THE NATIONAL STI SYSTEM OF EGYPT

Report of an Evaluation Team

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Chairman

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CONTENT OF REPORT

EXECUTIVE SUMMARY

This Report gives the results of the study by an Evaluation Team of four Egyptian and three international experts of the proposed design of an information system to provide information services of importance in science, technology and national development (STI). The plan has been developed over a period of two years under the technical direction of Dr. V. Slamecka of the Georgia Institute of Technology with U.S. Agency for International Development funding under a contract administered by the U.S. National Science Foundation and with the guidance of professional personnel from the Egyptian Academy of Scientific Research and Technology and related Egyptian institutions.

The proposed national STI System for Egypt is primarily described in four reports (listed in reference 2) which were issued during the past several months. These reports cover a national policy for STI, the design of the proposed system, an implementation plan, and a manpower development plan. These reports were preceded by several documents reporting the results of extensive, nationwide surveys of the information resources of Egypt. The Evaluation Team examined the reports, was briefed by the contractor, deliberated during an intensive six-day meeting in Cairo, and produced this unanimous report.

The report is structured into a series of general and specific findings and recommendations. The major general findings are that:

+ Egypt could increase its rate of national development with the proposed national STI System.

+ The proposed design, implementation, and manpower development plans are sound and are compatible with the Egyptian environment.

The major specific findings are that the proposed information resources and services systems should be an open-ended network of six nodes devoted to specific technical areas, that an active clientele development program should be initiated, and that a document delivery service be offered as proposed in the four reports. Technologically, the proposed system architecture, the plan to maintain hardware and software compatability at all the nodes, and the proposed tie to international packet-switching networks are appropiate. The proposed crash training program for professional and paraprofessional information specialists is the most cost-effective approach in the manpower development. In the management and governance area, there is a need for a strong central project directorate which carries out a number of technological tasks such as monitoring of activity at the nodes, technical support, and the development of hardware and software standards, and other functions associated with a national focal point for STI.

The major general recommendations are that the results of the initial phase of the project should be accepted by the Egyptian and USAID authorities and that the detailed design and implementation phase scheduled to take three years should start as soon as possible. Also systematic effort should be made to identify the most

important user communities and have their representatives participate actively in the detailed design and implementation phases. In addition a responsive project leadership and an effective decision-making mechanism should be developed.

The major specific recommendations made by the Team include greater emphasis being given to the use of the Arabic language in software development and that greater use be made of the experiences of other developing countries in the STI area. In addition to the crash training program which should be an integral part of the responsibility of the project directorate, efforts should be made to strengthen the information science-related academic progress in Egyptian universities. In most cases training should be accomplished in Egypt to reduce costs. A national policy statement with respect to STI should be formulated and an effort be made to include this statement in the Egyptian National Plan for Socioeconomic Development.

The Evaluation Team also reviewed a separate but simultaneous training program for Egyptian librarians and information specialists carried out by the Catholic University of America in Washington, D.C. which trained fifteen Egyptians who are part of the available human resources in Egypt.

The estimated cost of the implementation phase, if funded by the Egyptian government and the USAID according to present plans appears to be adequate to launch an effective national STI System for Egypt in three years.

PREFACE

It is a pleasure to acknowledge on behalf of the Evaluation Team (members listed in Appendix A) the many courtesies and substantial assistance provided the team during the six-day working period from March 15 to 21, 1982 in Cairo.

Dr. I. Badran, President of Egyptian Academy of Scientific Research and Technology, met with the external members of the team and graciously hosted a luncheon for the entire group. Unfortunately, his busy schedule precluded his taking a more active role in the Team's work.

Dr. Eng. M. Hallouda provided the Team excellent logistical support and participated in the Team meetings on several occasions. He provided active guidance to the Team and made several crucial contributions to the team's developing understanding of the Egyptian environment. His hospitality and innumerable courtesies gave the Team a feeling that they were valued as individuals as well as a group.

Dr. Mohamad Madkour served in a dual role. He was a gracious host for a Team luncheon and also participated as an active Team member. Through his role as Egyptian project manager during the first phase (Phase I) of the project, he had a detailed background of the project's history and development which he shared with the group.

The Team is grateful also to Dr. Vladimir Slamecka, the principal initiator of the STI System Design and Implementation Plan and the main author of the documents which the Team studied and examined. He briefed the Team on the project, worked with the Team's Task Forces at their request, and responded to innumerable questions. His availability whenever needed during the first five days of the working period facilitated the Team's understanding of the project's detailed structure.

The Team also benefited from a briefing by Dr. Bahaa El-Hadidy, the principal investigator of a training program undertaken at Catholic University in Washington, D.C. simultaneously with the STI System project. Dr. Hadidy participated in the roundtable meeting on the 4th day of the working period when the Team presented its preliminary results to the Executive Committee for the Project whose members are also listed in Appendix A.

The role and assistance of the U.S. National Science Foundation's (NSF) program manager, Mr. Eugene Pronko, is also gratefully acknowledged. He provided the Team's international members with valuable information and much travel assistance which greatly facilitated their work. The Evaluation Team operated under NSF project NSF - 82 - SP - 0648.

Also of great help to the Evaluation Team, particularly the international members, were Ms. Janice Weber and Mr. James Riley of U.S. Agency for International Development (AID) Mission in Cairo. Their efficient administrative help saved the Team much time and effort.

As chairman I should like to thank the individual members of the Team for their willingness to put in long hours of effort during six consecutive working days. Not only did they work hard, but they worked together so effectively that this final report has their unanimous concurrence. In view of the wide diversity of backgrounds of the team members, it is a tribute to their intellectual capabilities and spirit of cooperation that such a major undertaking was completed in such a short time.

F. Karl Willenbrock, Chairman
Evaluation Team

I. INTRODUCTION

In November 1976, a proposal for an Egyptian National Scientific and Technical Information (STI) System[1] was put forth. This proposal was followed by a series of agreements between the Government of Egypt and the United States Agency for International Development (AID) which resulted in the development of a plan for a National STI System. This plan is documented in a series of reports[2] by a United States contractor, the Georgia Institute of Technology, with Dr. Vladimir Slamecka as the principal author.

An Evaluation Team whose members are listed in Appendix A was organized in early 1982 to evaluate this proposed STI System. It was composed of Egyptian and international STI experts who met in Cairo from March 15-21, 1982. This report is the result of the Team's work and includes its findings and recommendations. It is directed to both the Egyptian authorities responsible for the project as well as the USAID which funded a major part of the work done on this project.

In addition to the four Egyptian members and three international members of the Team, there were four Egyptian observers listed in Appendix A who served as members of the four task forces into which the Team was divided. These task forces, whose titles and members are also given in Appendix A, examined specific components of the plan and wrote reports which constitute a major part of the Evaluation Team's report.

The Team started its work by generating a series of general criteria to serve as a common basis for the task forces' examination of the proposed System. These criteria were:

+ compatibility with the Egyptian environment
+ completeness
+ continuity beyond the 3-year implementation stage
+ utilization of international experience and resources
+ system adaptability and robustness
+ operational feasibility

These criteria were applied in a variety of ways by the task forces. The criterion, compatability with the Egyptian environment, is meant to designate to what extent the proposed system meets well the present circumstances, which prevail in Egypt both physical and organizational and to likely future developments. The criterion, system adaptability and robustness, refers to how the system can adapt to changes and in particular how fragile the system is. The term, robustness, is used to designate whether the system is overly dependent on a particular element which if it fails could result in making the entire system inoperable. There was a daily interaction between the task forces and the entire Team so that each Team member had an opportunity to participate in the work of all the task forces. However, the task force members who were the principal authors of the sections are listed in each section.

The report uses a findings and recommendations format. The findings are essentially the conclusions reached by the Evaluation Team and the recommendations are the actions which the Team proposes on the basis of its findings. An additional breakdown used by several task forces is to subdivide their findings into 3 categories:

A. Indicating the Team concurs with the contractor's proposal.

B. Indicating that the Team does not concur with the contractor's proposal and has a specific modification to recommend.

C. Indicating that the Team does not concur with the contractor's proposal and recommends a joint effort to resolve the differences in the future.

