with the signing of a contract with Georgia Institute of Technology in November of 1982. The responsible Egyptian Agency is the Academy of Scientific Research and Technology (ASRT). The contract with Georgia Tech is to expire in September of 1985.

In two and a half years, the project had already generated benefits to the Egyptian scientific and engineering community in the form of 3,000 searches of international databases for almost 2,000 users. Five information services houses in different ministries are participating in the information network. Their staffs have been trained, and they have been equipped with computers. A national training program, to expose interested organizations, firms and universities to major elements of modern information systems, is being carried out. Altogether, this project has trained more than 500 Egyptians in Egypt.

The project is being managed by the contractor, with the support of the Executive Committee appointed by ASRT. The contractor has also employed an Egyptian Technical Group to assist project implementation and coordination of network activities. However, ASRT has not yet created and funded a unit to take over the management and coordination functions from the contractor. The creation of such a unit has been complicated by the idea, presented in the contractor's design of a national S&T information "system" for Egypt, of having a legally-incorporated "governance" board or authority over the network. The contractor believes that such a governance would still be necessary to ensure that the participating nodes will continue to share some standard methodologies, procedural and technological standards underlying a network; will share non-restricted information (e.g., technical reports) produced in Egypt, for an Egyptian databases; and will continue to provide services to all users in their respective sector S&T markets.

Regardless of whether such a governance comes about (and AID should not advocate its establishment), the evaluation team found that three of the five nodes were strong or had future potential for strong development; were very interested in or committed to the creation of an Egyptian database, or databases; and were either serving, or eager to serve all potential users in their respective sectors of interest. The team concludes, therefore, that the contract should be extended one year, if ASRT provides compelling evidence by August 1985 that it will create and fund a management and technical coordination unit, and place on a more formal basis the operations of the Executive Committee. The team has also made some recommendations regarding amending the contract to reflect a higher priority for activities to

consolidate achievements, and to put up -- and on-line -- certain capabilities for demonstration purposes. The extension may require additional U.S. funds.

The team believes that prior to termination of the extended project in September 1986, AID should favorably consider providing GOE (ASRT) with a 3-4 year grant to subsidize the dollar costs incurred from searches of international databases. The team expects that the nodes will be able to recover all LE costs and also be able to cover some minor operating costs (costs for the international searches are now being subsidized under the Georgia Tech contract). Administration of a grant for this purpose by the ASRT unit would provide ASRT an important resource for supporting continued node participation in the purpose of the network. In the future, the unit could also promote the continued development of the Egyptian databases and their leasing to Arab World and other clients.

INTRODUCTION

The Science and Technology Information (STI) project was one part of the broader Applied Science and Technology Research Project (263-0016) undertaken by the Government of the Arab Republic of Egypt with the assistance of the United States. The first phase of the broader project began in 1977, during which some initial information activities began. The second phase began in 1980, during which an STI system for Egypt was designed and implementation started, and was scheduled to end in September 1985.

The evaluation team prepared this report in two parts:

Part I : Summary of Conclusions and Recommendations.

This includes a description of the achievements up to the time of the evaluation, and presents the major recommendations of the team.

Part II : Project Evaluation Report

This arranges the team's findings and covers specific questions raised in the scope-of-work of the evaluation.

Following the requirement stated in the Scope of Work, this evaluation was conducted to provide ASRT and AID with a management tool; that is, the evaluation team gathered information to help the ASRT and AID to make decisions and take actions necessary for the project to achieve its desired purpose.

In order to provide ASRT and AID management with the most helpful information in this regard, the team tried to keep in mind the following general evaluation issues during its research and discussions.

- Is the project still relevant? Is the problem being tackled by the STI Project still a major problem? Has the problem itself changed? If the project achieves its purposes, will it make a real difference in the social and economic development of Egypt?
- Is the project effective? To what extent is the STI project reaching the objectives it set out to achieve?
- Is the project efficient? Assuming the best possible conditions, could this project achieve the objectives at less cost, or go beyond its objectives at the stated cost? How could it do so?
- What are the impacts of the project? What are the positive impacts?, The negative impacts, if any? Were these expected or unexpected?
- Will the activities and benefits of the project be sustained in the future? When the AID project ends, are the benefits and activities likely to continue? What could ASRT do now to support future continuation?

The STI project was still being implemented at the time of the evaluation. Because of this, the evaluation team had to look for trends and interim indicators regarding the above five issues. On some matters, the evidence was clear. On others, the team applied its best judgement and interpretation.

Abbreviations

AID	- Agency for International Development
ASRT	- Academy of Scientific Research and Technology
CAPMAS	- Central Agency for Public Mobilization and Statistics
CET	- Centre for Education and Technology, Ministry of Health
EDICA	- Egyptian Documentation and Information Centre of Agriculture, Ministry of Agriculture
EIDDC	- Engineering and Industrial Design Development Centre, Ministry of Industry
Georgia Tech	- Georgia Institute of Technology
GOE	- Government of Egypt
ISN	- Information Services Node
JCC	- Joint Consultative Committee
NIDOC	- National Documentation and Information Centre, ASRT
NRC	- National Research Centre
OEP	- Organization for Energy Planning and Analysis, Ministry of Petroleum
OMIC	- Organization and Microfilming Centre, Al-Ahram
R&D	- Research and Development
S&T	- Science and Technology
STI	- Science and Technology Information
TIG	- Technical Implementation Group
USAID	- AID Mission to Egypt (Cairo)

PART I

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

A. STATUS OF PROJECT ACHIEVEMENTS

1. Information Services

After a year of accelerated implementation during 1984, the information system was already highly successful in meeting a strong Egyptian demand for scientific and technical information. There was a strong likelihood that these services would be fully and effectively handled in Egypt through a) a newly available access via packet-switching network services to U.S. database vendors, and b) a stronger capability to refer clients to journal and periodicals located in Egypt. This development would remove the requirement to route database searches through Georgia Institute of Technology, and at least part of the requirement for external sources of document delivery -- transforming the system into a fully Egyptian resource.

2. Competitive Position

The information system supported by the ASRT/AID project retained a competitive edge in the rapidly advancing field of automated information systems. It continued to serve an expressed need in the S&T Community for access to international information. It remained the only activity in Egypt aimed at coordinating the development of an Egyptian bibliographic database. Through application of an appropriate fee-for-service structure, the services could become substantially self-supportive.

