PD-AAZ-542

EVALUATION OF S&T INFORMATION TRANSFER PROJECT

Submitted to:
Agency for International Development
Bureau for Asia and Near East
Office of Technical Resources
Energy and Natural Resources Division

March, 1988

Submitted by:

MANAGEMENT SYSTEMS INTERNATIONAL

600 Water Street S.W., NBU 7-7
Washington, D.C. 20024

telephone: (202) 484-7170
telex: 4990821MANSY

EVALUATION OF S&T INFORMATION TRANSFER PROJECT

ANNEXES

1. NTIS Activities in Tunisia, 1985 and 1986
2. The Egyptian National Scientific and Technical Information Network: Present Status and Future Plans
3. List of People Interviewed in Morocco, Tunisia and Egypt
4. U.S. Private Investment Position and Trade with Project Countries
5. NTIS Response to MSI Team's Draft Evaluation

EVALUATION TEAM

Roger Popper

Marina Fanning

Timothy Alexander

EXECUTIVE SUMMARY

This study was conducted for the U.S. Agency for International Development's, Bureau for Asia and Near East (ANE), Office of Technical Resources, Energy and Natural Resources Division as a final evaluation of the ANE Bureau Regional Science and Technology Information Transfer Project (298-0049), implemented by the Department of Commerce's National Technical Information Service (NTIS) from end-1983 to September 1987. The project sought to expand the existing technical information network in Tunisia and initiate activities in cooperating agencies in nine additional Near East countries. Cyprus, Egypt, Morocco and Jordan, were to receive priority attention in the first year of the project, in addition to Tunisia. Successful strategies for the implementation of technical information services were intended to be later adapted for Portugal, Turkey, Lebanon, Oman and Yemen. This study entitled "Final Evaluation of the S&T Information Transfer Project", dated October 1987, was designed to:

* describe and assess the effectiveness of NTIS project activities in establishing technical information dissemination services in selected ANE countries;

* investigate the science and technology policy environment in cooperating Near East countries and determine the institutional impact of NTIS project activities on the counterpart institutions; and,

* identify options for A.I.D. to enhance the transfer of U.S. technical information to developing countries.

The methodology employed in this study was a survey of selected counterpart institution and USAID staff in three countries: Morocco, Tunisia and Egypt, using non-structured interviews (see Annex 3 for a listing of field personnel interviewed). Supplemental data were collected from interviews with the NTIS staff, and a review of pertinent project documents and other materials providing background information on the science and technology policy context in the project countries.

The evaluation report is divided into four chapters. Chapter One reviews the study issues as listed in the Scope of Work and as discussed in briefings with ANE and State Department officials. Chapter Two summarizes and evaluates the impact of the main activities carried out by NTIS by type of activity in all project countries during fiscal years 1986-1987, with emphasis on the three countries selected for field investigation. Chapter Three considers USAID mission involvement in the project and Near East country government science and technology policy. Chapter Four discusses lessons learned from the S&T Information Transfer project regarding private sector participation in technical information distribution

and presents recommendations for A.I.D. to enhance the dissemination of U.S. technical information to developing countries.

Annual reports of NTIS project activities and field interviews provide evidence that project impact and effectiveness was undermined by difficulties in identifying and recruiting Near East country institutions as cooperating agencies. Two countries, Lebanon and Oman, were dropped at the request of the respective USAID Missions. The lengthy time period required to obtain agreements with counterpart institutions reduced the time available for institution building activities. Obstacles to links between NTIS and local organizations included a book monopoly (Tunisia), discomfort with idea of selling U.S. government reports (Tunisia and Morocco), and competition from information services supported by other USAID project activities (Egypt). Use of a Cyprus-based consulting firm with branch offices in Egypt, Jordan, Morocco, and later Tunisia, was only partially successful in circumventing circumventing these difficulties.

Although conditions varied from one country to another, some progress was made at organizational development. In Egypt and Morocco, field investigation found that collaborating organizations were strengthened by training provided through in-country seminars. In Egypt, the cooperating agency expanded its microfiche collection by thousands of documents in selected fields, but was unable to link operations with other Mission-supported information services. In Morocco, considerable progress was made at the policy level, including commitments to add English language materials to their database, but document sales were low as active marketing of information services remained limited. NTIS annual reports indicated that the impact of training conducted in Jordan and Cyprus was diminished by staff turnover in the local organizations. In Tunisia, institutional impact was minimal as the Regional Coordinator, based in that country, undertook an effective sales campaign, but did not transfer marketing skills to counterpart nationals.

Document sales data collected for Tunisia, Morocco, and Egypt provided further evidence of the project's partial impact and effectiveness. Generally high document sales in Tunisia, estimated to exceed 500 documents annually in the last year of the project, were attributed to the active sales campaign of the Regional Coordinator. Strong sales in Tunisia were interpreted as demonstrating that aggressive marketing can generate demand for NTIS documents in at least some Near East countries. Low sales in Morocco and Egypt, averaging less than 75 documents annually, were attributed to a combination of factors. In Morocco, promotion efforts were limited almost exclusively to conference presentations and distribution of brochures. In Egypt, a principal Mission concern was that concurrent, regionally-funded and mission-funded A.I.D. technical information projects may give confusing signals to the Egyptian Government regarding U.S. technical information policy. In addition, the market for technical information services was effectively usurped by the

larger, mission-funded project supporting the Egyptian National Science and Technical Information Network (ENSTINET).

Major assumptions of the project that were questioned by the evaluation included: the feasibility of cooperating agencies operating on a self-sustaining basis without diversifying services to include popular trade publications, academic journals, Information Handling Services (IHS) manufacturers' standards, and other databases; and selection of project countries, recruitment of counterpart institutions and selection of marketing approaches without conducting country needs assessments.

Recomendations pertinent for A.I.D. in the design and management of future information transfer projects included: greater coordination between design teams to promote cross fertilization of learnings; emphasis of a private sector orientation in user education and marketing activities; investigation of information service organizational structure in mid-term evaluations; and more effective use of microfiche-to-paper printers. To test the inclusion of technical information dissemination responsibilities within the role of Private Sector Officers, the study recommended assigning Private Sector Advisors the responsibility of analyzing Project Papers to identify opportunities for inclusion of technical information components; training of Private Sector Officers in such information services as DIALOG, BRS, IHS, and NTIS; and authorizing Private Sector Advisors to open a "deposit account" on behalf of information buyers to avoid currency exchange problems. A pilot "information inundation" project, involving subsidized searches and distribution of technical information focused on a specific problem, was recommended to demonstrate the potential for technical information to address priority development issues. Recommmendations presented to minimize the damage caused by termination of the ANE Regional project included: linkage of cooperating agency efforts in Morocco to existing projects, such as the Catholic Relief Service / Executive Service Corps Experte Consulting Project; provision of a deposit account for clientele already developed in Tunisia; and continued efforts to establish an association between the NTIS counterpart institution in Egypt and the Egyptian National Science and Technical Information Network (ENSTINET).

LIST OF ACRONYMS

ABC	-	ABC Kitabevi Tic. A.S. (Private Firm, Turkey)
A.I.D./ANE	-	U.S. Agency for International Development, Bureau for Asia and Near East
ALERTEC	-	Alert to Technology (formerly AMTID, NTIS monthly bulletin)
ALDOC	-	Arab League Documentation Center
APROMAC	-	Arab Project Management Consultants (Egypt)
ASRT	-	Academy for Scientific Research and Technology (USAID contractor in Egypt)
ASIS	-	American Society of Information Scientists
CDA	-	Centre de Documentation Agricole (Morocco)
CND	-	Centre National de Documentation (Morocco)
CNUDST	-	Centre National Universitaire de Documentation Scientifique Tunisienne
CRS	-	Catholic Relief Services
ENSTINET	-	Egyptian National Scientific and Technical Information Network
ESDUCK	-	Egyptian Society for the Dissemination of Universal Culture and Knowledge
ETAP	-	Entreprise Tunisienne d'Activites Petrolieres
FCC	-	Yemeni Federation of the Chamber of Commerce
GRA&I	-	NTIS Government Reports Announcements and Index
IHS	-	Information Handling Services, Inc. (Private U.S. firm)
INAT	-	Institut National d'Agronomie Tunisien
INRST	-	Institut National de Recherche Scientifique et Technologique (Tunisia)
IRSIT	-	Institut de Recherche Scientifique en Information et Telecommunications (Tunisia)

JCMRS	-	Jordan Center for Marketing Research and Surveys (MEMRB/Amman)
JNICT	-	Junta Nacional de Investigacao Cientifica e Tecnologica (Portugal)
MEMRB	-	Middle East Marketing and Research Bureau (Cyprus)
MIT	-	Marketing et Informatique en Tunisie (MEMRB/Tunis)
NIDOC	-	National Information and Documentation Center (Egypt)
NTIS	-	U.S. Department of Commerce, National Technical Information Service
PASA	-	Participating Agency Service Agreement
RSS	-	Royal Scientific Society (Jordan)
SEMMA	-	Societe d'Etudes de Marketes Marocaine (MEMRB/Casablanca)
SRIM	-	NTIS Selected Research in Microfiche
STD	-	Societe Tunisienne de Diffusion
TUBITAK	-	Scientific and Technical Research Council of Turkey
TURDOK	-	Scientific and Technical Document Center (within TUBITAK)
YCIF	-	Yemeni Company for Investment and Finance

OUTLINE OF BASIC PROJECT IDENTIFICATION DATA

1. Regional Project Countries:

   Cyprus, Egypt, Tunisia, Morocco, Jordan, Turkey, Portugal

2. Project title:

   Regional Science and Technology Information Transfer Project

3. Project Number: 289-0049

4. Project Dates:

   a. Project Authorization Document: 8/18/83

   b. First Project Agreement: PASA signed: Sept. 1983
      PASA starting date:
      October 1, 1983

   c. Final Obligation date: Planned: FY 1987 (Project Paper)
      Actual: July 1986 (PASA)

   d. Most Recent Project Assistance Completion Date:
      September 30, 1987

5. Project Funding:

   a. A.I.D. Bilateral Funding:

US	$1,187,600
US	$ 0
US	$ 0
US	$1,187,600

6. Mode of Implementation:

   Participating Agency Service Agreement (PASA) with the
   National Technical Information Service (NTIS)
   of the Department of Commerce

7. Project Designers:

   NTIS, Office of International Affairs
   and NE/TECH/HRST

8. Responsible Officials:

   NE/TECH/HRST

   Barry Heyman, Chief HRST
   John Swallow, Education Officer
   Carolyn Coleman, Social Science Officer

Responsible Mission Officials:

Egypt
Sharif Arif
Lawrence Ervin

Jordan
Aylette Viallemain

Morocco
Robert Kahn

Tunisia
Mark Karns

Yemen
Rufus Long

9. Previous Evaluations: None

I. INTRODUCTION

This report by Management Systems International (MSI) evaluates the United States Agency for International Development's (A.I.D.) Regional Science and Technology Information Transfer Project (298-0049) in the Near East. The project was funded through the A.I.D. Bureau for Asia and Near East (ANE), and was implemented by the Department of Commerce's National Technical Information Service (NTIS) through a PASA agreement. Project life extended from FY 1984 through September of 1987, and the project budget amounted to a total of $1.3 million. The NTIS Information Transfer Project activities focused on Cyprus, Egypt, Jordan, Morocco and Tunisia; and included Turkey, Portugal and Yemen.