Not all the task forces used exactly the same format because of the different content of the components under examination and the different approaches to their tasks taken by different task forces.

The Team operated as a single group to develop its position on national STI policies and also to determine the general findings and recommendations which are summarized in the Conclusions section.

An additional ad hoc task force examined the Training Program undertaken by the Catholic University of America and summarized the reports[3] by Dr. Bahaa El-Hadidy. This program which was separate from the STI System Design effort was carried out simultaneously with USAID support.

The Team also hosted a roundtable on the fourth working day to present its preliminary results to the Project Executive Committee whose members are listed in Appendix A. The Team received recommendations and suggestions from this Committee.

The final (sixth) working day was devoted to revising the task force reports and all the sections and their appendices, except for the introduction and preface which were written by the Team Chairman after the completion of the working period. Each Team member approved the content of all the other sections of the report and the associated appendices. It is, therefore, appropriate to state that this report represents the unanimous position of the Team members.

In addition to the description of the history of the project and to the composition and procedure of the Evaluation Team, it is desirable to address one substantive issue in this introduction. The Team devoted considerable time to the question of who would be the potential users of the STI System. It was quickly agreed that if STI were taken in its literal sense of scientific and technical information, it could be inferred that only scientists and engineers would be users. This clientele is certainly too narrow a group for the System's potential services. Dr. Slamecka defined the System's potential clientele to be all problem - solvers active in national socio-economic development. While this term is much broader, it also allows room for ambiguity.

Thus, an effort to describe the System's users is worth undertaking.

The users of the proposed National STI System can be categorized into three major groups:

1. decision makers, policy makers, planners and managers and staff support personnel.

2. research and development personnel, and the academic community.

3. people at the "grass roots" levels, such as professionals and para-professionals in business, education, manufacturing, agriculture, public service, etc.

Traditionally, an STI System addressed itself largely to group 2. But increasingly it is found to be essential to provide information support to the activities of groups 1 and 3. However, the fundamental orientation is to be directed towards socio-economic development.

Finally, it is worthwhile to indicate the extent of the information support that the System would provide its users. In its Implementation plan, scheduled to occur over a 3-year period, the System would initially supply information in the form of numerical data, bibliographic data, documents, and provide referral services, etc. Information analysis services would be developed in a subsequent stage of development. However, it could supply the individual who performs information analysis services much of the information he needs; however, it would not supply him with simulation models.

While it is too early to predict all the services that the System might provide as it gains maturity, it should be kept in mind that in its initial phases, it is directed toward the more traditional information services through the application of state-of-the-art methodologies and technologies.

The next five sections of this report are devoted to the finding and recommendations of the task forces. The final two sections on national information policy and general conclusions were written by all Team members acting as an enlarged task force.

REFERENCES

1. Badran, I.G. and Slamecka, V.
Proposal for the Development of National (Vernacular) Information Services in Egypt: Definiton and Design (Phase I), System Implementation (Phase II), November, 1976

2. Slamecka, V.
The Egyptian National System for Scientific and Technical Information: Design Study, November, 1981 - referred to as the Design study in this report.

The National STI System of Egypt: Implementation, November 1981 - referred to as the Implementation study in this report.

Manpower Development for Egyptian STI Services, January 1982 - referred to as the Manpower Development study in this report.

Adams, S., Madkour, M.A.K., Slamecka, V.
A Proposed National Information Policy of Egypt, September 1981 - referred to as the Policy study in this report.

All these reports published by the School of Information and Library Science, Georgia Institute of Technology, Atlanta, Georgia, U.S.A. and the National Information and Documentation Centre, Academy of Scientific Research and Technology, Cairo, Egypt.

3. El-Hadidy, Bahaa
Training of Egyptian Information Specialists: A Multifaceted Approach, January, 1982

School of Library and Information Science, The Catholic University of America, Washington, D.C.

II. INFORMATION RESOURCES AND SERVICES

Task Force Members - Dr. Jacques Michael, Chairman
Ms. Nagah Habit
Mr. Osama El-Sayed

INTRODUCTION

The task force evaluated the design study report having in mind that the objective of the STI System is to serve the information needs of many users. The evaluation work was segmented in two parts: information resources and information services.

The task force considered the general concept proposed by the contractor for maintaining on Egyptian territory a non-trivial portion of the world's high quality scientific and technical literature. It also considered the general concept and proposed structure of an open-ended network of information services. Included in the activities of the System are clientele development, data development, generation of different types of data bases, access to domestic and foreign data bases, document delivery, and publications. For each of those components, the generic criteria were used as a basis for the analytical evaluation.

INFORMATION RESOURCES

1. General Comments

A. Findings

The task force fully endorses the strategies for the national development of STI resources in Egypt as outlined by the contractor including:

+ a common resource-sharing methodology
+ the systematic supplementation of national STI holdings
+ the central acquisition and processing of purchased materials
+ the maintenance of a union list of STI holdings.

B. Recommendations

1. During the implementation phase, it will be necessary to determine the number and the locations of document repositories having specialized collections. For this purpose a new survey should be made of all the major Egyptian STI libraries, especially those which could be document repositories in the STI System. In particular, surveys and comparisons with the core lists should be made at the American University in Cairo, Military Technical College, and U.S. Navy Medical Research Unit 3. In these surveys, the 1000 new titles of periodicals which have been already delivered to the Egyptian university libraries by USAID should be analyzed. The possibility of obtaining 5-year back-file collections on microfilm should be considered.

2. Consideration should be given to include the social sciences in establishing the core journals list.

INFORMATION SERVICES

1. General Comments

A. Findings

The creation of a geographically distributed open-ended network of information services is an excellent concept and is fully endorsed by the task force. Such a network has the following desirable characteristics:

+ a flexibility which permits progressive implementation
+ an adaptability to the Egyptian environment
+ technical feasibility
+ low risk of service discontinuity since most components fail soft
+ fully adaptable to international cooperation because a similar sectoral approach is followed in most countries and by many international organizations.

The functions of the information services which have appropriately been taken into account are:

+ the systematic development of user clientele
+ the compilation of data bases of indigenous information
+ the provision for foreign and domestic sources of data information.

The special attention given in the Design study to the marketing activities of the information services is noteworthy and is endorsed by the task force.

The progressive operation of sectoral information services will serve the socioeconomic development of Egypt and reinforce its scientific, technical, and cultural leadership in the Arab world.

B. Recommendations

Although the implementation of the information analysis function is proposed for a later phase due to the time needed to train manpower, this function should be initiated as soon as possible via existing extension programs and extension officers.

Information services should be strongly committed to serve the information needs of professional people engaged in science, technology, and development activities, including decision makers and practioners and not only researchers. For this reason information services should be managed by individuals who have both adequate professional experience in specialized fields and detailed knowledge of information operations.

2. Clientele Development

A. Findings

It is essential in an environment which is not information-oriented and does not make adequate use of information, to have a strong clientele development program. The success of the whole national STI System depends on the energy put into the marketing of services. The role of the project director in influencing educational programs to make students more information-minded is crucial. Students who are the future engineers, scientists, and professionals should learn that the first thing to do when facing a problem is to determine if a solution already exists and is available.

B. Recommendations

The marketing effort should cover the evaluation of local and sectoral needs, the study of markets, the promotion of products and services, through advertising and mailings. Appropriate information products should be designed iteractively by using evaluation and feedback techniques.

Present user education programs should be surveyed and evaluated. For example, the user training program for managers in Ain-Shams University should be used and, if necessary, it should be assisted to gain greater strength.

Special training sessions for students on new information technology should be encouraged and if possible integrated in existing curricula. Information resources should be made available to the faculty members involved including special incentives. Continuing education programs regardless of topics under consideration should be encouraged to pay some attention to available information services.