3. Development of Information Nodes

Four of the five information nodes in the network are rapidly gaining a better understanding of their respective sector markets, and were beginning to differentiate according to the information priorities of their clients. This natural and healthy development indicated that node staffs had grasped the important relationships between their responsiveness to client needs for various potential types of information and the growth of their respective information markets. This development also implied greater attention under the project to the differentiated, as well as the uniform, requirements of the system. It also implied the need for more forceful and focussed marketing strategies by most nodes. Compared to other nodes, the energy node was presenting its services in narrow and restricted terms, leading the evaluation team to question seriously the extent to which this node would serve the broad information needs of the energy sector.

4. Training

The training program, including the courses offered under the Al-Ahram subcontract and those offered through the contractor's technical services group, were adequate for the purpose of the STI project during its first two years. In this period, the project activities required Egyptian professional and paraprofessional skills that could be quickly adopted by experienced node staff, or else involved the use of standard "off-the-shelf" software only. For various practical reasons, the Al-Ahram courses were not as "neatly" meshed with the operational training of node staff as originally envisioned. In addition, the Al-Ahram program attempted to address three aims: 1) "information awareness" -- broaden exposure of the scientific, R&D, and management communities to new information applications and some common technical requirements; 2) general "manpower development" -- broaden understanding of information-related technical skills, with practical hands-on experience; and 3) specialized training for STI node staff operations, and those in other organizations and firms having information and documentation units. These aims were not altogether compatible, and each implied a somewhat different approach to marketing, trainee selection and follow-up. Al-Ahram required additional guidance on priorities to better focus the remaining period of the training program, with regard to the nodes and other sources of trainees, and with regard to its ability to select trainees whose training would most effectively support STI objectives in their respective institutions. The marketing effort needed to be carefully focused on a set of priority outcomes.

5. Use of Information

The nodes did not keep statistics required for the determination of the actual or intended uses of the information obtained. However, the number of repeating users, and the willingness of users to pay at least 20LE for a search, and the types of subjects being searched on all indicated a good probability that the information was useful and useable. The nodes were meeting the needs of the scientific and research community rather than the management community, whereas the 1981 baseline survey suggested that managers were even more inclined than scientists to regard information as essential and important in their jobs. The information provided was exclusively bibliographic, whereas three nodes (especially the Industry node) indicated that, in addition to bibliographic data, clients were also interested in non-bibliographic, referral and quantitative, or engineering, design information. The single largest category of search topics comprised agricultural research and food production.

6. Institutionalization of the Information System in Egypt

Neither the grantee (ASFT) nor the Government had yet established the type of "governance" directorate (or similar organization) as called for by the design of the information network. Moreover, the principal parties involved in the project on the Egyptian side had somewhat different views regarding the mandate and scope of such an organization, and did not appear to grasp fully the financial requirements necessary to support the "system" as distinct from the activities of the individual nodes. In the meantime, some node activities, the work of selected task groups, and the work of the Executive Committee confronted persistent problems regarding incentive pay (the level of incentive pay available for the STI component of the overall project was, in any case, too low).

The requirement for an a unit at ASRT that would carry out a minimum of technical, administrative and coordinating activities necessary to maintain an integrated information network -- activities that would take advantage of efficiencies and ensure continuation of such basic functions as Egyptian database development, maintenance of the Union List, promotion of relations with other information sources, and overall monitoring of network performance and needs -- had been recognized by all parties since 1980. The existing Executive Committee and the technical group established by the contractor could serve as the nucleus for such an organization.

Since action had not been taken between 1980 and early 1985 to create the required Egyptian unit, the evaluation team was forced to conclude that such an institution was unlikely to be functioning, or even be in concrete planning stages, before the project was scheduled to end. Since the purpose of the STI project was the establishment of an information network, as distinct from unrelated, individual, information facilities in separate institutions, this purpose would not be achieved. Accordingly, continued AID and Government investment to support the networking concept would not be warranted.

7. Relationship to Other AID Projects

No other donor was supporting the concerted development of an STI system in Egypt. AID's portfolio included several activities with an information component. Of these, three were particularly related to the STI project, in that their substance and purpose invited closer coordination. These were a) the University Linkages project, and that portion of the Commodities Import Program (CIP) that had already provided the Supreme Council of Universities with a very rich collection of periodicals and journals on microfiche; b) the ITAP project, in which the information activities overlapped those of the industry node at EIDDC; and c) the grant to CAPMAS to support the further development of an Egyptian statistical database and related activities; although the

CAPMAS program was just beginning, it suggested future opportunities for the STI network to make appropriate arrangements for tapping this database to serve S&T clients. At the time of this evaluation, the STI project activities were not coordinated with these related AID-supported efforts.

8. Contractor Performance

At the time of this evaluation, the contracted tasks were nine months behind schedule, largely because of delays associated with the ASPT's signing of agreements with the host institutions of the nodes, and approval of recommended computer equipment. Two other conditions influenced contractor performance. First, the contractor lacked a fully established counterpart unit with the necessary mandate, executive authority, technical and administrative staff and budgeted resources with which the contractor could relate. Therefore the contractor was unable to transfer -- and, more important, negotiate in realistic Egyptian terms -- the STI concept to an Egyptian institution which would be equipped to continue and sustain the key requirements of the information network after AID support ended. Second, the contractor followed an implementation plan for establishing an information system envisioned in the original design, which itself was too ambitious in its expectations (see below, "Project Design"). The contractor carefully revised implementation plans as delays occurred, but did not alter implementation tactics (e.g., efforts to provide demonstrations of the information system's interim capacity before the capacity was fully completed).

The contractor was responsible for a sub-contract to Al-Ahram OMIC for a major training program. Training courses began in January 1984. The goal and purpose of the training program, as stated in the sub-contract scope-of-work, did not describe expected outcomes in sufficient detail, and the focus of the training suffered accordingly (see above, "Training"). This problem could have been alleviated by more continuous substantive monitoring by the contractor after the courses began, and remedial action taken to refocus the program.

The contractor conscientiously sought to create and support a cadre of Egyptian information specialists and managers, accompanied by a "training of trainers" approach. Without the establishment of a counterpart Egyptian unit, equipped to support some of this cadre, and without full assurance by all host institutions of the nodes that they adequately support their respective node staffs, some of this contractor investment would probably be lost. As it became increasingly evident that a counterpart institution would not be created, the contractor did not revise implementation tactics (e.g. moving some tasks to a sub-contract in order to speed their completion). The contractor consistently alerted the ASPT, the Executive Committee, AID and the Joint Consultative Committee for the overall Applied S&T

Research project to the increasingly urgent need for a counterpart institution and to the likely consequence of a failure to establish it.