A. EVALUATION SCOPE OF WORK

The evaluation objective, as stated in the Scope of Work, was to "evaluate the ANE Bureau Regional S&T Information Transfer Project and to analyze the current and potential role of A.I.D. in promoting technology transfer to selected ANE countries." Issues to be addressed, as listed in the Scope of Work for this evaluation, can be grouped into the categories of effectiveness assessment, institutional assessment, and analysis of policy and context."

The effectiveness assessment category includes: description of NTIS project activities; description of the Regional Coordinator's role; effectiveness of marketing and information dissemination; effectiveness of information services, especially to the private sector; progress toward cost recovery, and the economic impact of project termination.

The institutional assessment category includes: the role of the resident Project Coordinator; the basis for selecting the counterpart agencies; the S&T role of counterpart agencies in the context of host country science and technology policy; and the impact of NTIS training and technical assistance on counterpart capabilities.

The context and policy category includes: A.I.D. Mission involvement and possible future support for NTIS activities; A.I.D.'s role in technology transfer; and U.S. private and public sector mechanisms for technology transfer.

While most of the research tasks outlined in the Scope of Work concern an evaluation of the ANE regional project, the Scope of Work also includes broader questions that concern A.I.D.'s role in technology transfer. However, due to the limited amount of resources allocated to the activity as a whole, readers will note that MSI's treatment of A.I.D.'s technology transfer role emphasizes technology transfer principally as it relates to information transfer.

B. EVALUATION METHODOLOGY

This study was designed as a rapid reconnaissance effort based on data to be collected by one person visiting each of three countries for approximately one week each. Given these resource limitations, it was agreed at the outset that the study would include no systematic contact with information users. Rather, tentative conclusions were to be based on the observations made by an experienced evaluator on the basis of a series of executive interviews with service providers and a review of the records easily accessible in Washington and in the field. As such, this report makes no claims to scientific rigor and is presented more in the spirit of informed observation. Annex 3 contains a list of those people contact in each of the three countries visited.

C. ANE AND NTIS CONCERNS

Discussions with ANE officials led to the suggestion that the following issues be addressed by the evaluation: U.S. industrial competitiveness, intellectual property rights laws in Near East countries; and implications for A.I.D.'s overall role in collaborative research, investment promotion, and regional networking and sectoral research.

Discussions with NTIS personnel resulted in the following evaluation emphases for the countries visited during the evaluation: Egypt, Morocco, and Tunisia.

- Specific questions regarding NTIS efforts in Egypt:
  - Why are sales low in such a large country? How is the prospective APROMAC/ENSTINET collaboration progressing?
  - What are the business implications of owning a microfiche-to-paper printer?
  - How have user seminars been adapted to Near East needs?
- Specific questions regarding NTIS efforts in Morocco:
  - How does the marketing section work? How effective is their outreach?
  - How does the SEMMA/CND arrangement in Casablanca work?, How self-sufficient is the NTIS-financed salesman in Casablanca?
  - Are on-line searches being carried out in Casablanca?
- Specific questions regarding NTIS efforts in Tunisia:
  - What level of effort, and what tasks were necessary to achieve Tunisia's high level of sales?
  - How generalizable is Tunisia's successful document sales experience?

- Can NTIS sales be incorporated into the Regional Coordinator's new role as Private Sector Advisor at the USAID Mission?
- Are there case studies on some user applications of NTIS information?

D. EVALUATION SCHEDULE, AND PEOPLE INTERVIEWED

Evaluation field work took place during the month of September, 1987. Approximately one week was spent in each of the following countries: Morocco, Tunisia, and Egypt. Persons interviewed in each of these countries visited are listed in Annex 3.

II. PROJECT DESCRIPTION AND PERFORMANCE APPRAISAL

This chapter assesses the ANE Bureau Regional S&T Information Transfer Project performance. Evaluation findings that concern the policy context for information transfer in selected Near East countries and implications for the future directions of A.I.D.'s role in technology transfer are presented in Chapters III and IV.

A. CHOICE OF COLLABORATING AGENCIES AND ORGANIZATIONAL DEVELOPMENT

SUMMARY

The S&T Information Transfer Project began operations in 1984, and ended in November of 1987. Much of the project life was spent in identifying suitable collaborating agencies and developing solid relationships with them. There were a number of obstacles to the forging of links between NTIS and local organizations, including a book monopoly (Tunisia), discomfort with the idea of selling U.S. government documents (Tunisia and Morocco), and competition from A.I.D. Mission projects (Egypt).

Types of collaborating organizations for the different countries vary. In Morocco an innovative collaboration between public and private sector organizations evolved. In Egypt and Tunisia, collaboration was primarily with private sector consulting companies.

Progress at organizational development also varied from one country to another. In Egypt and Morocco, collaborating organizations have been strengthened by training in NTIS products and services. In Morocco, considerable progress was made at the policy level, including commitments to add English language materials to their data base, and to give priority to active marketing of information services. In Egypt, the collaborating organization has been strengthened by the acquisition of microfiche libraries in selected areas. Tunisia has been basically a one-man-show run by an American, and organizational development has been minimal as he concentrated his efforts on a sales campaign within Tunisia and not on the transfer of marketing skills to host country nationals.

In the following sections, for each of the countries selected for field investigation, the three questions listed below are answered:

- How was the collaborating organization selected?
- What kind of organization is the collaborating organization? and
- What organizational development progress was made?

EGYPT

Selection of APROMAC

Early attempts by NTIS to enlist USAID/Cairo's participation in the ANE Regional project met with limited success. This was due to USAID/Cairo's prior involvement with another project concerned with institutional strengthening of S&T organizations in Egypt managed by the Georgia Institute of Technology in collaboration with the Egyptian Academy for Scientific Research and Technology (ASRT). While USAID/Cairo remained interested, the Mission did not want to send conflicting signals to the Government of Egypt by becoming involved with concurrent, centrally funded and Mission funded information transfer projects. In November 1984, ARST arranged for NTIS to give a one-week course, hosted by the National Information and Documentation Center (NIDOC), on marketing information. The course was attended by about 20 information specialists from various Egyptian ministries. NIDOC subsequently ordered NTIS search tools, but was not interested in becoming a collaborating agency.

In February, 1985 ASRT/NTIS began negotiations to recruit the Arab Project Management Consultants (APROMAC). Since APROMAC possessed microfiche-to-paper reproduction equipment, NTIS hoped to capitalize on their capability to reproduce NTIS information. In May 1985, APROMAC signed a cooperating agency agreement with NTIS.

Description of APROMAC

APROMAC is a consulting, training, and information service company. They have a contract with the Egyptian Government to store court records using their microfiche machines. The record storage business apparently employs fifteen people full time. Partly as a result of their relationship with NTIS, they have a 100,000 document library of microfiche in the areas of management, computers, agriculture, and energy.

APROMAC's information service product line consists of Information Handling Services'(IHS) standards, specifications and norms for manufacturers. Unlike the NTIS product line, the IHS product line seems to be a money maker. Major clients for the IHS products are in the Egyptian military and defense industries, a sector which is expanding as the result of joint ventures with American firms.

Progress in Organizational Development

Several APROMAC employees have received both training in the services offered by NTIS, and experience in trying to sell NTIS products. APROMAC has been able to enlarge its microfiche library by thousands of documents in the areas of management, information science, energy, and agriculture. Attempts to link APROMAC permanently to A.I.D. Mission-supported technical information services have not yet been successful.

MOROCCO

Selection of CND and SEMMA

Morocco was first visited by NTIS in 1978. At that time, the Centre National de Documentation (CND) declined NTIS' offer to join its international network due to an unfavorable exchange rate and other undetermined problems. These problems prevented further cooperation until March 1986, when NTIS negotiated a special agreement to help CND obtain two terminals for on-line searches, in exchange for CND's agreement to perform database searches in response to queries. In September 1986, a marketing course given by Prof. Andy Cao, Dean of the American University Business School, altered CND attitudes toward information marketing.

Field inquiries in Cyprus in October 1983 led to the signing in January 1984 of a standard cooperating organization agreement covering all Project countries with a Cyprus-based private consultant firm, Middle East Marketing Research Bureau (MEMRB), with offices in Egypt, Jordan and Morocco. In May 1984, a task order was issued for MEMRB to carry out a marketing survey, involving listings of potential clients and an assessment of their information needs in each of the five priority Project countries. The local MEMRB branch in Morocco, Societe d'Etudes de Marketing Marocaine (SEMMA), was first visited by NTIS staff in February, 1985, to provide training in NTIS products and services. In December 1986, a full time employee was hired with project money to sell NTIS documents. He works for SEMMA under some CND supervision.

Description of CND

CND services are extensive, and sales of NTIS documents form only a small portion of them. In 1986 there were 2,320 requests for service: 1,154 for access to CND's national database, 951 for access to international databases, and 215 were answered through CND's own library. Below are 2,466 requests classified by client type for 1985. Note that the vast majority of requests are from students, and almost none are from outside the academic community. CND has seven terminals throughout Morocco, with two people at each node to serve users.

Government administrators	320
Researchers	29
Teachers and professors	214
Students	1889
Professionals and companies	14
	2466

Progress in Organizational Development

In Morocco, NTIS has had good success at the policy level and resource improvement levels, but relatively little success at the operational (sales) level.

Policy changes in CND as a result of their experience with NTIS are:

1) There is now a commitment to developing access to English language materials;
2) There is now a recognition of marketing as a scientific, respectable endeavor;
3) Marketing efforts have achieved departmental status; and
4) There is now a working relationship in Casablanca with the local MEMRB office (SEMMA), in which SEMMA handles the marketing and sales, and CND does the searching, and document delivery. Such collaboration between the public and private sector seems to be an innovation in Morocco. It is not clear, however, whether this relationship will outlive the project.