3. Bibliographic and Referral Data Bases

A. Findings

The compiling of electronic data bases of indigenous information is most desirable. The estimate that the number of Egyptian documents to be put into bibliographic data bases to be about 3000 per year is reasonable for the present. The proposed access to data bases is fully satisfactory and the proposal of decentralized data-base searching is endorsed.

B. Recommendations

Two problems are raised:

1) For building an indigenous bibliographic data base of 3000 documents per year, it is not economical to have it built on a decentralized basis. The burden of coordinating such activities will be heavy; as many people will be used for coordination as for doing the work. A centralized input and processing activity is recommended.

2) Bibliographic data bases are raw information materials; they cannot be used directly by many users. Usually only researchers are able to use them without repackaging. Decision makers and practitioners are much more interested in obtaining practical information which is contained in referral data bases such as product information, standards, and ways of identifying exports. Therefore, the task force strongly recommends that:

   a) The data base activity in the information services should be focused on referral information as mentioned in Table 13 of the Design study. Developing referral-type information services should help the marketing of information product and services by their direct appeal to end users and in this way contribute strongly to the success of the overall program.

   b) One node in the STI System should be given major responsibility for building the Egyptian bibliographic data base.

   c) The Implementation study should define in more detail the content of referral data bases and determine:

      + the type of information to be collected
      + the volume of such information
      + the cost involved .

4. Document Delivery

   A. Findings

      The Design study proposals are very appropriate.

   B. Recommendations

      Three recommendations are made:

      + a strong coordination with existing document repositories is necessary,
      + a standardized and simple document order procedure based on coupons use (in order to avoid heavy accounting work) is needed,
      + the mail delay should be reduced by making the connection between copy production facilities and users as direct as possible.

5. Publications

   A. Findings

      The task force concurs with the Design study's recognition of the need for publishing printed products as data base outputs.

B. Recommendations

Publishing only abstracts or STI profiles does not fully serve users. It is recommended that regular publications be made of:

+ Directories from referral data bases as specified in the Design study
+ State-of-the-art summaries in different fields of science and technology
+ Newsletters for managers and decision-makers to provide them with technological trends and news of innovations and newly available technology.

III. TECHNOLOGICAL ASPECTS

Task Force Members - Dr. Nabil Aly, Chairman
Dr. Aly Fahmy

The technological aspects of the STI System project were broken down into the following main evaluation areas:

+ Overall system architecture
+ Hardware and administrative software
+ User interface with databases
+ Data Communication
+ Arabization
+ Applications development considerations

The generic evaluation criteria were broken down into specific set of design-related issues. Appendix B includes a detailed list of these issues as an indication of how the task force viewed the overall evaluation criteria in its own specific perspective.

The Design and Implementation studies were cross-examined against the exploded list of evaluation criteria. The outcome of this exercise is presented below for each of the evaluation aspects using A,B,C, categories:

A - Areas where the task force concurs with the Design study and endorses the design decisions

B - Areas in which the task force recommends a specific modification

C - Issues which need joint future study to resolve.

1. Overall System Architecture

A. Findings: The task force endorses:

+ the overall structure with its minimum reliance on intercomputer links,
+ the analysis of how the STI System will interface with an international packet switching network, and the resource sharing principle to avoid duplication.
+ the ring configuration of the network in light of the experience of STI networks in other countries.
+ the six nodes proposed since these represent a reasonable sectoral coverage and provide an achievable project scope in the implementation phase.
+ the major design criterion that the national STI system will continue to evolve over a long period. It is important to avoid system rigidities since there has been a high rate of failure of national information projects in less developed countries due to discontinuities, political decisions and/or organizational changes.

B. Recommendations

1.1 - Beside the sectoral coverage of the nodes, technical consideration should be given to ensure wide geographical access to the sectoral nodes.

1.2 - Extension of the resource sharing concept beyond the information resources to include also central technical support, research and development activities and system-wide network functions.

1.3 - The design should include a clearer concept of the functional hierarchy of the STI System as a whole and the relation of central staff to the nodes.

1.4 - The STI System project directorate should have its own facilities or gain access to computerized facilities to support its coordinating, monitoring and common development functions, such as

+ monitoring of overall system performance
+ development of common applications
+ assessment of the utilization of service
+ interfacing with local and foreign networks
+ research and development on standards.

2. Hardware and Administrative Software:

A. Findings; The task force endorses:

+ the gross sizing estimation technique adopted
+ the guidelines developed to specify the hardware
+ the recommendations for a single operating system.

B. Recommendations

2.1 - More guidelines are needed to help in selecting the administrative software to include word-processing capabilities, editing and on-line data entry functions, automatic monitoring features, and data communication drivers.

2.2 - While "problem solvers" are the major clientele of the STI System, the search volume upon which design estimates were based included only scientific and research usage. In view of the unpredictability of the workload and storage requirements, more attention should be directed towards how the STI System can cope with such uncertainties.

2.3 - Maintenance responsibility of hardware and basic software should be assigned to the supplier, at least in the first 3 years of the equipment life. The 2% figure for maintenance cost should be revised to meet the local market costs.

2.4 - The statement in the Design study (page 57) regarding asynchronous ports should be clarified or corrected.

2.5 - The Design study should spell out clearly and document the pitfalls to be anticipated in the subsequent detailed design and implementation phases.

2.6 - The distributed database (DDB) approach adopted in the system design was investigated thoroughly. It is understood that the DDB is restricted to that of sectoral specialization of the nodes rather than the integration of the dispersed data bases as a single logical system. Such a clarification should be formally stated in the detailed design specifications to avoid any future misinterpretations.

C. Joint Future Efforts

+ Since the STI System is to serve problem-solvers, the reliance on locally produced information will be significant. The design should explore the technicalities involved in providing interfacing of existing data bases as well as those that are currently under development. Difficult problems are encountered when diverse hardware and software are involved.

+ The design should emphasize the criteria governing the choice of a node location especially in relation to proximity to users and physical repositories as well as the possibility of connection to the network.

+ A set of guidelines to direct the procurement process has to be developed such as those related to vendor selection, second sourcing, and compatability matters.

3. User Interfaces with Databases

A. Findings; The task force endorses:

+ the relational database concept.
+ the use of unified query language.

B. Recommendations

3.1 - The use of relational databases should be coupled with the software that suits local conditions. The importance of a single updating entry to all relevant files should be stressed.

3.2 - The aggregated database at the central project directorate has to be outlined to interrelations between the specific data sets included in Appendix D-1 of the Design study. Incorporation of a log file on problems faced by users seems desirable.

4. Data Communication

A. Findings; The task force endorses the decision to interface with an international packet switching network.

B. Recommendations

4.1 - Technical specifications of the required local network as well as the link to the packet switching network needed for the STI System have

to be defined such that proper requests can be made to the Egyptian Telecommunication Agency. A primary objective of this coordination should be the establishment in Egypt of a node of the international telecommunication networks and record carriers. The Agency should be invited to participate in the detailed design phase, and the time-consuming task of coordinating should be taken into consideration in the implementation plan. Recommendation should be made in the detailed design regarding TELETEXT and the linkage of terminals to the nodes.

4.2 - Though the need for interfacing the nodes with each other and with foreign databases was stressed in the Policy and Design studies, the interfacing needs to be properly phased in the implementation plan.

5. Arabization

A. Findings; The task force endorses the short-term solution for the Arabization requirements which is based on the mechanical English to Arabic replacement of query commands and dictionaries.

C. Joint Future Efforts

The design should explore the efforts done in Egypt and other countries in Arabic informatics such as the Industrial Development Center of Arab States (IDCAS), the Central Agency for Public Mobilization and Statistics (CAPMAS), and other groups to avoid duplication and wrong decisons such as using last names for Egyptian authors. However, to guarantee a long-term evolution, a genuine Arabization development program should be planned.

The international experience of other countries such as India, Japan, and Mexico on how they handle native languages in STI systems should be assessed and analyzed. Also translation activities need more emphasis. Organizational and manning requirements should be specified. Although automatic/semi-automatic translation of English to Arabic is available, its use is not anticipated in the early stages of the implementation phase. Further information on this matter should be developed.