The contractor took advantage of opportunities to move the information nodes toward an ability to recover some LE costs, and ways of making the delivery of services more efficient.

Achievement of the purpose of the STI project would require the contractor to focus on three technical areas during the remaining period of the project. First, substantial and continuous guidance regarding Egyptian database development, by an experienced and knowledgeable individual (chief-of-party or equivalent). This would have to include the development of clear criteria governing the selection of materials appropriate for this databases. Second, the nodes would require strong technical training in their role and function in maintaining this database. Third, strong technical leadership would be required for the Arabization program. These technical requirements demand experience and knowledge beyond the existing capabilities of the contractor's TIG staff.

The performance of the contractor in the STI project suggested several lessons to AID. First, when supporting the establishment of a "system" of this kind, in an environment not fully conducive to integrated activity and information sharing, and involving the initiation and management of many closely-related activities, AID should require that the contractor's chief-of-party devote continuous periods of time in-country, particularly during start-up stage and during key junctures, to ensure the best possible monitoring and follow-up. Requirement for such continuous periods was incorporated in the August, 1984 contract amendment. Second, the contract should specify some interim deliverables marking stages in the development of broader tasks. Third, AID should ensure that related contracts with the same contractor (e.g., STI and ITAP contracts with the Georgia Institute of Technology) require the contractor, in addition to AID and the host country to take initiatives towards desirable coordination. This was made a requirement in the contract, but the contractor did not follow through with substantive coordination.

9. Project Design

The design of the STI network system provided, in theory, an efficient mechanism enabling the country's S&T community to meet an important part of its information needs. In practice, the design and its associated implementation plan did not take into account adequately the realities of the Egyptian decision-making and policy-formulation processes. The design also underestimated the requirements for Arabization of the automated information management system. In summary, the project assumed an unrealistically fast pace of implementation; thus, the

design was too ambitious -- it could not be accomplished within the anticipated time period.

In addition, the design promoted the concept of a gradually expanding information system that would retain, at every stage, a constant internal uniformity and compatibility (in terms of procedures, record formats, hardware, software and policies). Such uniformity and compatibility was necessary to lay the initial foundations for the STI network of five operating nodes. It was doubtful, however, that MID would wish to support future system expansion if that expansion was based on specifications that essentially supported a few selected vendors, or that implied a "governance" that would be capable of insisting on, or enforcing, adherence to methodological and technological procedures in a quickly advancing field. The evaluation team recognized that adherence to a basic set of procedures and formats was necessary for instilling the concept of information networking in Egypt. The team also recognized the need for a strong and influential advisory committee that would advocate, lobby and in other ways support the concept of a cooperative information system. However, the team found sufficient evidence to conclude that a formal, national "governance" authority was not a necessary condition to the achievement of the purpose of this STI project. What was necessary was the creation and funding of a unit that could assume management, administrative and technical functions being carried out by the contractor and the contractor's TIG in Egypt, and that would have sufficient resources to command the continued respect and attention of existing and possible future nodes participating in the network.

B. GENERAL RECOMMENDATIONS

1. One-Year Extension of the ASRT/AID STI Project

The highly successful achievements of the project merited a one-year extension through September 1986, but only if the following, closely related, conditions were met before August, 1985:

- a. Expeditions provision by ASRT of incentive payments to support selected activities of weaker nodes until their position was fully regularized in their host institutions; the activities of the Executive Committee (utilizing the administrative resources of the contractor's technical group) until a counterpart unit is established and in operation; and selected node staff participation in key task groups for tasks not moved to sub-contract. Those tasks requiring ASRT incentive payments to non-STI individuals (e.g., the Statistical Department of ASRT) should shift immediately to a sub-contract with a qualified Egyptian firm.
- b. Reaffirmation of the agreements between the ASRT and the host institutions housing the information nodes. This reaffirmation would have to achieve the following results: i) ASRT confidence that nodes were, or would soon be, integrated into the organization, staffing patterns, budget and incentive pay structure of their respective host institutions; ii) arrangements for each node, as appropriate to their host institutions, to establish a node revolving fund for depositing user fees and for handling certain costs, as defined by the node and associated with node operations; and iii) residual ASRT incentive pay responsibilities to the nodes through September 1985.
- c. Very compelling evidence (e.g., major progress toward inclusion of a line item in the ASRT budget for FY87 if not for FY86) that ASRT was forcefully and fully committed to the establishment of a unit with a staff, budget and incentive pay structure adequate to assume minimum management, administrative and technical tasks supporting the STI network, together with an organizational statement of its tasks and responsibilities.
- d. ASRT, the Executive Committee and AID should reconsider the selection of the Energy Node host institution.

2. Revise Priorities in Contract Activities

The contractor indicated that some of the following recommendations were expected to be completed during FY 1985. Their inclusion below highlighted their priority in consolidating the achievements of the project.

- a. The Union List of periodicals and journals should be expanded to include the holdings of the Supreme Council of Universities (acquired on microfiche through the AID Commodity Import Program), and the list should be automated before August 1985, with a file provided to each active node.
- b. The Egyptian database should be entered into the computer and operationalized on an interim basis before August 1985, to include the collection of Egyptian theses and the collection of Egyptian materials in AGRIS and the available data on on-going research projects. The database should be demonstrated on-line to the President of ASRT, directors of node staffs, and others at that time.
- c. Direct, on-line access to U.S. databases (via packet-switching network) should be arranged and tested for at least one active node before August 1985, under the auspices of the contract, and demonstrated to the President of ASRT, directors of node staffs, and others at that time.
- e. User logs, data on user affiliation and data on search subjects maintained by nodes should be automated as part of their internal management information system, in addition to manual logs; nodes should begin sending monthly, computer-printed reports on use and search subjects before September, 1985.
- f. A structure of user fees should be developed and placed in effect before September 1985. Consideration should be given to developing a wider range of payment options (e.g., lower rates for students, higher rates for institutional users, payment pro-rated to the number of abstracts). The subsidy for document delivery should be discontinued, and clients referred to Union list sources, or charged the full fee for British Lending Library service. The fee structure should be flexible enough to respond to differences in node clientele.