Resource improvements related to the experience with NTIS are:

1) CND now has a computer keyboard and software which allow entries and searches in Arabic; and
2) Through USAID/Morocco's graduate scholarship program, five Moroccans are being educated to the Masters level in Information Science. Three of the five work for CND, and two work at the closely related Ministry of Planning. All these people are obligated to work in their government jobs for eight years following their studies, although sometimes people do not complete their required government service.

TUNISIA

Selection of MIT

NTIS' first attempt at an agreement was with the Centre National de Documentation; this arrangement did not work, however, in part because the Societe Tunisienne de Diffusion (STD) had a book monopoly. Starting in 1981, NTIS had a collaborative agreement with STD. However, STD did not pay for documents ordered, and made little effort to promote NTIS. Due to book monopoly laws, negotiating with other organizations was impossible. In 1987 the STD debt was partially paid off.

NTIS allowed the agreement with STD to lapse, and in 1984 offered an agreement to the Centre National de Universitaire de Documentation Scientifique Tunisienne (CNUDST), and the CNUDST representative visited NTIS. Although, CNUDST officials demonstrated interest and visited NTIS offices in 1984, CNUDST did not place any document orders with NTIS until 1986.

Later in 1984, an NTIS Regional Coordinator was hired. In 1985, MEMRB was persuaded to open an office in Tunis, to serve as a base of operation for the Regional Coordinator. A Tunisian partner for MEMRB was found in Tunis, J. Bouraoui & Co., and MEMRB was paid $10,000 to open the Tunis office, which was called Marketing et Informatique en Tunisie (MIT).

Description of MIT

MIT is a subsidiary of J. Bouraoui & Co., an accounting and consulting firm with no experience in distributing technical information. It appears that MIT initially accepted the relationship with MEMRB and NTIS because they thought it would make money, and might generate additional accounting, consulting and survey business. None of this has occurred. The intermediary role of MEMRB between MIT and NTIS contributes virtually nothing, and complicates operations. MEMRB seems to have lost interest in NTIS sales.

B. REVIEW OF NTIS PROJECT ACTIVITIES

Chart I, presented below, summarizes the main activities carried out by NTIS staff by type of activity and country during fiscal years 1984-86. In the following paragraphs, an appraisal is presented for each of the following areas of project activity: negotiations, workshops, user education seminars, and technical advisory services.

NEGOTIATIONS

The outline of NTIS project activities shown in Chart I indicates the lengthy time period required to identify and recruit Near East country institutions as collaborating agencies. Among the five priority countries, in only four were collaborating agency agreements signed in the first year of the project (Cyprus, Morocco and Egypt in January 1984, and Jordan in September 1984). In Tunisia, agreements were not signed until early 1985.

As noted previously, significant difficulties were encountered in Tunisia and Morocco. The first agency signed in Tunisia, STD, was dropped in May, 1984 for inactivity and non-payment. The second agency, CNUDST, withdrew its involvement at the end of this USAID/NTIS project. NTIS was only able to establish a cooperating agency in Tunisia by contracting with the Cyprus-based private consulting firm, MEMRB, for a branch in Tunis. A formal agreement was never reached in Morocco, but Morocco was covered in the Cyprus agreement.

CHART I

ACTIVITIES CARRIED OUT BY NTIS STAFF, FISCAL YEARS 1984-86

NTIS PROJECT ACTIVITIES	MOROCCO	TUNISIA	EGYPT	JORDAN	CYPRUS	PORTUGAL	TURKEY	YEMEN	REGION-WIDE
I. Negotiations:	a. 1978 Pre Project offer. CND declined lack of access to U.S. dollars b. Oct 83, May & Aug 84 visits CND expressed interest, still unable to sign c. Oct 84 Economic Confederation visited for ALERTEC distribution d. Feb 85 CDA visited. e. Mar 86 CND agreed to search NTIS database in response to queries/CND helps to obtain 2 HP terminals	a. May 84 AMID-EAST visited to seek assistance hiring regional officer. Aug 84 S. Johnson hired. b. May 84 STD files reviewed. 1981 agreement allowed to lapse for non-compliance. c. May 84 CNUDST offered agreement. Oct 84 microfiche delivered. Mar 85 Agreement signed. d. Mar 85 MEMRB/TUNIS (MII) office operational e. Jun 86 On-going plans sought	a. Other USAID/ Cairo project involvement and Nov 84 marketing seminar for NIDOC predominates NTIS staff activity until Feb 85 visit to APROMAC. Agreement with APROMAC signed May 85.	a. Pre-project investigations in 1978 found little interest in NTIS cooperation. b. Oct 83 RSS staff indicated interest but RSS president declines. c. Apr 84 RSS official visited NTIS. d. May 84 NTIS staff visited MEMRB/Amman. e. Jul 84 NTIS negotiated agreement. f. Sep 84 RSS signed cooperative agreement. g. Jul & Dec 85, Feb 86 NTIS, USAID, RSS Min. of Plan discussions on commercial on-line service.	a. Oct 83 MEMRB/ Cyprus referred by Commercial Officer. Jan 84 MEMRB signs Coopera-tive agreement. b. May 84 task order signed with MEMRB for market survey in 5 priority countries.	a. Aug 85 NTIS visited JNICT & Consulplano. b. Nov 85 NTIS visited Consulplano. c. Apr 86 Consulplano signed cooperative agreement.	a. May 85 initial discussion with TUBITAK led to signing of Cooperative Agreement in Sep 85. b. Dec 85 ABC Kitabevi signed Cooperative Agreement.	a. Feb 85 NTIS discussed potential cooperating agreement with USAID & Commercial Officer. b. Jul 85 offer made to FCC. Cooperative Agreement signed by FCC. in Sep 85. c. Sep 85 FCC withdrew involvement with each of other USAID/Sana project & NTIS negotiated with YCIF to enter Cooperative Agreement.	a. Jan 84 MEMRB/ Cyprus signs cooperative Agreement covering all project countries. b. May 84 MEMRB/ Cyprus issued task order for marketing survey in 5 priority countries.
2. Workshops/training for cooperating agency officials.	a. Feb 85 SEMMA start-up training b. Sep 86 CND marketing course by Prof. Cao c. Sep 86 SEMMA training.	a. Oct 84 STD officer attends Info scientist meeting in U.S. b. Feb 85 CNUDST Director visits NTIS & other U.S. info centers c. Aug 85 ALDOC Director visits NTIS	a. Sep 84 MEMRB/ Cairo training b. Feb 85 APROMAC start-up training by NTIS staff c. Aug 85 APROMAC training by Regional Officer d. Sep 85 APROMAC training by NTIS staff	a. Sep 84 RSS official at tended ASIS seminar in U.S. b. Feb 85 MEMRB/ Amman start-up training set back by staff departure	a. May 84 MEMRB start-up training b. Jul 84 MEMRB training repeated for new staff c. Oct 84 Marketing seminar by NTIS for MEMRB staff		a. Dec 85 TUBITAK & ABC start-up training.	a. Dec 85 FCC start-up training. b. Aug 86 FCC officials visited NTIS & other U.S. info centers.	a. Sep 84 Workshop at NTIS. b. Nov 85 Riyadh conference. c. Apr 86 Information Systems Management Workshop at NTIS.

CHART I

ACTIVITIES CARRIED OUT BY NTIS STAFF, FISCAL YEARS 1984-86 (Continued)

NTIS PROJECT ACTIVITIES	MOROCCO	TUNISIA	EGYPT	JORDAN	CYPRUS	PORTUGAL	TURKEY	YEMEN	REGION-WIDE
3. User Education Seminars:	a. May 85 SEMMA participants in USIA exhibit "Casablanca International Fair."	a. Mar-Sep 86 Regional Officer conducts user ed seminar every other month		a. Apr 85 RSS conducts user ed seminar for 60 clients	a. Feb 85 User ed seminar for 20 librarians b. Oct 85 on-line search demonstrations held for Pres. of Cyprus & 125 potential clients	a. Jun 85 NTIS Deputy Director addressed OECD Seminar in Liaison b. Feb/Mar 86 on-line search demonstrations at International Technology Fair c. Jul 86 User ed seminar 25 participants	a. Sep 86 NTIS & TUBITAK participated in Izmir International Fair	a. Dec 85 2 User Ed seminar held at FCC in Sana b. Jan 86 2 User Ed seminars for 18 participants at TAIZ Chamber & 8 participants in Hodeseidah	a. Oct 85 Marine Science Information Workshop at Williamsburg & NTIS.
4. Technical Advisory Service		a. Mar-Sep 86 Regional Officer routinely visits 20 clients per months b. Feb & Jul 85 NTIS staff joins client visits		a. Nov 85 Director of S&T Ministry of Planning visits NTIS b. Apr 85 Regional Officer visited Jordanian S&T organizations	a. Mar 84 MEMBR Pres. visited NTIS to discuss marketing survey b. Feb, May, Jul, & Aug 85 Regional marketing plan reviewed	a. Jul 86 NTIS assisted LUSO-AM Foundation procure microfiche reader/ printer	a. Dec 85 NTIS officer toured university b. Jun 86 Regional Officer visited clients c. Sep 86 NTIS staff made to potential clients		a. Feb-Aug 85 Regional marketing plan prepared, followed by direct mail campaign
5. Equipment Provided: (All countries provided info materials	a. Jul 86 2 MP terminals delivered			a. Early 87 IBM-PC delivered		a. Sep 86 Microfiche reader/ printer delivered to Consulplano	a. Sep 86 Microfiche reader/ printer delivered to ABC & TUBITAK		

Additionally, an informal agreement was made in early 1986 which involved NTIS assistance in purchasing two PC terminals for CND's agreement to perform database searches in response to queries and to purchase NTIS information from SEMMA.

Among the three lower priority countries (Portugal, Turkey and Yemen), two agreements were not reached until late in the project period (December 1985 for Turkey and April 1986 for Portugal), and in Yemen, the cooperating agency withdrew its participation after one year, coinciding with the end of a prior USAID/NTIS project. The operation was consequently shifted to a new organization, YCIF, which was recommended by USAID/Sanaa; operations resumed only at the end of this project.

WORKSHOPS FOR COOPERATING AGENCY OFFICIALS

Both start-up and subsequent training of cooperating agency officials using in-country seminars was provided in all of the project countries. The impact of initial and follow-on training in Jordan and Cyprus was diminished by staff turnover in the local organizations. In Tunisia, training was accomplished primarily through visits of cooperating agency officials to NTIS offices in the United States. Additional training for candidates from all project country agencies in information marketing was provided through two regional workshops held at NTIS in Washington; a third was held in Riyadh.