6. Applications Development Considerations

A. Findings; The task force endorses the adoption of ready-made software packages to make the implementation phase as smooth and free of major trouble as possible.

B. Recommendations

6.1 - The detailed design should define the types of applications in adequate detail to phase in the recruitment of professional and paraprofessional technical personnel and their training in the implementation stage.

6.2 - A set of guidelines should be specified to govern the applications package selections process such as modifiability and customization.

C. Joint Future Efforts

+ The development of user manuals in both English and Arabic for both the local system and the foreign-based databases should be undertaken.

+ The Egyptian group responsible for implementation should be complemented by competent members from the user communities. User groups should explicitly participate in developing the organizational structure.

IV. MANPOWER DEVELOPMENT

Task Force Members - Dr. A. Neelamegan, Chairman
Dr. Mohamad Madkour
Dr. Farag Sedky
Dr. Samir Rashad

A. Findings

The contractor's analysis of the manpower needs of the proposed STI System and the proposals for the development of the required professionals and paraprofessionals through a crash program of short training courses are generally sound and acceptable.

It is also noteworthy that the STI policy proposals rightly recognized manpower development, in adequate number and of the appropriate quality in the different specialties, as of crucial importance in the practical realization of the STI System.

The objectives of the crash program for manpower development are well defined in relation to the STI System implementation in the next three-year period.

The proposed strategies to develop the required information personnel to implement the STI System are well conceived and feasible in the Egyptian environment.

The facilities, resources, and finances needed to implement the crash program of a series of short courses as identified in the manpower report are reasonable and necessary.

The centralized management of the crash training program through an Information Career Training Center (ICTC) is a sound proposition and should prove effective.

The proposed syllabus for the short courses, the manner of conducting the courses, etc. are appropriate for the purpose.

B. Recommendations

The following comments and recommendations relate to the practical realization of a manpower development program for supporting the national STI System development in Egypt.

1. Although the manpower development proposals address themselves mainly to the immediate needs of the STI System Implementation phase and gives a brief chapter regarding strategies, after the three-year Implementation phase, it is desirable that more definitive guidelines be provided on the actions to be taken now in parallel with the crash program for the long term institutionalization of the education and training for information personnel development in Egypt. The development of a good complement of resource persons (faculty), defining appropriate curricula and teaching levels, building up the necessary teaching aids and facilities, etc. for graduate and postgraduate level courses in Egypt could take two to three years of preparatory work.

2. Development of a core faculty/trainers in information science/informatics is a critical factor in the manpower development effort. Some guidelines in this regard would be helpful, for example:

a) the use of the Egyptian resource persons involved in teaching/training in the crash courses in the faculty development program,

b) formulating and implementing a carefully prepared long term plan for training selected Egyptians in other countries (e.g. USA, UK, France) for teaching information science/informatics subjects at the graduate and postgraduate levels.

c) the identification of existing informatic centers, programs and facilities in Egypt for use in the training of teachers of information science/informatics.

3. The availability and provision of local facilities especially computer hardware and software for use in the training programs, for demonstration and hands-on experience are important. A survey and compilation of the resources of such facilities is a worthwhile project to be undertaken. It would then be possible to formulate appropriate assistance schemes for upgrading the facilities to an adequate level wherever necessary.

4. The selection of persons for the training is an important function. The proposals do contain some guidelines on the criteria or qualifications for the selection. However, more detailed procedures have to be formulated and adhered to. In most cases, the administration of a pre-admission test including foreign language competence (especially English), professional/technical knowledge and experience, motivation, and attitude would be necessary for the selection of the right type of candidates.

5. Although the contractor's manpower report does not deal with the training of the fifteen Egyptian library/information personnel in the program at The Catholic University of America in Washington, D.C., the experiences gained from that program in the selection of candidates, language competence requirements, types of courses to be provided, and the depth of training, could be useful in preparing guidelines and in planning future training programs. Also, the candidates trained under the Catholic University program should be considered as potential human resources in the STI System implementation phase.

6. It appears that there is a high degree to turnover of trained and qualified informatics personnel in Egypt and that this undesirable characteristic is likely to continue. This factor could become a serious problem in ensuring the availability of an adequate number of competent persons for the implementation and continued operation of the STI System. Although this is a matter for resolution by Egyptian authorities, nevertheless hints at some possible approaches might be helpful. For example, the provision of adequate career opportunities and financial incentives in the STI System and the formation of a separate cadre of information specialists with appropriate status for its members could be useful motivation to information professionals. Also establishing some types of reasonable contractual obligations for those selected and trained for the STI System may serve as a deterrent to a large turnover. It is also desirable that the number of persons trained be at least 50% more than the estimated requirements so as to constitute a buffer of back-up expertise for the loss due to attrition of various kinds.

7. Experience in other developing countries shows that persons trained under a crash program of non-degree courses face problems of recognition of their certificates vis-a -vis those obtaining a degree or diploma from local universities in library/ information science. The severity of the problem varies from one country to another. Nevertheless, it is desirable that the STI System project directorate initiate early action with the appropriate agencies including universities, the Ministry of Education, the body concerned with establishing equivalence of degrees and diplomas, to mitigate, if not solve, the problem. The documents and guidelines generated by UNESCO in this regard are useful.

8. The Information Career Training Center (ICTC) that manages the training program should be affiliated with the STI System project directorate.

9. The link between the information personnel training and user-education program should be brought out more explicitly so that helpful arrangements for resource sharing between the two programs can be made.

10. Continuing education programs for information professionals must be developed now. The experiences in this matter in other countries should be studied and utilized. The financial resources required should be found outside the current US AID allocation for the implementation of the STI System.

11. As the STI System is implemented, a considerable amount of documentation such as manuals and guidelines, especially for the computerized systems will be prepared and kept updated. These documents should be produced in sufficient volume for use in the training programs.

12. In formulating the curricula for the graduate and postgraduate training courses in information science/informatics in the institutions of higher learning in Egypt, the recent development and proposed programs in the Egyptian universities and the guidelines for an informatics course for developing countries recently proposed by the UNESCO/Science Sector/Informatics Unit should be studied and taken into account. Account should be taken of the recent changes in the existing training facilities in the Department of Electronics and Computer Engineering at Ain-Shams University, the Department of Library and Information Sciences at Alexandria University, and also the courses in library automation, application of computers in library operations, library administration, psychology and behavioral sciences introduced recently at Cairo University.

13. While the initiation of action for instituting fullfledged graduate courses in information science/informatics in Egypt even now is important for the continued operation and development of the national STI System after the implementation phase, it must be stressed that the financial resources required for the purpose should be found outside the current USAID allocation of the implementation of the STI System. The Universities Linkage Program could provide the necessary resources for the purpose.

C. Joint Future Efforts

For the purpose of formulating uniform guidelines on incentives and contractual obligations for those trained under the STI System project, further studies on the existing situation, rules and regulations and labor laws in Egypt should be examined as soon as possible. What has been done in other countries may also prove to be helpful.

V. TRAINING PROGRAM

Ad Hoc Task Force Members - Dr. F.K. Willenbrock, Chairman
Dr. Nabil Ali
Dr. Mohamad Madkour
Dr. Nadia Hegazi

Introduction

The ad hoc task force which considered the training program at the Catholic University of America used three major sources of information in reviewing the training program. These were the briefing by the principal investigator, Dr. Hadidy, the final report on the program[3], and contacts with a number of the trainees in the program. The ad hoc task force noted the following:

1. The program was initially designed for five library-oriented training tracks, which were later modified to accommodate nine additional tracks which were information science-oriented. These latter tracks involved a substantial amount of sophistication in computer-based information handling,

2. The training program even after modification was completed prior to the completion of the STI System design,

3. The trainees completed their training much earlier than the determination of the functions they might perform in the STI System and the possible jobs or positions they might hold.