3. Prepare Budget Estimates:

The contractor should prepare and submit to AID and the President of ASRT, on an expedited basis, the following estimates, which would assist concrete planning for an information unit :

- i) The incentive pay amount and distribution required, through September 1985, to support activities of newer nodes; activities of task groups associated with the above priorities; and activities of the Executive Committee.

ii) An estimated annual ASRT budget and incentive pay structure for an established unit capable of carrying out the following functions through its own staff:

- monitoring node search service and database input
- /administering packet-switching network access
- backing up equipment maintenance
- marketing and exchanging system service
- developing inter faces with other information sources
- selling technical information services to other organizations
- updating Union List
- managing S&T database development

This estimated budget should also include an item for obtaining specialized systems development from private sector firms in Egypt; contracting annually for Egyptian data base development to supplement node efforts; and a dollar amount representing the cost of 6000 searches/100 abstracts per search via packet-switching access to US databases.

iii) An estimate of the skills which an established unit having the above functions may have to employ at the estimated realistic salary and incentive pay scales.

4. Focus Training

- a. To enable some nodes (e.g., industry) to develop information services most responsive to the differentiated needs of their sectors, and to support STI information system management skills, the contractor should consider additional learning ventures for node staff and staff of the contractor's technical group, including US training.
- b. The contractor should "customize" one presentation of the Al-Ahram OMIC professional courses ("P2" and "P3") by exploring some applications discrete to the work of individual nodes. All courses would benefit from the use of case materials based on actual experiences of the nodes (including information requests which nodes were unable to handle).
- c. The contractor should ensure that the sub-contractor makes additional efforts to increase the likelihood that trainee and/or their affiliated organizations intend to apply their acquired knowledge in the information management field, and to follow-up a sample of trainees and their organization shortly after course

completion. For the purpose of encouraging applicants with serious intentions, the contractor, sub-contractor and AID should examine the possibility of charging a modest fee during the sub-contract period.

- d. The contractor should re-examine the purpose of the Al-Ahram OMIC training program; restate the purpose in terms of more precise training outcomes that directly support the purpose of the STI project; and ensure that the subcontractor markets the program in ways that support these outcomes.

5. Intensify Effort to Arabize System

Making the information system bilingual in English and Arabic remained a desirable objective, for longer-term purposes beyond the time-frame of the contract, and for shorter-term possibilities of exploiting World Health Organization and Food and Agriculture Organization materials in Arabic. The level of effort suggested by the contractor's planning budget did not appear to reflect the intensive effort by highly qualified Egyptian specialists that would be necessary to attain this objective by either September 1985 or September 1986. The contractor should consider revising these estimates, as well as the possible need to use equipment at the nodes to implement the Arabization goal.

6. Plan for Self-Sufficiency

The evaluation team observed both the need and the opportunity to place the STI system on a more self-sufficient basis. It is imperative that ASRT establish and budget for an information unit, as indicated in Recommendations 1 and 3 above. This would accomplish the transfer of "system-wide" and coordination functions, which were being managed by the contractor, fully into the hands of Egyptian management. This transfer would make the information capabilities responsible and accountable to the interest of the S&T community, and less dependent on donor grants.

The evaluation team fully realized that the costs, in terms of salaries and incentives, for keeping qualified staff in such a unit and in the nodes would be high. The ASRT and host institutions should regard this problem as a challenge rather than a constraint, and should purposefully employ all indigenous opportunities to make the system cover a part of its operating costs. The following recommendations pertain to these opportunities :

- a) Establish node revolving funds. ASRT should encourage, through clarification of the agreements with the host institutions housing each node, the proper formation of "revolving funds" under the administration and authority of node managers, accountable to their respective host institutions. These revolving funds

should receive user fees, and node managers would disburse funds to meet certain contingency costs. Such costs would appropriately include non-major equipment maintenance, software related items, modest systems development needs, and incentives for special activities. During the remaining period of the ASRT/AID project, node managers would also report to ASRT the total fees collected for searches subsidized under the AID contract, and disbursements made from these fees. This reporting should begin for the period starting March, 1985 (for NIDOC, the report should also cover the retrospective period from the time fees were charged). Following termination of the AID contract, a pro-rated portion of collected fees should be allocated for paying any LE costs associated with use of the on-line packet-switching network.

- b) Develop user fee structures appropriate to node markets. As noted above, users should be given more options than a single flat fee for an on-line search of international databases and the Egyptian database. For example, Institutional Users should pay more than students; charges should be pro-rated to the number of abstracts; etc...
- c) No national S&T information system has been completely self-supporting, since it is in the interests of the governments to ensure a basic access to information by their countries' scientists and engineers. In this case, a major part of the cost for accessing international databases was chargeable in US dollars, estimated at the time of the evaluation at \$35 for an average search yielding 100 abstracts.

7. Future AID Support

When an Egyptian unit is established to continue the management and coordination of activities related to the information network, AID should consider favorably the provision of a grant to this unit to cover the dollar costs associated with international database searches for a four-year period following the termination of the STI project. This would provide sufficient time for the services participating in the network to prove their value to the S&T community, and to Egypt's social and economic development.

PART II

PROJECT EVALUATION REPORTA. BACKGROUND

The Science and Technology Information (STI) project was one major component of the "Applied Science and Technology Research" project. The purpose of the STI project, as stated in the authorizing document was :

"Establishment of information network to supply information resources for researchers and policy-makers to make informed decisions concerning all aspects of S&T research."

The activities of the project were thus directed at the progressive establishment in Egypt of national information services. The availability and use of these information services were seen as necessary to enable the S&T community to engage effectively in the types of research of priority importance and applicable to solving national development problems (see Logical Framework, Appendix B).

The overall Applied S&T Research project began in FY 1977 and was to end in FY 1986. This project, and the STI project it included were carried out in two phases. Some preparatory steps regarding S&T information improvements were undertaken during Phase I. Phase II began in 1980. In August 1981, the Georgia Institute of Technology developed a design for an Egyptian national scientific and technical information system, together with an implementation plan to establish such a system in a three-year period. These plans were assessed, and in March, 1982, the assessment team recommended adoption of the design. Georgia Tech submitted a more detailed proposal in July, 1982, and AID signed a contract with Georgia Tech in November 1982 to implement an S&T information system. All activities of the STI project were included in the one contract.