Marketing Seminars By Dr. Andy Cao

Dr. Andy Cao of American University (Washington, D.C.) gave marketing seminars in Morocco and Egypt. In Morocco, he succeeded in convincing the Centre National de Documentation (CND) personnel that marketing is indeed a respectable, scientific endeavor, and not just a publicity campaign. This was a major accomplishment, since before the seminar, resistance to marketing at CND had been adamant. This change in philosophy has resulted in a restructuring of CND so that marketing is now accorded official departmental status. CND personnel also became convinced that they must actively collect English language materials. A powerful argument used to persuade them was that 65% of world's intellectual output is in English, and only 12% is in French.

In Egypt, Dr. Cao's seminar was also well received, and served to improve relations between the Collaborating Agency (APROMAC), the local A.I.D. Mission, and the A.I.D. Mission-funded technological information project.

In both Morocco and Egypt it seems likely that Dr. Cao's seminar resulted in a change of attitudes toward marketing efforts. In both instances, systematic marketing of NTIS documents has taken place.

In neither case, however, has there been marketing success; that is, in both Morocco and Egypt NTIS sales have remained low.

USER EDUCATION SEMINARS

User education seminars, often supplemented by cooperating agency participation at international fairs, were conducted in nearly every project country. Typically, such seminars and on-line search demonstrations were offered only once or twice. Only in Tunisia, where the Regional Office held user education seminars every other month, were such events conducted on a regular, ongoing basis.

The user seminar attended by the evaluator in Egypt consisted primarily of slides showing NTIS' Springfield, Virginia operations. There was little material of relevance for the individual interested in learning how to access NTIS products and services. The overall message conveyed seemed to be how complicated and advanced the NTIS system is. However, in Morocco the evaluator was present at discussions of user-oriented, problem-solving approaches to user training.

TECHNICAL ADVISORY SERVICES

The MEMRB Market Survey

NTIS contracted MEMRB to conduct a market survey of Near East countries regarding demand for NTIS documents. According to NTIS, the survey should have taken six months, but took one and one-half years. The results of the survey consist primarily of lists of possible clients such as companies, and suggestions on subject areas which might interest them. The survey was followed by a broad direct mail campaign throughout the Near East which resulted in virtually no responses. According to collaborating agency officials, the survey was conducted primarily by phone and mail and there was very little field work. Collaborating agency officials indicated that the survey told them little they did not already know, and felt that MEMRB was overpaid (approximately $100,000). No one was satisfied with the MEMRB study. However, it is one thing to criticize a market study for technological information and, another to carry one out.

The Regional Coordinator's Role

In August 1984, a Regional Coordinator was hired for the NTIS Near East project. His role was originally envisioned as primarily one of coordination, and secondarily, to boost NTIS sales in Tunisia (where he lives). As things worked out, however, the emphasis was reversed. His job was primarily NTIS sales in Tunisia, and secondarily, the provision of coordination and technical assistance (primarily the latter) throughout the region.

It is not clear that his time would have been better spent doing more coordination and less sales in Tunisia. The sales efforts of the Regional Coordinator in Tunisia have proven that when marketed effectively, there can be a healthy market for NTIS documents in the Near East. Details on his sales efforts are presented in Annex 1.

Specific reasons why the coordination role was weak appear to be: 1) central NTIS staff continued in their coordination roles; 2) the Regional Coordinator was never given a budget including travel allowances to manage; 3) hiring and payment were through MEMRB in Cyprus which made the entire arrangement unwieldy; 4) the Regional Coordinator was required for a time to carry out non-NTIS MEMRB tasks; and 5) the NTIS sales job in Tunisia became very demanding.

In Tunisia, the coordination role consisted primarily of establishing and managing the relationship with MIT, the private sector, and the collaborating agency there. There was little institution building, or training of Tunisians to undertake NTIS sales. Efforts were made to have the local A.I.D. Mission support NTIS activities after termination of the regional project. The idea was given serious consideration but ultimately was turned down (see section III A).

Coordination and technical assistance work in Morocco was accomplished primarily through two visits. In spring of 1985, the Regional Coordinator helped with an NTIS exhibit at a Trade Fair, and encouraged the Casablanca salesperson to make personal visits to clients as well as to carry out a direct mailing. In fall of 1986, he went on visits with the new Casablanca salesperson; assisted him in getting promotional materials from NTIS; assisted him in making a client list; resolved computer delivery mix-ups; and gave advice on who should attend the NTIS seminar in the U.S. Further visits were planned but did not take place. The evaluator noted resistance within CND in Morocco to extensive "coordination" from the outside.

In Egypt, coordination and technical assistance work was provided during three visits. In October of 1984, the regional officer attended the marketing seminar given by Dr. Andy Cao, and tried to encourage an agreement between APROMAC and ENSTINET, the Egyptian National Scientific and Technical Information Network, which is assisted by an ongoing mission-funded project. In December of 1985, the regional officer accompanied APROMAC's sales force on visits to potential customers. And in December of 1986 he tried again to encourage the collaboration between APROMAC and ENSTINET. A relationship between the two organizations has still not been consummated.

Other activities carried out by the Regional Coordinator included accompanying regional NTIS representatives to a conference in Beijing, China (in May 1986); conduct of a user education seminar in Jordan; accompaniment of the NTIS salesperson in Jordan on client visits; and a visit to Washington in June of 1987 when an extension of the project termination date was negotiated.

C. DOCUMENT SALES, USERS AND USES

Table 1 represents a rough attempt to summarize document sales for the core countries (Tunisia, Egypt and Morocco) since 1980. This table indicates that document sales have tended to be generally low with two exceptions. First, high sales occurred in Tunisia in 1986 and 1987; and, secondly, there have been occasional large purchases of microfiche documents by collaborating organizations in Egypt and Tunisia. In the following paragraphs, some explanations are presented for the recent strong sales in Tunisia, and the generally low sales in the other countries selected for field investigation in the evaluation.

Document Sales in Tunisia

High document sales in Tunisia are relatively easy to explain. A salesman was hired who: 1) is an American who feels comfortable selling American technology; 2) speaks excellent Arabic; 3) has lived many years in Tunisia, and knows his way around Tunisian industry and business; and 4) is a sophisticated, organized, hardworking salesman.

Table 2 analyzes a sample of sales made in Tunisia. Annex 1 presents the Regional Officer's marketing methodology, and his visit schedule for a typical month. Over and above two years of high document sales, the most significant and long-term contributions of the Regional Coordinator are: 1) proof that a market for NTIS documents does exist; 2) establishment of a client base for continued sales; and 3) development of a methodology for marketing and selling technical information which can be generalized throughout the developing world.

Unfortunately, this expertise has not been passed on to the Tunisians. NTIS salespeople in Morocco and Egypt have read his methodology, but have not yet put it fully into practice. Implications of the Regional Coordinator's work for private sector participation in technical information sales are presented in Chapter IV.

Document Sales in Egypt

A relatively large proportion of Egypt's population is highly educated, with their second language being English rather than French. Arab Project Management Consultants (APROMAC), the collaborating agency, has a collection of microfiche bought from NTIS to meet Egyptian demand, and a sales force of two individuals who spent considerable time marketing NTIS documents. One could speculate that Egypt might be fertile territory for large NTIS sales.

However, NTIS sales by APROMAC have been low, and there is no way to know with certainty why sales were low. Primary reasons for low sales in Egypt offered by APROMAC staff are high prices, and long

turn-around time between requests and delivery. APROMAC reported turnaround times of two months or more, and that the only way to get results was through personal contact with NTIS's Near East representative. Why long turn-around time should be a problem for Egypt but not for Tunisia is hard to understand. APROMAC may be reacting to an unfortunate experience: one sale of solar energy documents to an engineering company where the turnaround time was apparently three or four months. Additional reasons for low sales volume in Egypt are listed below:

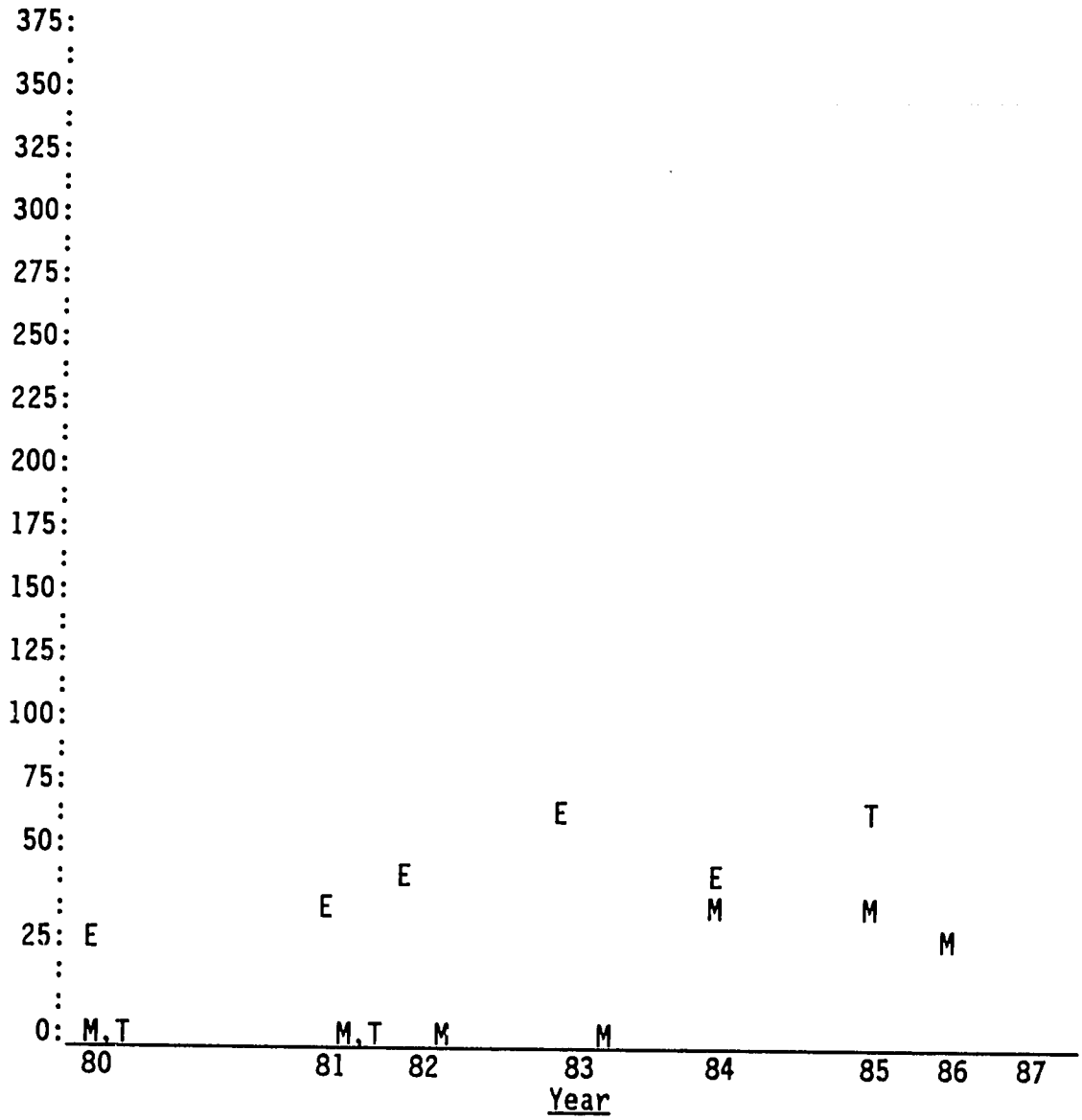
1. In Egypt there is competition in the technical information field from ENSTINET, a project funded by USAID/Egypt, and the British Lending Library. ENSTINET dwarfs APROMAC in size, has an operating budget of slightly less than $1 million per year, and processes several hundred search requests per month. ENSTINET apparently did not sell NTIS documents, but may have usurped APROMAC's market nevertheless. The British Lending Library can sell NTIS documents, and, according to APROMAC calculations, sells them cheaper than APROMAC for documents shorter than 50 pages. An article and tables summarizing the ENSTINET project are presented as Annex 2. Apparently ENSTINET has an official collaboration agreement with the British Lending Library, but not with NTIS or APROMAC (Table 2 of Annex 2).