A. Findings

1. For each trainee, the program succeeded in

   a. organizing the training paths to meet individual needs,
   b. dividing the training program into modules,
   c. packaging the overall training of the individuals appropriately.

2. The Principal Investigator showed great flexibility in accommodating the additional requirements of nine new training tracks. He also redistributed the training time among fifteen trainees instead of the twelve trainees originally specified in the contract.

3. The Principal Investigator, through his direct involvement and strong personal commitment, assisted the trainees through the difficult period involved in their individual adaptation to a foreign country and its customs.

4. The present working affiliations of the fifteen trainees are presently as follows:

Seven trainees are staff members at the National Information and Documentation Centre, one is on the staff of the Academy of Scientific Research and Technology, and seven are attached to Cairo University. Three are lecturers in the Department of Librarianship at the Faculty of Arts, one is a lecturer in the Faculty of Engineering, and two are programmers at the Scientific Computation Center. One of the fifteen trainees has resigned from her original job at the Industrial Development Centre for the Arab States (IDCAS) and is employed by a private computer software company. However, her employer has made a firm commitment to make her available to the STI System project on a part-time basis of two to three days a week.

B. Recommendations

1. In view of the prohibitive cost per trainee incurred in this program, future training should be performed in Egypt whenever possible.

2. Training abroad should be confined to the acquisition of specific operational skills or the education of trainers. The attendance of Egyptian personnel at a particularly important technical gatherings relevant to the overall STI System development and performance will also require time overseas.

3. Training should be carried on as an intrinsic part and subcomponent of the STI System development and not as a separate activity.

4. More strict criteria and testing procedures should be applied in the selection of trainees in the forthcoming phases of the STI System project. The criteria should include technical background, personal capabilities, personal commitment, and foreign language proficiency.

5. The fifteen trainees involved in the Catholic University Training Program should be considered as a significant asset when forming the STI System project staff. However, they should meet the criteria specified for the job under consideration.

VI. MANAGEMENT AND GOVERNANCE

Task Force Members - Dr. A. Neelameghan, Co-chairman
Dr. Mohamad Madkour - Co-chairman
Dr. Farag Sedky
Dr. Samir Rashad

The dual title of this section indicates that two distinct phases will be considered. They are:

1) the interim project management for the 3 years implementation phase,
2) the establishment of a permanent governance body for the ensuing period.

A basic function of the interim project management is to seek the establishment of the permanent governance body.

In Figure 1 of the Implementation study, a possible project organization is outlined and in Figure 10 of the Design study, a Council on Information Services and Resources is proposed as a possible permanent governance body. While the configurations proposed are certainly feasible, the task force concluded that the determination of the most appropriate location for the STI System in the Egyptian governmental structure is clearly a decision to be made in Egypt. However, by drawing on organizational experience from 14 other nations as indicated in a paper by A. Neelameghan (Appendix C), there are a number of comments which may help determine the best organizational structure for Egypt.

A structure for the interim project management is shown in Figure 1. The project directorate should operate with two major committees whose membership and functions are distinctly different. The Steering Committee should serve as the link between the project and the political structure of the government. It should be comprised of high-level representatives from the Egyptian ministries of Industry, Agriculture, Health, Housing and Human Settlements, Petroleum and Mineral Resources, Electricity and Power, Telecommunications, Education and Scientific Research, Planning, and the Supreme Council of Universities. Other organizations Central Agency for Public Mobilization and Statistics (CAPMAS), the Academy for Scientific Research and Technology (ASRT), the Egyptian Organization for Standardization and Quality Control, Al Ahram and the Chamber of Commerce should also be included. The Steering Committee should provide policy guidance to the project director; it should also facilitate making decisions which will maximize the benefit of the STI System to these organizations.

In contrast, the Advisory Committee should consist of persons who are selected solely on the basis of their individual expertise. They are not organizational representatives but, rather, serve as sources of information and knowledge important to the effective operation and management of the project.

It is difficult to overemphasize the importance of the selection of a highly-capable project director who has high technical and managerial expertise. The success of the project is directly dependent on the quality of the director. He must be

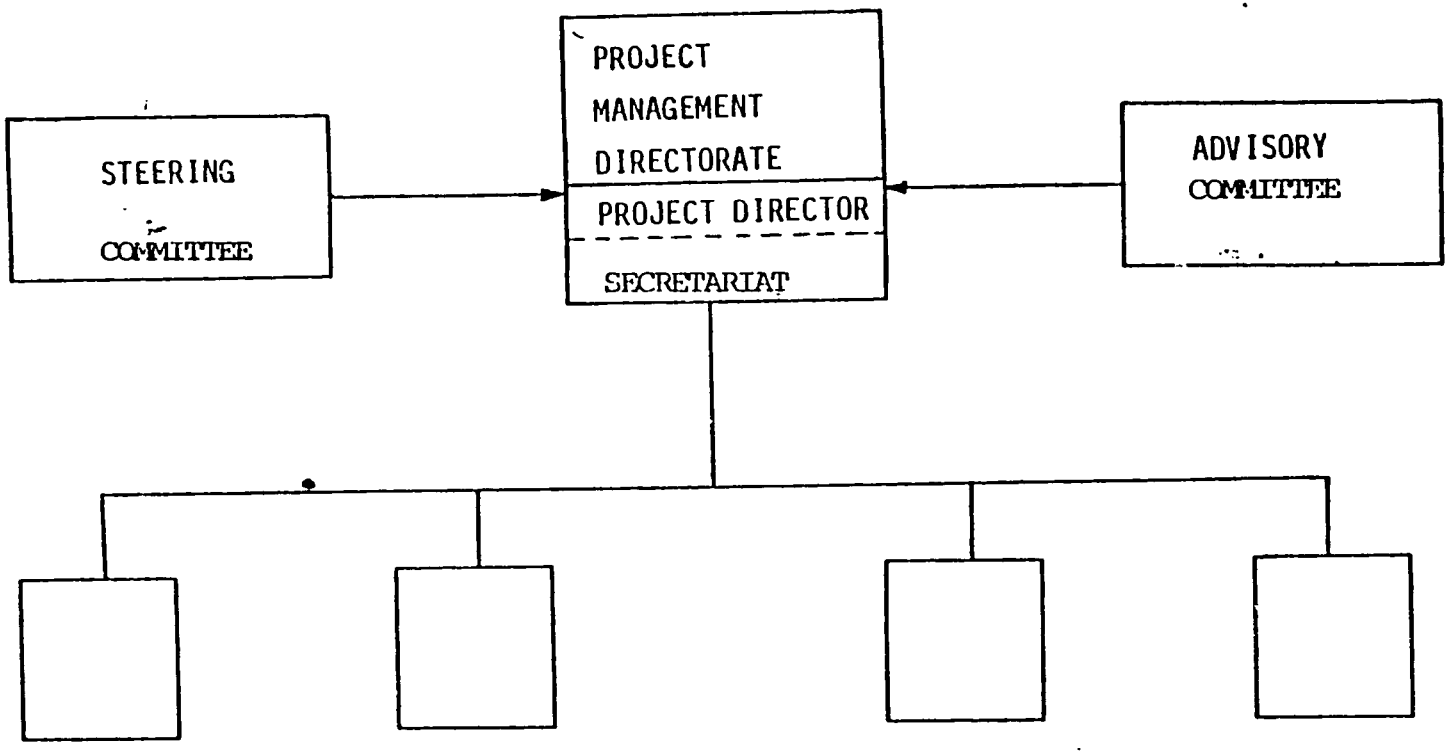
PROJECT
MANAGEMENT
DIRECTORATE
PROJECT DIRECTOR
SECRETARIAT
STEERING
COMMITTEE
ADVISORY
COMMITTEE

Fig 1

energetic and be dedicated full-time to the project. The same applies to all members of the Technical Implementation Group (TIG) as described in the Design and Implementation studies.