The design of the system envisioned an open-ended network of information "nodes"; up to six of these nodes would be established during the three-year period. They would be located in host institutions representing major sectors or technical areas -- e.g., agriculture, industry, health; and they would provide information services/access to information sources to clients in their respective sectors of interest. In addition, the activities of the project would work on two other aspects of an information "system" : broadening the market for information -- generating awareness of the availability and utility of information to meet research, operational and management problems related national development; and developing repositories of information in Egypt, initially through cooperative participation of selected Egyptian libraries.

The task of putting into operation all three parts of the system proved to be greater than could be achieved within three years in Egypt. At the time of the evaluation, activities were nine months behind schedule. A number of activ-

ities had to be carried out, most of which were interdependent -- acquisition of computer equipment, selection of and agreement with host institutions to house and staff each node, training node staff in skills required, selection of software, preparation of manuals, selection of libraries, etc..

The responsible Egyptian agency was the Academy of Scientific Research and Technology (ASRT). The Academy delegated decision-making and coordinating functions to an Executive Committee. This Committee did not have firm organizational status. That is, it had no nationally-authorized mandate, statement of functions and responsibilities, or budget. Therefore, despite its title, it had no executive authority. If any of the nodes or participating libraries decided to depart from minimum technical standards and norms necessary to make the network services operate smoothly; or if they decided to use the equipment for some other purpose; or if they decided to restrict their clientele to the privileged few by approving some requests for information and disapproving others on an arbitrary basis -- the Executive Committee had no power except to pave the way.

The necessity for some "governance" of the network had been suggested even before the information system was designed in detail, and it was clearly discussed in the design of the system prepared by Georgia Tech. Between 1980 and the time of this evaluation in 1985, neither ASPT nor any other agency of the Government had succeeded in establishing such a "governance", or even a technical focal point for the system. In the meantime, the contractor employed a small Technical Implementation Group" (TIG) to assist the implementation of the project in Cairo; this group managed day-to-day activities of training; preparation of manuals; record formats for an Egyptian database of theses, articles and technical reports; and similar tasks.

The idea of a governance, together with the possibilities for further expansion built into an open-ended network of nodes (plus the possibility that each node in turn could have several off-site terminals), immediately evoked the kind of political interests and concerns one might have expected. On the one hand, host institutions wished to ensure their autonomy; they would be responsible for their respective nodes and equipment, and some feared that they would be required to divulge proprietary information. On the other hand, the power implied by governance over such a growing system was tantalizing. Possibly for this reason, no other free world country has sought to establish an information system in this model.

In any country, including Egypt, the very idea of information "governance" would tend to imply information "control". But, if one carefully examined the premises of the information system model designed by the contractor, one could identify very practical and straightforward requirements for an information network. These were the following: The nodes participating in an S&T Information network would continue to cooperate; their services would continue to be supported by their host institutions; certain minimal state-of-the-art

methods and technologies would be employed by all participating nodes to facilitate the continued development of an Egyptian database as well as efficient interfacing between nodes; every node would make the best possible effort to serve its sector clients; and Egyptian producers of S&T information would contribute this information in a more or less systematic way to a shared Egyptian S&T database, or databases, supported by library services. Based on the achievements already put in place by the contractor, these requirements could be handled by a competent Egyptian management unit together with an influential advisory board, both supported by clearly established mandates and responsibilities, and budgeted funds, related to an STI network rather than some more comprehensive but vague national information system. Unfortunately, these very practical requirements for a unit and a board, with enough resources to relate effectively and convincingly to participating host institutions, seemed to have been submerged in discussions regarding a national "governance".

The resulting contending interests in Egypt were, in the view of the evaluation team, partly responsible for the slow implementation. Not only did decisions (e.g., regarding the type of equipment) have to be made on a collaborative technical basis, but every decision had to be considered from the angle of the above political dimension. During 1984, two major decisions were made: agreements were signed between ASRT and the nodal institutions, and equipment was selected. Implementation proceeded very rapidly thereafter.

The idea of a governance could be distinguished from that of a technical resource and support unit. The team found that the active nodes would continue to require some external support, particularly in the areas of systems design and customization, if they were to continue evolving the types of services needed by their differentiated sector clients. Similarly, certain shared resources -- the Union List, the Egyptian bibliographic database, overall national awareness and marketing programs, Arabization of computer language, and follow-up training in paraprofessional and professional skills -- would be provided most efficiently through some central unit.

If the purpose of the project were to be achieved, then, first, the S&T community would have to feel confident that the network, and appropriate network access to other information sources inside and outside Egypt, would be fully responsive to their needs (within established official bounds governing access to proprietary information). If this were already the case, then one reason for a governance would disappear. Among the five nodes active in early 1985, only the energy node did not meet this requirement. Second, nodes participating in the network would have to observe some standard conventions regarding database development and node interfacing. Preliminary evidence suggested that the active nodes had not only accepted these minimum standards, but were anxious to more on, and required technical assistance to build on existing capabilities without jeopardizing the integrity of these standard network requirements. ASRT was already receiving expressions of interest from other

agencies in joining the network, implying a willingness to accept standard network requirements.

On the other hand, the team found that the whole matter of access to and use of Egyptian information was still a sensitive one. Both the concept of the use of information for development, and advocacy and support for the existing nodes and possible future nodes, would continue to require high-level attention.

At the time of this evaluation, five nodes were active. In all but one, the computer equipment had been installed. Over 3,000 requests for information from international databases had been handled by the nodes, for almost 2,000 clients. All but the health node was staffed to handle a range of information services and related operations. The Union List was awaiting automation, as was a modest Egyptian database limited to Egyptian theses and some technical reports and articles. Two of the five nodes, some node staff seconded to work on task groups at the TIG, and the Executive Committee itself, reported that their current activities and future continuation would require additional incentive payments (the team found that, in general, the incentive pay apportioned for activities under the project were wholly inadequate). The Arabization effort had just been initiated. The national training program in information, carried out under subcontract by Al-Ahram OMIC, had graduated some 480 trainees.



B. EVALUATION METHODOLOGY (see Appendix C)

C. EXTERNAL FACTORS AND PROJECT ASSUMPTIONS

The project assumed that a demand for R&D information existed in Egypt, and that the awareness, or marketing, activities of the project would succeed in attracting and informing end-users. The rapid increase in demand for information from international databases provided evidence that the first assumption remained valid. The team found less satisfactory evidence regarding the second assumption. First, the marketing program, in a formal sense, was just getting underway, although two of the nodes had been very active in promoting their services. The Al-Ahram training program was also, in part, a marketing and awareness program; a review of the affiliations of trainees indicated that several major Egyptian companies had sent trainees for several courses, but there was insufficient evidence to determine the impact their exposure was having on the purposive use of information within the companies' research, development and management operations.