2. The NTIS salesmen are relatively young and inexperienced. Sales of a document, sight unseen, requires that the buyer have a large amount of respect for the maturity and judgement of the salesman.

3. APROMAC attempted to sell NTIS products in bunches rather than one at a time. They did searches on behalf of clients, and then wrote up a pro-forma billing. The result was often a bill amounting to several hundred dollars. First-time purchasers should probably start off buying one document at a time.

4. There was interest in buying an energy database whose sale is prohibited outside the United States.

Table 1
DOCUMENT SALES IN PROJECT COUNTRIES
SELECTED FOR FIELD INVESTIGATION



E - Egypt
T - Tunisia
M - Morocco
* - Data available only in dollar value of sales

Large Sales to Intermediary Organizations, not to end users	T (1232)	T (862)	T (730)	E ($8313 SRIM)*

Table 2
TUNISIA USER ANALYSIS
(Sample from 1986)

	Academic Higher	Training Institution	Social Service Organization	Energy Research Regulation	Technical Assistance	Private Company	Other
Large	750 SRIM		189 doc 121 doc				
Medium	11 doc 5 searches	18 doc		19 doc 4 doc 23 searches	14 doc 20 searches		30 doc 12 doc 4 doc 1 doc
Small		5 doc 4 searches	3 doc	3 doc 3 searches		4 doc 3 doc 3 doc 2 doc 2 searches	
TOTAL							
Users	3	3	3	3	1	5	4
SRIM	750		3				
Documents	11	23	313	26	14	12	47
Searches	5	4		26	20	2	

5. NTIS charges royalties on documents bought by collaborating agencies, and then copied and sold. NTIS' interpretation of this policy in the case of APROMAC may have considerably lessened APROMAC's incentive to market and sell. Some details are presented below.

APROMAC has microfiche-to-paper printers which are used to make paper copies of documents bought in microfiche form for clients. APROMAC also tries to predict the market, and buy SRIM, in pre-selected categories. APROMAC planned to start a business on the basis of these contributions of value and assumptions of risk.

In theory, this contribution of value and assumption of risk by APROMAC should give it the right to buy low, sell high, and accrue a margin to cover marketing and profit. In theory, this display of entrepreneurship by APROMAC is precisely what the NTIS project should have tried to promote. In reality, however, NTIS required that APROMAC pay NTIS a royalty on the paper copy price rather than on the microfiche or SRIM price. This issue was the subject of debate, and resulted in reduction of the royalty percent from 33% to 20%.

NTIS' ruling may satisfy a bureaucratic requirement, but from business and development points of view, does not make sense. APROMAC bought the microfiche-to-paper printers with its own funds, and predicted the market with their own ingenuity. It appears that NTIS felt entitled to profit from APROMAC's assumption of risk. In any event, the NTIS ruling wiped out any chance for APROMAC to accrue a margin. From APROMAC's point of view, NTIS required them to pay royalties in excess of the document price they were going to charge clients. These actions by NTIS may have prevented APROMAC from carrying out a breakthrough experiment in developing a permanent role for NTIS overseas.

Document Sales in Morocco

NTIS activities in Morocco were divided into two markets: 1) Rabat, where the clientele is primarily academic and governmental, and 2) Casablanca, where there is potential for industrial sales.

CND clients in Rabat are largely students. High NTIS prices have apparently caused a several fold reduction in demand among students. CND services have always been free, or offered at a nominal charge. Additionally, the turnaround time (20-30 days) for NTIS documents was too long for students conducting research.

Some students have bought NTIS documents, but according to the marketing manager, are not happy with the product. Students want journal articles and texts, not the English-language, technical monographs which are NTIS' stock in trade. There is a series of French "fichiers" available on site, free of charge, which the students prefer.

Until recently, emphasis at CND has been on collection and treatment of the Moroccan "intellectual patrimony" rather than on offering and promoting an information service. It is worth noting that CND's name emphasizes documentation, not information services.

CND staff in Rabat recognizes that: 1) attempts at "outreach" are weak, and that promotion consists almost exclusively of hand-outs and presentations at conferences; 2) CND "has not done its work yet" with regard to non-academic and non-governmental clients; 3) users are timid in making demands of CND; and 4) NTIS's microfiche collections in Rabat are apparently not used at all, and are considered too taxing. At the time of the evaluator's visit, the microfiche drawers were behind a heavy desk so that they could not be opened.

NTIS' operation in Casablanca consists of the local CND office, in collaboration with the local office of MEMRB called SEMMA. The collaboration seems to work well, with the SEMMA salesman, Mr. Abdennaceur, taking policy direction from CND in Rabat. The division of labor in Casablanca is for SEMMA to handle sales, and CND to handle on-line searching.

One hundred and fifty English language brochures prepared in Egypt were sent out to a wide variety of potential clients, but there have been few responses. A French language brochure by the SEMMA salesman has been prepared which is very professional looking. CND in Casablanca claims that they can do on-line searches using DIALOG, but that they have as yet, done few. The salesman says, "We are starting to understand their needs well enough to make some sales. Industrial clients are very demanding, and their requests are very specific."

At the time of the evaluation visit, SEMMA and CND in Casablanca were preparing for a user education seminar. The initial idea of the salesman was to invite professors and researchers because they had been the most receptive so far. This is in direct contradiction to the notion that the Casablanca operation should identify industrial clientele as their primary market. This has been pointed out by the CND Deputy Director, and was presumably corrected.

Mr. Abdennaceur is relatively young, and might have benefited from close collaboration with the NTIS Regional Coordinator, in terms of producing good sales results. However, it is doubtful that CND would have countenanced such collaboration.

Impact Indicators

Only in Tunisia were there enough users to warrant conducting an analysis of users and uses of NTIS documents. The NTIS Regional Coordinator responsible for sales in Tunisia estimated that 40 to 50 users account for his approximately 500 documents sold per year. This means that the average purchase per user is approximately 10 documents.

Table 2 categorizes buyers of NTIS documents for a sample representing approximately eight months of sales in 1986. Buyers are categorized by type of organization, and number and nature of NTIS products bought. Note that: 1) SRIM purchases are confined to the "academic/higher education" category, probably because they have microfiche readers; 2) "private company" buyers are numerous, and tend to buy small numbers of documents, probably because they are focusing on specific problems; and 3) social service organizations are high volume buyers.

Case Examples: Three Tunisian Users

1) Professor Rauf Bennaceur is Director of Solar Energy Research at the National Institute for Scientific and Technical Research. His organization carries out research and development in solid state electronics for photovoltaic applications. The objective of the research is to develop-industrial and academic applications.

   Dr. Rauf first used NTIS as a student in Delaware and New Mexico. Then, before the S&T Information Transfer Project, he bought documents from NTIS directly. Over the past two years he has bought several thousand dollars worth of NTIS documents.

   Documents of primary interest he buys in paper form; those of secondary interest, in microfiche form. He puts covers on the paper reports to preserve them. Sometimes he uses the CNUDST microfiche printer, which at about $9 per report, is very expensive.

   The documents have guided key decisions in the construction, design, equipment and operation of a factory for manufacturing photovoltaic cells. The factory represents an investment of approximately $500,000. Photovoltaic cells are not presently economic for some rural applications, but will become economic for more applications should petroleum prices rise.

   The economic impact of the NTIS information on the operation of the factory is evident in the context of potentially costly errors avoided. NTIS documents guided the following key decisions and processes:

   - replacement of plastic capsules with glass to avoid discoloration, and loss of energy;
   - quality control procedures for panel testing procedures;
   - use of spire corporation laminator;
   - cleaning and etching of plackets; and
- selection of different kinds of metal ink paste - copper not as good as aluminum/silver alloy.

2) Mme. Zeinab Najaar is Information Director at the Entreprise Tunsienne d'Activites Petrolieres (ETAP). ETAP is a semi-governmental regulatory and technical advisory agency for the

Tunisian hydrocarbon industry. It serves as the liaison between Tunisia and all foreign oil companies working in Tunisia. ETAP is a major buyer of NTIS published searches (24 published searches, four primary documents).

The professionals at ETAP consider NTIS documents "basic work tools," and a "gold mine." They don't want the French catalogues anymore because they are out of date. Standards and norms are their major interest. Mme. Najaar says the user seminar was very successful. NTIS is neither too expensive nor too slow. She is very disappointed at the termination of the project. ETAP is buying a reader-printer.

3) Mr. Mohammed Salah Rhomdhana is Director of the Fisheries Department at the National Agronomy Institute. The objective of buying NTIS documents is to build a strong core for a Fisheries Library which serves staff and students. NTIS has donated a microfiche reader, and a Peace Corps Volunteer, had worked at the Institute and helped choose NTIS documents. The Fisheries Department has apparently bought 250 NTIS documents on 750 microfiche. There is a microfiche-to-paper printer across campus. Cost of use is U.S. $.25 per page, which is very expensive.

According to Mr. Rhomdhana the documents are useful for reference and for research papers, but the replication and adaptation of the research in them requires equipment which is unavailable in Tunisia.

Topics of interest are control of fish and micro-organisms during live transport, and control of water quality.

Mr. Rhomdhana was curious whether there might be A.I.D. fisheries projects where the research could be applied. He feels that the fish industry does not receive the attention it deserves in light of its importance to the Tunisian economy.