The organizational structure of the directorate is the prerogative of the project director. However, the functions to be performed include, but are not limited, to the following:

- System promotion
- Manpower development
- System and network development
- Central technical support
- Policy and planning

The directorate should not have operational responsibility, which is the role of the nodes, but should operate as the National Focal Point (NFP), a concept which is extensively developed in many of the UNESCO documents related to STI. Appendix C summarizes some of the functions associated with the NFP.

A. Findings

The task force found that:

1. the determination of the appropriate permanent governance structure is best done by Egyptian authorities;

2. the interim project management can be described in general terms on the basis of experience gained from other countries; and

3. there are specific functions that the project directorate of the interim project management should perform.

B. Recommendations

The task force recommends that:

1. a project directorate of the general format shown in Figure 1 be established;

2. a Steering Committee of representatives of the Ministries and other appropriate organizations as listed should be appointed;

3. a capable full-time project director be appointed;

4. the project director be authorized to appoint an Advisory Committee of experts whose knowledge would be of value to the project;

5. the project directorate shall have as a major responsibility seeking to establish the permanent governance body to have responsibility for the project upon the completion of the Implementation phase; and

6. during the early stages of the implementation phase, it is desirable that the core Egyptian group involved be exposed to the experiences gained in other both developed and developing countries in the establishment of national STI Systems.

VII. NATIONAL STI POLICY

Task Force Members - Entire Evaluation Team

The Policy report presents seven broad policy statements which provide a general framework for a national STI policy for Egypt. However, the Evaluation Team concluded that a more specific list of policy objectives should be formulated to provide more specific policy objectives. Drawing on experience gained from other countries, a series of sixteen policy objectives have been identified which can serve as a basis for both a broad and specific policy statement. These sixteen objectives which follow are not in conflict with the seven broad statements presented in the Policy report but rather amplify and complement it.

1. The national STI System when fully established should endeavor to provide access to timely and reliable information and data to all sectors of the Egyptian community, supporting research and development, problem solving, educational and other development activities. In the earlier stages of its development the System should be initially oriented to meet the information needs of problem-solvers in the production and service sectors as well as users involved in research and development, research management, and education in science and technology.

2. Responsibility for building up appropriate information resources and for providing information services appropriate to different user clientele should be allocated to different Egyptian organizations so as to maximize resource utilization.

3. Appropriate codes, guidelines and standards should be formulated and adopted so as to facilitate system interconnections, resource sharing, networking and collaborative and cooperative activities in the System.

4. A national referral facility supported by appropriate tools and mechanisms such as union catalogues, directories, clearing houses, and switching centers should be established.

5. Suitable information personnel development programs should be established to meet the immediate as well as future manpower requirements of the STI System. Procedures for a periodic survey and forecasting of manpower needs of the system should be formulated.

6. Differentiated user education, user orientation, user sensitization programs should be developed, supported, and organized so as to promote the effective utilization of the information resources and services.

7. Periodic surveys or other appropriate mechanisms shall be organized for assessing the changes in the composition of information user groups, their information use patterns, information needs, and the impact of STI services.

8. The national STI System and its components should collaborate with regional and international information systems, services and programs so as to augment the resources and services to the Egyptian user clientele.

9. The national STI System and its components should cooperate with and draw upon existing information systems, services and programs in other sectors and agencies.

10. The national STI System should utilize bilateral and multilateral exchanges and collaborative arrangements with other countries.

11. The STI System should promote and develop adequate translation facilities to augment information use domestically and facilitate the use and recognition of indigenous sources internationally.

12. The development of adequate information technology facilities such as computer hardware and software, telecommunications, micrographics, and audiovisual technology management should be promoted and supported.

13. The STI System should endeavor to secure adequate service conditions, status, job opportunities, incentives, for information personnel.

14. Research projects in the information area, especially relevant to the development of the national STI System should be promoted and supported.

15. The nation's science and technology publications capability should be augmented and improved so as to maximize the capture of the national science and technology research information and its dissemination to the widest extent possible.

16. A national focal point (NFP) placed high in the government structure, with a management directorate and function similar to those recommended by UNESCO for such purposes should be established to facilitate the effective management of the national STI System in its implementation, and operational phases.

A. Findings

The Evaluation Team finds the seven policy statements in the Policy report are acceptable. However, these statements are not specific enough to provide an adequate base for a national statement on STI policy.

B. Recommendations

The Evaluation Team recommends that the seven statements in the Policy study be augmented by the two following two policy statements:

1. In the design and development of the national STI System, the experience of other developing countries in the planning, implementation, and operation of such systems should be taken into account.

2. The STI System should give due consideration to the need for research and development in Arabic informatics to consolidate local and regional efforts and to restore Egypt's regional leadership in informatics.

C. Future Joint Efforts

The Evaluation Team urges that an appropriately definitive policy statement be developed for promulgation by Presidential decree, by legislative enactment, or through incorporation in the Egyptian National Socioeconomic Development Plan. Such a promulgation should have the two-fold effect of raising public consciousness to the importance of STI and also focussing the responsibility for STI System development in the appropriate agencies and defining the location of the System in the governmental structure of Egypt.

VIII. CONCLUSIONS

These conclusions were developed by the entire Evaluation Team.

A. General Findings

1. The Evaluation Team

+ appreciates the significant initiative taken by Egypt to formulate a plan for a national information system for science technology and development;

+ strongly endorses the concept of an integrated network to constitute a national STI System;

+ is convinced that such a System can play a major role in accelerating Egypt's development efforts.

2. The Evaluation Team commends the efforts of the Georgia Institute of Technology contractor and finds the overall design of the national STI System presented in the series of reports is

+ basically sound,

+ compatible with the Egyptian environment,

+ properly reflective of the experience in other countries involved in similar STI System development efforts.

However, with a view to strengthening the System design and to facilitating its implementation, the Evaluation Team has developed a number of general as well as specific suggestions and recommendations in this report.

3. The Evaluation Team concluded that the community for whom the STI System is being developed has not been adequately identified and apprised of the characteristics of the proposed System.

4. The Evaluation Team found that the response to the interim recommendations and actions proposed during the first phase of the proposed STI System were slow and in some respects final decisions are still lacking. As a result, progress towards design consolidation has been substantially delayed.

B. General Recommendations

These general recommendations are to be considered as supplementing the specific recommendations made in Sections II, III, IV, V, VI, and VII of this report. Both the specific and general recommendations should be systematically reviewed and appropriate resolutions should be made.

1. Since the overall design is acceptable and the specific modifications recommended by the Evaluation Team can be completed in the next three months, the actions needed to make the general design more concrete can become the first stage of the coming implementation phase. However, the completion of these actions should be subject to review and endorsement by the Egyptian Executive Committee. This procedure permits the formal approval of the STI System, Design, Implementation, and Manpower development plans (Phase I) to be accomplished immediately and the detailed design and implementation plan (Phase II) to be started at once.

2. The Egyptian user community for whom the System is being developed should be systematically identified and given adequate opportunities for active participation in the detailed design and implementation of the STI System.

3. During the next stages (Phase II) a workable arrangement should be developed to secure more rapid progress in implementing the STI System. Hence,

a) Egypt should provide a highly responsive project leadership and decision-making mechanism;

b) the detailed design, the actual implementation, and the monitoring of the subsequent stages should be performed in Egypt whenever possible;

c) there should be continuous interaction between the US contractor and the Egyptian decision-making and implementation groups; and

d) the Egyptian participation should be maximized.

4. An innovative incentive scheme should be developed to ensure the recruitment of highly competent full-time project staff willing to provide long-term dedicated service to the project. Appropriate incentives should also be provided to ensure effective cooperation among the participating organizations.

5. The Academy for Scientific Research and Technology (ASRT) and the USAID should finalize the specific allocation of all funds needed for the next phases as specified in the Implementation study. The budget breakdown proposed should be reviewed and adjusted at an early stage of the implementation phase after a detailed analysis of the allocation of responsibilities between the Egyptian project staff and the US contractor has been made. An appropriate balance between staff, material, and ancillary expenditures should be maintained.