Second, the team found that, even when the system succeeded in attracting end-users, an important part of their information needs could not be met. For example, engineers seeking information from the industry node were less interested in journal and periodical literature than with direct access to referral databases, and data related to specifications and

designs. Access to such information was a purpose of the ITAP project, also located in EIDDC; these two related information activities needed to be more carefully coordinated. Since the Egyptian database was not yet accessible, the team could not determine the actual demand by scientists and engineers for their own information.

Egypt was clearly well into the "information age", and the external conditions were even more conducive to the purpose of the project than at the time it was conceived in 1977. The Al-Ahram training program had had to turn away great numbers of applicants for the more general, introductory courses. The Military Medical Academy had initiated an on-line service to Switzerland (via Data Star), and was soliciting shared use of the line by non-military clients (e.g., universities, the medical profession). Even during the evaluation, the telephone system of Egypt announced on-line, packet-switching service (via dedicated lines) to US databases vendors, and the contractor was planning to use this service in the STI project.

The services of the STI network were likely to retain a competitive edge in this growing field. It was structured to support specialized user services in specific sectors and technical areas. It was the only effort to create and maintain an Egyptian database, to offer a bilingual system, and to provide library services and document delivery. There was an opportunity, however, to shift the marketing program from one of national awareness to a more focussed approach to user education.

D. PROGRESS SINCE LAST EVALUATION

At the time of the last evaluation (November-December, 1983), decisions were pending without which the system could not move to activate fully its user clientele. With the formal signing of agreement between ASRT and the host institutions, implementation proceeded quickly in setting up and staffing the nodes, ordering equipment, etc... The emphasis on the "supply" side of the system -- staff training, initial development of the Egyptian database, access to international databases through the facilities of Georgia Tech -- could move toward the "demand" side; even at the early stage of node operations, most were beginning to get a clearer picture of their respective client requirements. Greater attention would have to be given to customizing software and extending non-bibliographic sources of information; and to improving the ability (and willingness) of individual nodes to refer clients to other nodes able to offer more specialized or focussed service, or on-site access to documents.

The newer nodes expressed a reluctance to develop and promote aggressive and focussed marketing strategies until they had fully staffed and had acquired more experience. The evaluation team found enough initial evidence of differentiating user needs to conclude that, only by forcefully activating its sector market would a node begin to learn

about the discrete needs of its clients, for which the node could then begin to tailor its activities and resources. On an individual basis, the marketing activities of the science and agriculture nodes were satisfactory; the energy node had adopted a passive strategy; and those in industry and health needed a more vigorous, focussed approach. Overall, the marketing of the information services required greater coverage of potential clients outside the Cairo area.

E. INPUTS

Because of the close implementations relationship between acquisitions of hardware, selection of software, and the training of node staff, several activities were delayed by the length of time involved in reaching a decision on computer equipment. The equipment itself had ample capacity for the Egyptian database, and was selected in part because it could be maintained and serviced in Egypt.

The evaluation team found that two major inputs -- training and consultancies -- warranted attention.

1. Training

Two types of training were provided under the project; both appropriately emphasized training in Egypt. The first consisted of a series of more or less formal courses offered to and by the staff of the contractor (TIG) in Cairo, and, to a much lesser extent, training visits to the US by selected node and TIG staff. This training focussed specifically on the development of network capabilities. Some more experienced staff at the nodes and TIG warranted more opportunities for specialized learning ventures in the U.S.

The second type of training began in January 1984 through a subcontractor to Al-Ahram OMIC, and was to be a "crash" program to train some 1,000 professional and paraprofessional employees of the nodes, and other organizations and companies. As stated in the scope-of-work of the subcontract, the objective of this Information Management Training Program was :

"...to generate an adequate cadre of Egyptian professionals and paraprofessionals qualified to manage, operate and make effective use of the system of national information services now under development."

As was the case for all activities managed under this Georgia Tech contract, thorough records had been maintained to support monitoring; in the case of Al-Ahram OMIC, data on course delivery and trainees had been automated. By March, 1985, 481 trainees had passed through or were attending one of five of the eight courses planned

under the program. The subcontractor reported that, although the schedule was extremely tight, involving back-to-back use of equipment relevant to the immediate needs of the STI project (the subcontractor had very adequate space and terminal facilities for hands-on training), all courses would be held. However, for the more advanced courses, it had proved difficult to draw the anticipated number of trainees.

The evaluation team found that this training program lacked sufficient focus in contributing either directly or indirectly to the outputs of the STI project, and to its purpose, largely because the sub-contractor lacked sufficient guidance to enable it to direct its highly qualified staff and excellent facilities to well-defined STI project aims. In reviewing project documents and files, and in discussing the program with the principal parties, the team found varying interpretations of the objective of the program, and, accordingly, similarly varying interpretations of its achievements.

The subcontractor was meeting the scope-of-work of the contract, because the criteria (in terms of knowledge and skills outcomes of the training) were assigned different weights from time to time, with at least the implicit agreement of the contractor. In attempting to focus the program, the subcontractor was handicapped by two early decisions: 1) the training program would not lead to an academic-type certificate, but rather would provide a series of discrete training and "awareness" opportunities, and 2) the program would discourage the same trainee from taking more than one of the eight modules in the program. As a consequence, with very few exceptions, the same individual had not attended more than one. Some major organizations and companies were represented by different trainees in all the modules.

The subcontractor was covering sectors representing the target groups of the STI project; universities and research institutes in the academic community (29 percent of the trainees); industrial organizations and companies (32 percent); energy (10 percent); agriculture (8 percent); the CAPMAS statistical agency (8 percent); health (4 percent); and other areas (9 percent). Only 38 percent of all trainees, however, had had some background in the information management field; 16 percent were from the STI nodes (over half from NIDOC). These proportions were expected to grow in the more demanding courses on information systems, database management, and software programming.