D. CRITIQUE OF THE NTIS APPROACH

Development of Links with Collaborating Organizations

More than half of the four-year project life, and a major portion of project resources were spent on finding appropriate collaborating organizations in the participating countries. This was not contemplated in the Project Paper.

Economics

Self-sufficiency was posited as an objective with no analysis of what self-sufficiency means, and no calculation of margins or break-even points. NTIS is barely self-sufficient in the U.S. with its sophisticated, largely captive market. By what logic is it reasonable to assume that self-sufficiency is feasible in the developing world, where marketing is considerably more difficult?

NTIS is required by law to cover costs, and therefore must charge substantial prices ($15 to $20 dollars per document in paper form). In the developing world, where sales volume is very low, the prices charged covered no costs, and resulted in inhibiting demand. It can at least be posited that lower prices might have resulted in higher revenues. For this project, NTIS lowered prices by charging U.S. rather than foreign rates (double the U.S. price), but is prohibited by law from altering prices further.

In Egypt, NTIS charged royalties on paper copy prices, although the documents were bought by APROMAC in microfiche form and converted to paper on APROMAC equipment. Thus, NTIS removed an excellent opportunity to promote self-sufficiency and private sector participation in the technical information business. It would seem that since APROMAC took the risk, and contributed the value, they should be allowed to accrue a margin of earnings to cover marketing costs and profit.

Equipment

People do not like to use microfiche readers, and paper copy bought from NTIS is expensive. Therefore, inexpensive microfiche-to-paper printers would seem to be the necessary complement to NTIS services. Such printers were not an effective part of the S&T Information Transfer Project however, although they would seem to complement the project better than computers, which were part of the project.

User Education Seminars

There seems to have been little adaptation of user training materials for developing world clients. The materials still consist primarily of slides of NTIS/Springfield operations, and the message seems to be

"Look how complicated and advanced we are." There seems to be relatively little material which takes the user's point of view, demonstrates user benefits, and provides instruction in how to use the system. User training should involve users in solving sample problems.

Institution Building

While there was impressive sales progress in Tunisia, there were no arrangements for transferring an institutional capability to the Tunisians.

Marketing

In Morocco, needs of student clientele were not understood and responded to. The students are apparently not satisfied with the NTIS product. They need journal articles and texts rather than technical monographs. The project should be able to answer needs outside NTIS when such client needs arise.

III. THE POLICY ENVIRONMENT FOR THE ANE BUREAU'S SCIENCE AND TECHNOLOGY INFORMATION TRANSFER PROJECT

Policy topics examined in this chapter include the following: 1) A.I.D. Mission involvement in the project; 2) Near Eastern country government science and technology policy; and 3) U.S. private investment and trade in project countries.

A. A.I.D. MISSION INVOLVEMENT IN THE PROJECT

SUMMARY

There is no interest within the Morocco and Tunisia Missions in supporting NTIS activities, although in Tunisia the project was given serious consideration. There is some Mission interest in Egypt in having the NTIS collaborating agency combine forces with a large, existing Mission technological information project. However, negotiations between the two Egyptian parties, at NTIS' instigation, have been going on now for nine months with no closure.

Part of the problem is that no one understands what "Mission support for NTIS" means. Does it mean that the Missions give money to NTIS in Washington to pay for NTIS administration, and trips by NTIS personnel to the Mid-East? Does it mean that the Mission gives 25% commission to the collaborating agency for document sales, and to pay salesmen's salaries? Missions are especially (and understandably) reluctant to spend money which would end up supporting NTIS operations in the U.S. NTIS did not succeed at establishing a constituency within USAID Missions which understood and supported the project. Especially lacking was an understanding of the development implications of technical information. NTIS might have done free research for A.I.D. projects, discovering their particular problems and proposing solutions to them. Even in Tunisia where sales were generally high, there were few if any sales to A.I.D. projects and their beneficiaries.

USAID/EGYPT AND THE S&T TECHNICAL INFORMATION TRANSFER PROJECT

In Egypt, during the project approval process, the USAID Mission expressed the following concerns regarding the S&T Information Transfer Project.

1. The Mission already had an Applied Science and Technology project which was the result of long, difficult negotiations which addressed organizational and attitudinal obstacles to information sharing.
2. How does NTIS know there is a market for NTIS products, and who constitutes this market?
3. The S&T Information Transfer project has a private sector focus which is new to Egypt.

4. The original idea that Egypt be the project's center for the entire region was unacceptable to the Mission. Eventually Tunisia was chosen.

After several years of observing the project, the Mission impressions are that: 1) the project was designed in Washington, was not based on a country needs assessment, and is run from Washington in a free-wheeling fashion; 2) the Mission is aware of the project's seminars, and has received positive feed-back on the marketing seminar by Dr. Andy Cao. and 3) perhaps the project is too original, and was implemented too early; organizational and attitudinal changes must be allowed to take place first.

The principal Mission concern is that parallel, centrally-funded and mission-funded A.I.D. technical information projects may give confusing signals to the Egyptian Government regarding U.S. technical information policy. The Mission seems to prefer that all information requests, even for NTIS, be funneled through ENSTINET. The Mission is interested in an APROMAC/ENSTINET collaboration. Questions they posed regarding APROMAC are: How much do they sell? How many users do they have?

ENSTINET-USAID/Egypt's Technical Information Project

For several years the Egypt Mission has had a project with a technical information component which was the result of five years' design work. The contractor for the first phases was Georgia Institute of Technology. The implementor is now the Academy of Scientific Research and Technology (ASRT). Egyptian National Scientific and Technical Information Network (ENSTINET) has on-line nodes in all the Ministries, and at the Industrial Development Center in Giza.

The system is not designed to cover costs, and subsidies are part of the long term arrangement. A.I.D. subsidizes searches, and users pay for documents. There are apparently 300/400 searches per month. The objective at present is to establish credibility, not to garner profits and amass a wide audience. Marketing apparently includes pamphlets and amass some client visits. Customers are mostly researchers in medicine, agriculture, and the physical sciences. Table 2 of Annex 2 lists databases accessed by ENSTINET. NTIS is noticeably absent from the list.

POSSIBLE COLLABORATION BETWEEN APROMAC AND ENSTINET

For more than a year, NTIS has tried to promote an on-going relationship between APROMAC and ENSTINET. The USAID Mission seemed supportive of this idea. The basis of the collaboration was to be that ENSTINET handle the bibliographical searches, and APROMAC handle the document delivery. Profits or commissions would be shared.

The two Egyptian parties, however, have not reached an agreement, and it seems unlikely that they will do so. Both A.I.D. and NTIS expected a joint proposal, but none seems forthcoming. Reasons given for the lack of a consummated relationship include the following:

1. Private sector/public sector collaboration is new to Egypt. Why should subsidy go to one particular private sector entity?
2. What does APROMAC offer? Do they have a large NTIS sales base?
3. A.I.D. will approve, but the Government of Egypt will not. ENSTINET does not want the information resources to go to anyone else.
4. Neither A.I.D. nor the Egyptian government will pay for the visits of NTIS personnel. To pay Washington salaries does not make sense to them.
5. ENSTINET wants TV and radio promotion, not the type of face-to-face marketing APROMAC does.

The opportunity for mutually beneficial APROMAC/ENSTINET collaboration seems to have been ignored. APROMAC has a high quality, low cost machine for converting microfiche to paper copy. This facility offers several advantages:

- o Buying documents in inexpensive, microfiche form;
- o Conversion of microfiche documents to user-friendly paper form;
- o Collecting a margin based on value-added, which can be used to pay for advertising, promotion, etc.; and
- o Facilitating the establishment of a permanent Egyptian collection of technological information in microfiche form.

USAID/MOROCCO'S POLICY TOWARD THE S&T TECHNICAL INFORMATION TRANSFER PROJECT

Morocco Mission policy is that projects must be sector-specific with measurable development objectives. This is A.I.D. policy in general, and Morocco Mission policy in particular. A project proposal to support a Center for Science and Technology, similar to the Egypt project, was turned down emphatically. Earlier collaboration with the proposed counterpart organization had been considered a failure.

USAID/TUNISIA'S POLICY TOWARD THE S&T TECHNICAL INFORMATION PROJECT

The Tunisia Mission was sympathetic enough to give the NTIS project serious consideration. The Mission decided against supporting the project for the following reasons:

1) Paying $18,000 in annual salary for the NTIS representative in exchange for $10,000 per year in document sales did not seem cost-effective;
2) They did not think English language documents were useful in a French environment; and

3) Small projects, in general, are not viewed as cost-effective because they require as much administration as large projects.

USAID/Tunisia Support of Applied Research in Computer and Information Science

The objective of USAID/Tunisia's Institute de Recherche Scientifique en Informatique et Telecommunications (IRSIT) project is to forge links between academe and industry in carrying out applied research in computer and information sciences. Components of the IRSIT project are technical assistance, pilot projects, training, and institutional analysis; the project also provided 160 Macintosh and IBM computers. Eventually IRSIT may by part of a university, the Carthage Institute of Technology, and industrial park complex now in the planning and fund-raising stage.

The Chief of Party of IRSIT reacted to the possibility of collaboration with the NTIS project as follows:

1) if we have to go somewhere and look at catalogues, that is too much trouble; and
2) DIALOG is already too expensive.

B. NEAR EAST GOVERNMENT SCIENCE AND TECHNOLOGY POLICY

In all ANE countries, technology transfer seems to suffer from embargoes on the import of goods not essential to production, because the definition of what is essential to production is narrow. In some countries there have also been monopolies on book distribution (Tunisia), and restrictions on data transmission (Egypt).

SCIENCE AND TECHNOLOGY IN MOROCCO

In Morocco there is an attempt at centralizing science and technology activity through a Center for Science and Technological research. The center, however, has no power. In the past they had received a USAID grant to support several research efforts. This was considered a failure to the extent that future collaboration with them was recently turned down by the Mission. Sectoral ministries wield the real power in Morocco. Heavy duties on imports are obstructing technology transfer, as in the area of solar energy for example.

SCIENCE AND TECHNOLOGY POLICY IN TUNISIA

A Tunisian Applied Research Program

In 1980 an applied research program was announced under the direction of the Ministry of Higher Education and a commission of specialists. On the basis of studies and analyses, even research foci were chosen in physics, engineering, medicine and pharmacy, energy, water resources. In 1986, the Fond pour la Recherche Scientifique et la Maitrise de la Technologie (FORESMAT) was established and funded by a tax of 1 millem for each liter of gas bought. The money was to go for projects between universities and industry. Shortly thereafter, the 11 research foci were reduced to 4.