APPENDIX A

LIST OF PERSONNEL

EVALUATION TEAM

Egyptian Members

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Egypt Air

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Faculty of Engineering
Cairo University

Dr. Farag Sedky
National Computing
Central Agency for Public
Mobilization & Statistics

Dr. Nadia Hegazi
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International Members

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Dr. F. Karl Willenbrock, Chairman
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Dr. A. Neelameghan
Project Coordinator
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Manila, Phillippines

Egyptian Observers

Dr. Samir Rashad
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Armed Forces

Mr. Osama El-Said
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Cairo University

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Centre

Eng. Sayed Hathout
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TASK FORCES

Information Resources and Services

Dr. Jacques Michel - Chairman
Ms. Nagah Habit
Mr. Osama El-Sayed

Technological Aspects

Dr. Nabil Aly - Chairman
Dr. Aly Fahmy

Manpower Development

Dr. Neelamegan - Chairman
Dr. Mohamad Madkour
Dr. Farag Sedky
Mr. Samir Rashad

Training Program Evaluation

Dr. F.K. Willenbrock, Chairman
Dr. Nabil Ali
Dr. Mohamad Madkour
Dr. Nadia Hegazi

Management and Governance

Dr. Neelamegan - Co-chairman
Dr. Mohamad Madkour - Co-chairman
Dr. Farag Sedky
Dr. Samir Rashad

EXECUTIVE COMMITTEE FOR STI SYSTEM PROJECT

Dr. Awad Muktar Hallouda, Chairman
President, Central Agency for
Public Mobilization & Statistics

Dr. Ahmad Aziz Kamal
Dean, Faculty of Engineering
Cairo University

Dr. Ahmad Mohamad Gad
Director
National Information and
Documentation Centre

Dr. Mohamad Madkour
Director-General
Al-Ahram Organization
and Microfilming Centre

Dr. Aziz Morsi El-Kholi
Associate Chairman
Medical Research Council

* Dr. Ali El-Selmi
Professor, Faculty of Commerce
Cairo University

Dr. Mohamad Younis
Head Information Systems
Academy of Scientific Research
and Technology

* Did not attend Roundtable on fourth working day.

APPENDIX B

DETAILED BREAKDOWN OF THE GENERIC EVALUATION CRITERIA FROM A TECHNOLOGICAL VIEWPOINT

This detailed breakdown of the technological aspects of the STI System design with respect to the generic criteria served as the basis of the analysis of the task force on technological aspects. It will be beneficial as guidance for the detailed design stage and as a checklist in assessing the overall design.

I. Compatibility with the Egyptian Environment

I.1 Overall System Architecture-related Issues
- Suitability of the network topology
- Sharability of critical and expensive resources
- Ability to interface with local databases

I.2 Hardware-related Issues
- Transparency to end-users
- Commonality of hardware and software
- Maintainability
- Utilization of existing resources

I.3 Database-related Issues
- Database maintainability
- Natural language interface

I.4 Data Communications-related Issues
- Coping with the modest quality of the Egyptian public telecommunication network
- Node location considerations
- Interface with international packet-switching networks
- Coordinating considerations with the Egyptian Telecommunications Agency

I.5 Arabization-related Issues
- Utilization of local efforts in Arabic Informatics

I.6 Applications Development Considerations
- Extent of analysis of the "Acquire or Develop" issue

II. Completeness

II.1 Overall System Architecture-related Issues
- II.1.1 Inclusion of alternatives
- II.1.2 Validity of the estimating techniques
- II.1.3 Clarity of the system hierarchical structure

II.2 Hardware-related Issues
- II.2.1 Completeness of the major hardware requirements
- II.2.2 Completeness of the software requirements

II.3 Database-related Issues
II.3.1 Presentation of the conceptual databases

II.4 Data Communications-related Issues
II.4.1 Utilization of the local experience gained in establishment of data communication networks

II.5 Arabization-related Issues

II.5.1 Long-term view of the Arabization efforts

II.6 Applications Development-related Issues
II.6.1 Outlining of types of applications
II.6.2 Clarity of the structure of applications development process

III. Continuity Beyond the Implementation Phase

III.1 Overall System Architecture-related Issues

III.1.1 System expendability considerations
III.1.2 Building-in of "true" user participation
III.1.3 Highlighting of anticipated difficulties and pitfalls

III.2 Hardware-related Issues
III.2.1 Continuity of supply
III.2.2 Provison of guidelines on how to cope with unpredictable workload and storage requirements

III.3 Database-related Issues
- Not applicable

III.4 Data Communication-related Issues
III.4.1 Degree of participation of the Egyptian Telecommunication Agency

III.5 Arabization-related Aspects
III.5.1 Organizational aspects of the Arabization activities

IV. Utilization of International Experience and Resources

IV.1 Overall System Architecture-related Issues
IV.1.1 Consideration of international and regional STI-related studies and experience
IV.1.2 The orientation of the STI System to national development

IV.2 Hardware-related Issues
- Not applicable

IV.3 Database-related Issues
- Not applicable

IV.4 Data Communications-related Aspects
- Not applicable

IV.5 Arabization Aspects
- Utilization of the experience of non-Latin countries and Arab regional efforts

V. System Adaptability and Robustness

V.1 Overall System Structure-related Issues
V.1.1 Inclusion of system monitoring capability
V.1.2 Consideration of fail-safe characteristics

V.2 Hardware-related Issues
V.2.1 Consideration of performance-monitoring issues
V.2.2 Consideration of system-tuning and diagnostic tools

V.3 Database-related Issues
- Emphasis on database integrity
- Consideration of database activity monitoring

V.4 Data Communications-related Issues
V.4.1 Reconfigurability of the network
V.4.2 Considering the line control functions

V.5 Arabization-related Issues
- Not applicable

V.6 Applications Development-related Issues
V.6.1 Consideration of applications maintainability

APPENDIX C

COORDINATING AGENCY FOR THE NATIONAL STI SYSTEM

A. NEELAMEGHAN

INTRODUCTION:

It would be helpful to establish a national agency (called the national focal point) to facilitate the implementation of the national STI plan, for resource mobilisation, for co-ordination and monitoring of programme activities, and for assessment of system performance. Although socio-political factors and the character of the government structure would influence the choice of the national focal point (NFP) and its functions, there are several common features among existing NFPs in different countries. THe UNESCO Guidelines provide useful ideas on the structure and functions of NFP. In order to ensure the effective functioning of a NFP, the following aspects should be given attention from the outset:

1. Position of the NFP in the national government structure;
2. Objectives and terms of reference;
3. Functions and activities;
4. Organisational and management aspects;
5. Financial resources.

These aspects are considered in the succeeding sections.

1. Position of the NFP:

It is desirable to have a single NFP placed as high as possible in the government hierarchy, for example, in the Prime Minister's Office or Ministry of Education, Science, Planning, Industry, etc., so as to secure adequate support to the STI system development. The Ministry of Education or Science is the usual focus. The NFP should be endowed with adequate policy making, financial and executive powers. Table (1) indicates the location (or proposed location) of the NFP in several countries.

Table (1) Location of NFP in Government Structure

Country	Prime Minister's Office	Ministry of Education	Ministry of Industry Eco. Affairs
BELGIUM.....	X		
DENMARK.....		X	
FINLAND.....		X	
FRANCE.....		X	
GERMANY.....		X	
HOLLAND.....		X	
INDIA.....		X	
IRAN.....	X		
ISRAEL.....	X		
MEXICO.....		X	
NORWAY.....		X	
PHILIPPINES.....		X	
POLAND.....		X	
SWEDEN.....			X
TURKEY.....		X	
U.K.....		X	

Location of Management (N F P) directorate in government structure in 16 countries (develop 11 developing 5)

Ministry of Education/Science.....	12
Prime Minister's Office.....	3
Ministry of Industry/Econo. Affairs.....	1

2. Terms of Reference:

Existing models indicate a possible choice between a NFP with only an advisory role to one with policy making, advisor, planning, and operational functions. The choice would depend upon:

+ How large the community to be served is,

+ Financial resources of the NFP,

+ The state of development of the existing information services in the country, and

+ The extent of the coordination and extent of centralisation or decentralisation of information activities.