The training program was supporting at least three objectives: 1) general awareness of information; 2) general "manpower development" limited to a broader understanding of information-related skills, with some hands-on experience; and 3) more specialized training for the nodes and a few organizations having information and documentation units. The program was also promoting the STI network. These multiple objectives made it difficult for the subcontractor to concentrate on any one to the fullest

and most efficient degree. They also aggravated the problems of marketing the program, selecting trainees, and following up on the actual contribution trainees were making to their sponsoring organizations. The last problems were particularly important. One of the weakest information nodes was in the industrial sector; this sector was strongly represented in the training program coverage. Follow-up would provide an opportunity to assess the types of STI information services industries and firms really require. A careful re-orientation of the training purpose to well-defined expected outcomes from the program would enable the subcontractor to develop more focussed marketing strategies.

2. Consultants

A portion of the consultant inputs was to provide support for Arabization of computer system language. Accomplishment of this project output by 1986 would require a very substantial "crash" effort, drawing on a group of highly qualified specialists in the fields involved. The scope and cost of such an effort were not adequately reflected in the amount budgeted.

F. OUTPUTS

Most of the outputs had been accomplished, or were expected to be achieved before the end of FY 1985. The major exceptions were 1) the development and automation of a database of Egyptian materials; and 2) Arabization of computer systems language. The contractor was taking concrete steps to initiate the Arabization program at the time of the evaluation. In addition the Union List had not been automated, and did not include the journal and periodical holdings of the Supreme Council of Universities.

In addition to some miscellaneous reports, a collection of Egyptian theses had been collected by the contractor's TIG. Together with Egyptian reports contained in AGRIS (the FAO database), these could be processed quickly to form the nucleus of the database. Processing had been assigned to the statistical department at ASRT, and would not occur unless the assigned staff were provided additional incentive pay. In the meantime, the capability of the database could not be demonstrated to the President of ASRT or to others whose advocacy might be instrumental in support for the network.

In other respects, major steps had been taken to create the outputs of the project. Five information nodes were staffed (one not fully) and were providing services, including searches on international databases through the facilities of Georgia Tech. A training program had been institutionalized at Al-Ahram; the number of trainees was likely to approximate the estimated 1,000 and the subcontractor believed that the demand for several of the courses would be strong enough to make the program substantially self-supporting in the future. Some of these accomplishments would require a period of consolidation,

particularly in ensuring that all the nodes were well-established and supported in their host institutions (e.g., budget and incentives).

The five operating nodes were: NIDOC (science), EDICA (agriculture), EIDDC (industry), CET (health), and OEP (energy). The nodes had varied strengths and weaknesses; these were well-known to the contractor's TIG, the Executive Committee and to the USAID project offices, and efforts were being made to address the weaknesses. NIDOC was a well-established institution, located in the National Research Centre (NRC), and it had the largest volume of international database searches. EDICA, also an established organization, was a model of a vigorous and forward-looking S&T information service, and its node was well-supported in its host institution. The EIDDC node was new, and required additional incentives, and probably specialized information systems development to assist the unit in grappling with its mission; it also required a clarification of its relationship with information activities being supported in the same institution by another AID supported project (ITAP). The CET node offered considerable promise for becoming a useful and fully professional information service to the health and medical research community; it required a firmer consolidation and support within its host institution. The OEP node defined its mandate and services much more narrowly than the others, focused primarily on OEP client, and OEP-related activities. All except the OEP node and, to a lesser extent EIDDC, were well located -- accessible to their respective potential user and having adequate parking facilities. None of the nodes had a well-developed, aggressive marketing program.

For the future, but not necessarily before termination of the ASRT/AID project, further development of these outputs could include consideration of potential interfaces or leasing arrangements between the STI network (or individual relevant nodes) and other sources of information in Egypt as these are developed (e.g., publicly available statistical data sets developed by CAPMAS under the AID-funded EGYNET grant, private sector data sets). To the extent that external interfaces were being explored (e.g., potential EDICA lease arrangements to obtain AGRICOLA data from the US National Agricultural Library), the project could encourage them.

The development of these outputs through the ASRT/AID STI project was managed by the Georgia Tech contractor, with the assistance of the contractor's TIG in Cairo, and with the support of the Executive Committee. (The main findings, conclusions and recommendations regarding the performance of the contractor are presented in Part I). The role of the Executive Committee was particularly important -- crucial in many respects -- in such matters as obtaining firm host institution support for their respective nodes; maintaining the cooperation of Egyptian libraries; and securing S&T materials for inclusion in the Egyptian database. Thus, the Committee exercised some of the functions of the "governance" envisioned in the STI system design. The Committee, however, had no legal, organizational status; no firm execu-

tive authority; no budget or incentives; and especially, no clear criteria or benchmarks (other than those provided in the contractor's implementation plan or implied in the general design at the STI system) against which the performance and progress of the project could be measured, nor the mandate and authority to enforce its recommendations in this regard. Similarly, there was no counterpart Egyptian implementing agency; the TIG staff were employees of the contractor, not the ASRT.

In these circumstances, it was a testament to the sincerity and enthusiasm of the parties involved that decisions were made and implemented, and that activities did achieve a real degree of coordination. Communications were reasonable, although there were instances of misinterpretation or a perceived failure in communication, even between some nodes and the contractor, despite the regular bi-weekly meetings between node representatives and the TIG manager.

Internal network monitoring by the contractor was well-developed, although node capabilities to monitor their own operations were not yet automated. Contractor reports to AID were restructured in August 1984, to better reflect task achievements.

The contractor did not reside in Egypt, but made frequent visits. Given the degree of coordination required in implementing the activities of the project, and given the practical fact that the contractor was the manager of the project, it would have been preferable for AID to have required a resident chief-of-party during the first two years of the contract. For the remainder of the contract, the Egyptian TIG manager would be able to carry some management and coordination functions related to some activities already developed. However, highly qualified and experienced technical guidance remained crucial if the basic standards and procedures for the Egyptian database were to be in place, and the Arabization program completed before the project ended.

G. PURPOSE :

The purpose of the STI project was:

Establishment of an information network to supply information resources for researchers and policy-makers to make informed decisions concerning all aspects of S&T research (thereby better enabling Egypt's S&T community to develop and manage research programs to solve priority development problems).

In summary, the team found:

- Very rapid growth in the use of information nodes, to access international scientific and technical bibliographic information; this growth was limited almost exclusively to Cairo area users;

- Variation among the five information nodes as to capabilities, marketing aggressiveness, and user interests;
- Persistent lack of an institutional and management framework to support the network, as distinct from the individual nodes;
- High probability that at least three of the information nodes would increase their capability and market, and will be able to recover a substantial proportion of the costs of information services.