Tunisian Education Policy

Greater emphasis has been given recently to Science and Technology, and less to humanities. It has been concluded that the traditional French approach to education has not paid off. Arabization in the schools has resulted in a drastic drop in test scores (given in French), and is causing widespread concern. Apparently some reintroduction of European material has occurred. However, the process of Arabization is irrevocable.

Very few Tunisian undergraduates now go to Europe or to the U.S. on scholarship, although graduate study abroad is still common.
There are few government scholarships, but A.I.D. is trying to provide scholarship assistance in technical skill areas. One observer indicated that graduate degrees acquired by Tunisians tend to be in inappropriate areas, and that they need a guidance committee which understands Tunisia, and the technological areas.

SCIENCE AND TECHNOLOGY POLICY IN EGYPT

An assessment of science and technology policy in Egypt is presented in Annex III of the Project Paper (1980) for the Applied Science and Technology Research Project, Phase II. The assessment noted that Egypt has a large Science and Technology resource base with more than 22,500 holders of M.Sc. or Ph.D degrees in virtually all fields of science and technology. The majority of these advanced degree holders worked in more than 260 research institutions, many of which were attached to Ministries and were ostensibly organized around specific major problem areas (e.g., the Corn Institute, the Soil and Water Research Institute, and the Water Distribution Irrigation Methods Research Institutions). Universities were less significant as a source of research for development due to low research budgets, heavy teaching responsibilities, and the role accorded to full-time research institutes. Approximately 79% of the Government of Egypt's research expenditures went to full-time institutes.

The Egyptian Government, under President Anwar Sadat, began an "open door" policy in 1974 to encourage foreign private investment with the specific aim of introducing new technology and more efficient management in the productive sectors. Science and technology policy statements made under Sadat's administration called for closer links between the Egyptian universities and scientific institutions, on the one hand, and the production sectors, on the other. Emphasis was placed on research, avoidance of over-dependence on imported Science and Technology and the adaptation of imported technologies to suit the Egyptian environment. Yet real policy was often made at the sectoral level where the Ministries were most influential, having the budget resources, often their productive enterprises, and in most cases, their own research institutes. Across-the-board science institutions, like the ASRT, could not compete very well in terms of setting priorities that would significantly alter the allocation of resources under ministerial control.

President Hosni Mubarak has shifted away from the consumer-oriented policy of the Sadat years to an emphasis on a "productive" open door policy emphasizing improvement in the country's heavy industry and industrial plants. The first major step in the implementation of this policy was an agreement in early 1986 with General Motors to begin local production of two automobile models in early 1987. Egypt's Five Year Plan for 1982-87 has given priority to agriculture and industry rather than services. Some 25% of the capital budget is expected to come from the private sector.

The Government of Egypt has moved closer to a more open market for direct foreign investment and trade. However, increased technology transfer may in part depend on the progress made by multi-sectoral science institutions, such as ASRT, in linking applied research to established priorities.

IV. IMPLICATIONS OF THE S&T INFORMATION TRANSFER PROJECT FOR INTERNATIONAL SCIENCE AND TECHNOLOGY POLICY

Prominent U.S. institutional actors in international science and technology policy are A.I.D. in Washington, A.I.D. Missions, the Department of State, and the Department of Commerce. Access to and distribution of U.S. technical information can be an important component of science and technology policy.

A.I.D. has an interest in technical information as a development tool, and its subsequent effect on LDC economic performance. A.I.D.'s concern for sustainable development processes leads also to an interest in private sector participation in technical information distribution, an interest shared by NTIS due to the Congressional requirement that costs be covered. The Department of Commerce has an interest in the effects of technical information on U.S. industrial competitiveness. The Department of State has an interest in the effects of such technical information transfer on relations with Near Eastern Governments and peoples.
This chapter attempts to address all the above points of view. The chapter is accordingly divided into the following sections:

A. An Information Revolution in the Developing World
B. Technical Information as a Development Tool
C. The Technical Information Product and Business
D. Technical Information and the Private Sector
   1. .Private sector participation in technical information distribution
   2. Distribution of U.S. technical information and U.S. industrial competitiveness
E. Recommendations
   1. A.I.D.
   2. NTIS

A. AN INFORMATION REVOLUTION IN THE DEVELOPING WORLD

For some years now it has been fashionable to speak of a world "information revolution". Politicians and social scientists who give attention to the "information revolution" do so because they believe that the informational context in which we find ourselves determines what we know, believe, expect, buy and form allegiance with. If an "information revolution" is pending in the developing world, it is due to the following factors:

1. There is a critical mass in many developing countries of highly educated people capable of absorbing and using highly specialized quantitative, technical information. Over the years, A.I.D. scholarships for university training, especially at the graduate levels, have contributed significantly to this "critical mass".

2. Efficient and inexpensive transmission of data, including bibliographic data, is fast becoming universal even in the developing world due to the advent of telecommunications with packet switching. From the telecommunications standpoint, the S&T Information Transfer Project has perhaps been premature, since packet switching is being installed just as the project terminates.

3. The information service business, including such organizations as DIALOG, BRS, IHS, and ERIC as well as NTIS, is growing rapidly (See Table 5). It is now possible to search quickly and inexpensively among vast databases for the answer to individual problems. The information industry may have more significance for the developing, than for the developed, world. In the developing world, a technician, researcher or businessman is less likely to have the answer to a problem at hand, or among personal or organizational resources and contacts.

4. Increasing economic interdependency generates demand for an "information revolution". Banks, for example, are often in the forefront of financing, or lobbying for, packet switching. Import, export, and production activities that straddle geographical, national and cultural boundaries, are becoming the rule rather than the exception.

5. Inexpensive microfiche-to-paper printers which use normal paper are now available. Advantages of the microfiche-to-paper mode include the following:

   - o Microfiche are cheaper to buy, and less expensive to mail than paper copy;
   - o People generally do not own microfiche readers, however, and do not like to use them for text;
   - o Buying documents inexpensively in microfiche form, and converting to paper and charging for the service allows collaborating agencies to accrue a per-document margin, and perhaps turn NTIS documents into an economically self-sufficient product line;
   - o Microfiche collections allow collaborating agencies to acquire large libraries and store them in a small space; and
   - o Microfiche collections are durable, lasting (under ideal conditions) up to 200 years, much longer than paper or computer disks. In spite of the advantages of microfiche-to-paper printers, they have not yet been an effective part of the S&T Information Transfer project.

B. TECHNICAL INFORMATION AS A DEVELOPMENT TOOL

Strengths

Those who have spent time with users of technical information, and have experienced the frustration of attempting development by other means, tend to become advocates of technical information as a development tool. Some reasons for this advocacy are presented below.

The advantage of technical information access and distribution as a development tool is that it allows innovativeness and creativity to breathe and grow. Often technical assistance in the form of the human expert inhibits innovativeness, creativity and the trial and error necessary for true learning and institution building. Technical information distribution is a non-paternalistic tool which gives the developing world a resource, and allows recipients to do what they want with it.

In spite of the inefficiencies inherent in technical information distribution systems, it is very probable that a dollar spent on technical information access buys as much development as a dollar spent on expert technical assistance. To maintain one person-year of technical assistance overseas in human form costs well over $100,000. For $100,000 dollars you can select and distribute an enormous amount of technical information.

Weaknesses

Technical information as a development tool is not without weaknesses, or course. Two features of technical information distribution which might be perceived as weaknesses from A.I.D.'s point of view are:

1. Technology transfer and economic development via technical information access is a "trickle down" process, as consumers of technical information are characteristically social and economic elites.

2. A.I.D.'s clientele and the clientele for technical information overlap, but they are not the same. A.I.D. project funds tend to focus on the poorest countries, whereas the countries where technical information is likely to have its greatest impact are those which have reached a "takeoff" level of educational and industrial development. In fact, NTIS impact may become potentially largest at precisely the moment when A.I.D. assistance becomes least urgent.

C. THE NATURE OF THE TECHNICAL INFORMATION PRODUCT

If sound database search methodology is used, the product is not a document, but rather bringing together of bodies of knowledge and expertise to bear on the solution to a particular problem. This view

of the technical information product leads to the paradoxes discussed below, which have caused problems for NTIS operations.

There is high demand for technical information in general, but generally low demand for any one specific document. The idea that you can simplify things by focusing on "best sellers" is therefore wrong. By pre-choosing documents, you are emasculating the product whose strength is characterized by the ability to search among a wide range of sources. The high-general-but-low-specific demand paradox may explain why SRIM (Selected Research in Microfiche) does not sell better.

In an important sense, the less information received, the higher its value. In large part, a client is paying someone else to wade through lots of irrelevant information to arrive at a small body of relevant information. Therefore packages designed to reach a large number of clients play against the product's strength. Experiments with packaging attempted in Costa Rica and Egypt have met with little success, and a proposed packaging experiment in Egypt must be viewed at least with some skepticism.

"It is estimated that of the 2.5 billion copies of journal articles published each year in America, 250 million, or only one in ten, are ever read. Providing each reader with selected sets of articles reflecting an individual profile of the reader's interests rather than sending entire, uniform journals have clear advantages."[1]

The NTIS Product

The NTIS technical information product tends not to be reader friendly. It is dense, thick, difficult to read, and generally quantitative rather than descriptive. It has high potential value, but is a difficult start for beginners at using technical information. In Latin America, evaluations found that the NTIS product sells in low volume, but when it is bought, the utilization as opposed to mere reference, rate, is high. Potential economic impact of NTIS sales in Latin America as well as in the Near East appear to be high, although it was not possible to measure within the scope of this evaluation.

Not being able to see the product before being purchased is a major drawback to sales. This drawback is partially solved by having local microfiche collections. But this solution requires being able to predict the market, and gives up technical information's major strength, which is to be able to search among a wide range databases for the answer to a particular question.

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[1] Gloss, Alfred, Personal Computer Communications St. Martin's Press; New York, 1985.

Characteristics of NTIS Marketing

NTIS barely covers costs in the U.S. with sophisticated users, and a largely captive market, so it is unreasonable to expect cost coverage in the developing world. A viable business requires a product line, not just a product. NTIS is part of product line, not a product line itself. The product line probably includes IHS, popular technology magazines, and academic scientific journals. If an organization has on-line searching, then of course the product line includes DIALOG, BRS, AGRICOLA, and MEDLINE, etc. One of the things that the U.S. does best is to popularize technical information so that it is user-friendly; however NTIS is the not the best example of this talent. NTIS documents tend to be for an expert audience, not a popular audience.

In any country, there is not just one market for technical information, but several. There are very different types of buyers with very different needs which require different marketing and packaging approaches. An institution which is building its library and has a budget to spend every year must be dealt with differently from the individual problem-solver who has no information budget, and for whom there are significant opportunity costs.