The terms of reference of the NFP could be drawn up from the objective formulated and the study of the existing national infrastructure. The proposed or anticipated improvement in the STI infrastructure should have a relation to the changes in the information environment. The statement of the policy objectives should be clear, precise and unambiguous.

Table (2) indicates the terms of reference of NFPs in several countries.

Table (2) Terms of Reference of NFP

Tasks	Belgium	Denmark	Finland	France	Holland	India	Israel	Norway	Poland	Sweden	Turkey	U.K.
National STI Network development	x		x	x	x	x	x		x			
National STI Network Coordination	x	x		x	x	x	x	x	x	x		
STI Services Development	x		x	x	x	x	x	x			x	x
Promotion of User Education			x	x		x	x			x		
Promotion of Information specialist training			x	x		x	x			x		
R&D in information promotion	x	x	x	x	x	x	x	x	x	x	x	
Financial support	x		x	x	x	x	x	x		x		
International responsibilities in STI	x	x	x	x	x	x	x	x	x	x	x	x
Function as UNISIST national focus	x	x	x	x	x	x	x	x	x	x	x	x
Long-range planning of STI objectives				x	x	x		x	x			
Development of national STI policy	x		x	x	x	x	x					x
Advice and guidance to national institutions on information systems planning and development		x	x		x	x				x	x	x
Involvement in STI at operational level					x						x	x
Promotion of standards in information handling	x	x	x	x	x			x	x	x		x

TERMS OF REFERENCE OF NATIONAL FOCAL POINTS

(14 COUNTRIES)

3. Functions:

The functions of the NFP would include:

+ Advising the government in the formulation of the national STI policy and on the methods for its implementation.

+ Ensuring that the national STI policy and plan are incorporated into the national development policy and plan documents.

+ Developing mechanisms to ensure adequate inputs of manpower, finance, and facilities to the STI systems.

+ Co-ordinating, stimulating and promoting information activities in collaboration with other organizations within and outside the country.

+ Allocation of finances for projects and monitoring and evaluation of the projects.

+ Encouraging and supporting research and development in information and related areas.

+ Promoting and supporting education and training programmes in information and in user education.

+ Developing co-operative and collaborative operations with regional and international STI systems and programmes.

+ Formulating criteria, guidelines and standards for the planning, developing, financing and assessing the performance of the STI systems.

Table (3) indicates the usual operational procedures of NFP in carrying out task.

Table 3. Operational procedure of NFP in Carrying out Tasks

Procedures	Belgium	Denmark	Finland	France	Holland	India	Israel	Norway	Poland	Sweden	Turkey	U.K.
Publicity of STI services.			x	x	x		x	x	x		x	x
Promotion of use of STI.	x	x	x	x	x	x	x	x	x		x	x
Advisory functions	x	x	x	x	x	x	x	x	x	x	x	x
Solution to sectoral needs.	x	x	x	x	x	x	x	x	x	x	x	x
Liaison operation .							x				x	
Publishing operations.							x		x			
Rl. and activities in information												
--advisory		x	x					x			x	
--support/management	x			x	x	x	x		x	x	x	x
Education and training in information												
--General advice	x	x	x	x	x	x	x	x	x	x	x	x
--Coordination of STI education	x	x	x				x		x			
--Management of education schemes			x			x					x	
--Financial support	x	x	x			x						x
--Promotion of user education	x		x	x	x	x	x		x		x	x
--Promotion of information education	x		x	x	x	x	x		x		x	x
--In house training, postgraduates			x				x					
--In hous training, other			x				x				x	

OPERATIONAL PRODLEDURES
OF NATIONAL FOCAL POINT IN LARRYING OUT TASKS

PUBLICITY/PROMOTION OF STI SERVILES 14

ADVISORY FUNCTIONS TO INFO. CENTERS/SYSTEMS 14

PROMOTION/SUPPORT RESEARCH IN SECTORAL NEEDS 14

EDUCATION AND TRAINING (MANPOWER) :

- ADVILE AND MANAGEMENT 14
- FINANCIAL SUPPORT 7
- IN-HOUSE TRAINING 2

PROMOTION OF USER EDUCATION 11

PUBLISHING 2

4. Organization and Management:

4.1. COVERAGE

It is desirable to determine at the outset whether the national information policy, plan and programmes would cover science and technology only (cf. France, India) or the social sciences and humanities as well (cf. Great Britain). The scale of organization and networking will differ depending upon the extent of sectoral/disciplinary coverage. Perhaps, initially the plan and programme may be limited to STI in which there may be the greater demand for information and subsequently extended to other areas on the basis of experience, needs and demands.

4.2. STEERING COMMITTEE

A Steering Committee of 10-15 persons should be constituted to provide the political linkages to the government structure. The Steering Committees should have representation from appropriate government departments and private sectors, should represent a cross-section of the different disciplines, and be able to accommodate minority interests.

For example, representatives of the:

+ R and D Organizations,

+ Industry,

+ Government departments — education, sciences, planning, finance, industry, communications, etc.

+ Academic and professional organizations representing user agencies and information bases.

+ National libraries, information and documentation centres, etc.

+ Information experts in personal capacity.

Table (4) indicates composition of the steering committee of NFPs in several countries.

Table (4) Composition of Steering Committee of the NFP

Representation from	Belgium	Denmark	Finland	France	Holland	India	Israel	Norway	Poland	Sweden	Turkey	U.K.
National R & D organizations		x		x	x	x	x	x		x		x
Currrnment Ministries	x		x	x	x	x	x	x			x	x
Industry		x	x	x	x	x				x		x
Libraries-Genl				x	x	x						x
-Spl/Res		x	x			x		x				x
Information centres			x	x	x	x		x		x		
Higher Edn-Staff ...			x	x			x			x	x	x
-Students				x								
Information users ..			x			x		x				
Publishing organizations				x	x							
Statistical organizations				x								
Technological services			x									
Information specialists				x		x		x				

COMPOSITION OF STEERING COMMITTEE

(14 COUNTRIES)

REPRESENTING

NATIONAL R & D ORGANIZATIONS	10
GOVT. MINISTRIES	11
INDUSTRY	9
LIBRARIES	
• GENERAL	4
• SPECIAL LIBRARIES/INTO CENTERS	9
HIGHER EDUCATION	7
PUBLISHING ORGANIZATION	2

4.3. ADVISORY COMMITTEE

It is helpful to constitute an Advisory Committee with representation from the sectoral information systems, the library and information professions, etc. The membership may go by rotation between the sectors. The disciplinary/sectoral emphasis will depend upon national priorities (cf. the academic advisory group in Netherlands, industrial advisory in Sweden). The Advisory Committee may have about ten members at any one time. The members serve in a personal rather than organizational capacity providing specialized expertise and sectoral interest support to the NFP.

4.4. SECRETARIAT

There should be a secretariat of 10-15 persons including professional information as well as administrative/secretarial personnel headed by a director.

4.5. AD HOC WORKING GROUPS

The NFP should have powers and resources to constitute ad hoc working groups as and when required to carry out special studies, surveys, or other tasks.

4.6. PERFORMANCE ASSESSMENT

There should be provision for feedback and periodic evaluation of the work of the NFP.

5. Financial Resources:

The annual expenditure on the national STi programme should be about 5 per cent of the national R and D expenditure. It may be up to 10-15 per cent in the initial stages. The operating cost of a sectoral center is of the order of $200,000 (US) a year in developing countries. In most countries, that budget of the NFP is in the range of $500,000 to $1.0 million (US) a year. The major items of expenditure are usually network development, support for education and training, R and D projects in the information area. These account for 90 to 95% of the budget with 5 to 10% for the directorate staff. Some NFPs having information service functions recover at least part of the expenditure, especially on mechanised information systems, through charges and subscriptions for the service.