The information services of the project, provided by the five nodes of the network, handled more than 3,000 requests for information in the two-year period ending in January, 1985 alone. The demand for these services was accelerating. During 1983 and 1984, over 1,800 users requested services; the number of users in 1984 was double that in 1983, largely as a result of the activities of EDICA and EIDDC. Although the information system did not maintain a profile of its users, the staffs at the nodes reported that the overwhelming proportion of users were post-graduate students, scientists and engineers, and university professors. The subjects on which searches had been requested tended to support this view. Most searches were related to the agriculture sector, and the rest covered a variety of technical topics.

Even discounting for an initial burst of enthusiasm at having access to international bibliographic databases, the number of users increased consistently; and users were satisfied. The more established nodes -- NIDOC and EDICA -- had many repeat users (about 6 percent and 9 percent respectively)-- users who had returned at least once after a period of a week or several months. Selective dissemination of information services, whereby a client can place a standing order to update periodically an initial search-- were also increasing. There were some complaints about slow delivery. Delivery of actual documents requested by clients, handled through an arrangement with the British Lending Library, was invariably slow. Computer-printed bibliographies usually arrived within two to three weeks of a search, but were occasionally delayed at the Cairo post office for up to 4-5 days. Such complaints were likely to decline once the search capability was "on line" in Egypt, and once the nodes were able to refer clients to holdings of journals and periodicals in Egypt through use of the Union List. (The team found that almost all the documents requested were in the journal and periodical holdings of the Supreme Council of Universities, acquired on microfiche through AID's CIP).

The value placed in the service -- as evidenced by clients' willingness to pay for the service -- was of particular concern to the evaluation team in view of the scheduled termination of the project. The STI project provided a very large subsidy for each request, 100 percent during the early period of node development, to 66 percent for NIDOC. Beginning in late 1982, NIDOC began charging users LE 20 for a search (the average cost of a search was \$ 60), and the

sudden imposition of a fee had had virtually no effect on the level of demand. Other nodes planned to begin charging the same fee in March 1985, and their staffs did not expect demand to fall appreciably. If the direct on-line search capability were established through use of a new dedicated line packet-switching network facility (announced by the Egyptian telephone authority during the course of this evaluation), the average search cost would fall to approximately \$ 43, of which between \$ 30 and \$ 37 would be payable in US dollars).

Most of the nodes were quickly gaining a better understanding of their respective markets, and required further assistance to help them differentiate their services according to the priorities of their clients. Otherwise, particularly in the case of EIDDC, their potential markets would disappear. The development of the nodes was too recent to observe the extent to which one node might be willing to refer clients to another node for relevant specialized assistance. Certain areas of client demand were not being met through the STI network (e.g., access to visual data, data on engineering specifications and designs). In addition, the scope of the network's services was narrowly confined to users in the Cairo area.

The purpose of this project would not be achieved until a minimum management, administrative, technical, maintenance and coordination capability was institutionalized in an organization by ASPT. This basic requirement, widely confused with the idea of a legally incorporated national "governance" in the form of a quasi-governmental authority, would be necessary to nurture the existing nodes, and to provide technical guidance and training to a future sixth node serving a major sector of the S&T community (e.g., construction or urban development). To perform these activities effectively, to be able to offer nodes benefits that would encourage their continued participation in the network, and to gain efficiencies from centralized programs of Egyptian database development, Arabization, and training in procedures common to the network, this organization would have to have an established budget and incentives, funds to contract for specialized systems development to support node services, funds for equipment maintenance after expiration of warranties, and, preferably, authority and foreign exchange to administer the arrangement made to enable the nodes to perform on-line searches through the new packet-switching network.

II. GOAL

The implementation phase of the STI project began with the signing of the Georgia Tech contract in November 1982, with one exception, the nodes only began operations supporting the purpose of the STI project during 1984. It was, therefore, much too early to assess the impact of the projects activities on the goal of the overall "Applied S&T Research" project.

The following interim indicators related to goal achievement:

- Continued relevance. The information capability remained the only such capability in Egypt to systematically promote wide access to scientific and technical information pertinent to five major development sectors -- agriculture, industry, health, energy, and applied scientific research. Assuming that, without this project; Egypt would be constrained in attempting to focus its R & D and development management efforts effectively and efficiently, then the project was still likely to have an impact on the goal.
- Appropriate user community. Individual and institutional users of the information services were predominantly the types of users whose work was likely to relate to the goal (e.g., scientists and engineers, graduate students, research program managers). This community included beneficiaries of both the information services and the information training program conducted by Al-Ahram OMIC.
- Narrow focus. In three respects, the project's scope was too narrow to achieve the desired impact on the goal. First, the geographical coverage of the project was largely limited to the Cairo area. Second, the range of information management services emphasized bibliographic information over other types of information. Third, although university graduate students made up a large proportion of the users, the university community at large was not well served.
- R & D management limitations. The ability of this project to contribute to or have an impact on the goal was constrained by the same factors that handicap the broader development of effective R&D management in Egypt.
- Lack of coordination with related AID projects. This project was not effectively coordinated with related AID funded activities having an information component.

I. BENEFICIARIES

Almost 2,000 Egyptian scientists and engineers were users of STI services by March 1985.

J. UNPLANNED EFFECTS

The team found no unplanned effects. However, from its inceptions, the design of the STI system developed by the contractor contained the recommendation for a national information "governance" in the form of a legally-created governmental or quasi-governmental authority. This recommendation was the source of considerable difficulty for the project and its implementation. AID policy does not advocate the establishment of new public sector bodies.

Accordingly, ASRT would have to consider alternative approaches to sustaining the most fundamental and practical elements of an STI information network. These were:

- Continued promotion of the concept of sharing S&T information by the producers and repositories of the information;
- Continued service to the broadest possible community of information users in respective sectors;
- Continued adherence to a shared minimum standard of methods and procedures relating to maintaining the Egyptian database; and
- Continued shared development of minimum technological capability to interface information between nodes.

ASPT were willing to establish and fund a focal point for coordinating the existing network for managing resources useful to the network, these fundamental elements could be sustained. ASPT would then also have an organizational ability to receive any future donor support for the network, which, if linked with ASPT management of network access to international databases, would put ASPT in an important position to "negotiate" with participating nodes.