Older technology may be as useful as new technology. Victor Martinez, an observer of technical information issues in Ecuador, posited that what the developing world needs is U.S. technology that is approximately fifteen years old. He believes that the industries for which the developing countries have comparative advantages are those for which the technology, and therefore the technical information, is approximately fifteen years old. Fifteen year old information is not necessarily obsolete information. Remember that man walked on the moon more than fifteen years ago, and hasn't been back since. Information on older technologies, as well as new technologies is available through NTIS.

D. TECHNICAL INFORMATION AND THE PRIVATE SECTOR

Three potential private sector beneficiaries of technical information are: first, developing world businesses which use technical information; second, developing world businesses which sell technical information; and third, U.S. businesses which become more competitive because U.S. technical information indirectly markets U.S. industry. Within the ANE S&T Information Transfer Project, there have not been enough private sector clients, and not enough time has passed, for there to be substantial benefits of the first type listed above. Experience in Latin America indicates, however, that in middle-income LDCs, approximately half the market for technical information is private sector business, and the impact on productivity is high. In the following two sections, technical information benefits of the second and third types are discussed.

1. Private Sector Participation in Technical Information Distribution

Private sector participation in technical information sales requires that the business be profitable. For the technical information business to be profitable, there must be a per document (or per service) margin between cost to the business and price paid by users. Four potential sources of per unit margin can be identified. It may be noted that sources of per unit margin tend to be contribution of value added and assumption of risk by collaborating agencies.

Potential sources of per unit margin between cost paid and price charged by collaborating agencies in the technical information business are:

1) The 25% commission on sales offered by NTIS as part of the A.I.D. project;

2) A margin charged by sellers in exchange for converting into paper copy;

3) A margin charged by sellers in exchange for predicting the market, and assuming risk by regularly buying SRIM collections at a discount; and

4) Purchase of documents by a consulting group which uses them to increase the value, volume, and therefore, revenues in exchange for its consulting services.

In the paragraphs that follow, the merits and weaknesses of the different sources of per unit margin are discussed

1. Commission as a source of per unit margin:

As part of the project, NTIS gave collaborating agencies a commission amounting to 25% of sales revenues. In the example of Tunisia, approximately $10,000 in sales would generate approximately $2,500 for MIT. The 25% commission as a source of margin has several weaknesses. First, commission as a source of margin is temporary because it is a provision of the S&T project, and is therefore not the basis for sustainable profit. Second, selling 700 documents at approximately $15 a piece is a very difficult way to earn $2,500; there are much easier ways. Third, selling 700 documents per year is a full-time job, but $2,500 is not enough to pay a full-time salesman. Fourth, a margin based on dollar sales produces a bias against selling microfiche, which have advantages from the point of view of volume and economic development. A criticism of the commission approach, which encompasses all of the above is that it is not based on, and therefore does not encourage, contribution of value added, and assumption of risk by the collaborating agencies.

2. In-country microfiche-to-paper conversion as a source of per unit margin:

Under this arrangement, the collaborating organization buys documents in microfiche form. The microfiche document costs $6.50 ad hoc and $1.35 for SRIM. The collaborating agency then adds value by converting the documents into paper copy using a microfiche-to-paper printer. Then the document is sold at a price above the cost of the microfiche to the collaborating agency. At present, NTIS documents in paper form sell for approximately 20 dollars per document (the domestic price), in which case the seller has a margin of $13.50 ad hoc and $18.65 for SRIM per document with which to cover sales, promotion and profits. This source of margin requires investment in a microfiche-to-paper printer.

3. Prediction of market, and subscription to SRIM, as a source of margin:

NTIS offers a discount on microfiche reports if they are subscribed to on a regular basis, simplifying NTIS document search procedures. This approach allows the seller to reduce the price of document acquisition to between one and four dollars, depending on the size of the document. Regular subscription to microfiche in certain categories allows a seller to contribute value added and take risk by studying and predicting the market, and buying microfiche out of his own pocket on speculation.

APROMAC in Egypt has microfiche-to-paper printers, and planned to combine approaches #2 and #3 noted above to create a "business." NTIS royalties policy prevented this however, as discussed previously.

4. Absorption of document costs by a consulting group, and recovery in the form of consulting fees:

A consulting group could buy the documents, and incorporate their use into their consulting product, thereby increasing value offered to the client, and raising the consulting fee charged. Under this arrangement, the collaborating organization is both seller and user of the technical information.

It appears that APROMAC in Egypt is following this approach. APROMAC considers acquisition of a library of technical documents in their area of interest as a primary and sufficient reason for participating in the NTIS project. The library adds to the value of expertise APROMAC can offer clients, thereby presumably increasing his volume of business, and the rates that can be charged.

The analysis presented above suggests that a business based on a margin between the cost and price of services is at least theoretically possible. Assessment of how good a business NTIS

document sales might be requires an estimation of sales volume as well as marketing costs.

In Tunisia, it was demonstrated that with an aggressive, professional marketing and sales program, there is demand for NTIS documents. The aggressive marketing was not accompanied by any of the sources of margin described in the previous section. Therefore it did not demonstrate the feasibility of a profitable technical information business. It did, however, give information on marketing costs and level of effort necessary to support a technical information sales business.

Optimistic sales projections: Tunisia sales results have led to a sense of confidence that sales of $10,000 per year, and 1,000 documents per year are eventually possible. Number of users could probably grow with the passage of years, but number of documents per user would probably decrease, as institutional buyers acquire their basic stock, and then add to it by small increments.

Projected marketing costs, and level of effort: The Tunisia NTIS salesman earned $18,000 per year. In one year, the NTIS salesman made approximately 240 visits per year, or one per working day. To this must be added at least half time spent on advertising materials, and administration. It is unreasonable to assume that there would ever be a more aggressive, sophisticated salesman than was the case in Tunisia. Therefore, to increase sales and volume you would have to increase marketing and sales staff.

Optimistic extrapolations: If the Tunisian operation had owned a microfiche-to-paper printer, and bought half its documents as single microfiche documents, and half as SRIM subscriptions, documents would have cost approximately $6.00 each. If documents are sold at $20.00 each, that leaves a margin of $14.00 per document. One thousand documents per year times $14.00 margin each gives $14,000 per year to pay sales personnel and run the business.

Conclusion: Even using optimistic assumptions, achievement of self-sufficient NTIS document sales is doubtful. Perhaps technical information sales, using a wider product line including popular and academic journals could be self-sufficient, however. APROMAC in Egypt, for example, sells Information Handling Services products as well as NTIS, and seem to make money on them. Information Handling Services products are manufacturing specifications and standards. The clientele in Egypt seems to consist largely of manufacturers of defense and military equipment, who are involved in U.S./Egyptian joint ventures.

2. Distribution of U.S. Technical Information and U.S. Industrial Competitiveness

There are several possible connections between distribution of U.S. technical information to the developing world, and U.S. industrial

competitiveness. Some of the connections are of benefit to the U.S. industry, and some are detrimental to it. On the positive side:

1. In the most narrow view of the relation between technical information distribution and competitiveness, technical information access and distribution have recently become an industry in the U.S., and therefore purchases of technical information by the developing world benefits U.S. industry.

2. People in developing countries with access to U.S. technical information may learn about specific U.S. technical products and services and buy them. New markets for specific U.S. products and services may be created through the distribution of technical information. Dr. Rauf Bennaceur's photovoltaic cell factory described at the end of Chapter II provides such an example. While this is a more sensible way to view the relation between technical information distribution and competitiveness, it is also too narrow.

3. People in developing countries with access to U.S. technical information may gain respect for, and feel comfortable with, U.S. technical products and services in general, and therefore may be more likely to purchase American goods and services. Access to and distribution of U.S. technical and scientific information may be a subtle and powerful economic tool in the promotion of U.S. exports, in the sense that the informational context in which we exist conditions what we know, believe, expect, buy and form allegiance with.

On the negative side, contact with and absorption of U.S. technical information may result in the creation of competing industries in developing countries which rob U.S. industry of jobs, growth and profits. It would seem that this negative result would occur rarely, since the comparative advantages of the U.S. and developing countries are, almost by definition, different.

In reality, some or all of the above connections between access to technical information and competitiveness of U.S. industry are likely to occur simultaneously. Competing industries originating in the developing world, based on access to U.S. technical and scientific information, would almost certainly be consumers of U.S. technology in the narrow and broad senses. Industries based on U.S. technical information might simultaneously compete with a specific U.S. business(es) while contributing to net U.S. industrial competitiveness.

In conclusion, it seems probable that facilitating or even subsidizing developing world access to U.S. technical and scientific information would develop markets for U.S. exports, without seriously undermining U.S. competitiveness, and would promote LDC technological development, based on U.S. norms, standards, concepts, and approaches.

E. RECOMMENDATIONS

1. Recommendations for Consideration by A.I.D./ANE

Acceleration of the Economic Impact of ANE Bureau Information Transfer Projects

1) Promote cross fertilization among future information transfer projects.

For example, it seems that there may already have been duplication of design effort and expenditure in the Egypt and Thailand information projects due to lack of communication between design teams. Greater coordination between project teams may lead to savings and improvement in implementation activities.

2) Insure that future A.I.D. information projects include a private sector orientation in user education and marketing activities.

Experience in Latin America and the Near East demonstrates that information professionals tend to develop systems that are technologically elegant and useful to academicians and researchers, but do not serve private sector users well. A major component of the recommended approach would be user training for clients outside academic, research, and government circles. Another lesson from Latin America was that case studies regarding concrete economic impact are an effective, perhaps the most effective, tool for promoting information sales. A first step to encourage inclusion of a private sector orientation in user training and marketing might be distribution to the Egypt and Thailand information transfer projects copies of the 1982 and 1985 Evaluations of NTIS in Latin America.

3) Include issues of marketing outreach, specific technological and economic impact, cost-benefit of elaborate versus streamlined organizational structures, and choice of countries in mid-term evaluations of information transfer projects.

An investigation of the cost-benefit issue mentioned above could seek to answer two questions: What might a "streamlined", less expensive, but self-sufficient information service look like? What are the cost-benefits of building an elaborate infrastructure and carrying a high operations budget? The choice of country question might address whether S&T information transfer projects must be confined to countries and Missions with extensive resources?

4) Insure that microfiche-to-paper printers are made an effective part of future information transfer projects.

In their understandable interest to take advantage of the latest computer and telecommunications technology, the information projects should not ignore the advantages of microfiche technology, including microfiche-to-paper printer. Microfiche technology allows rapid turnaround, decentralized information distribution points, and accrual of a profit margin through the fiche-to-paper conversion.

Testing of the Inclusion of Technical Information Dissemination Responsibilities within the Role of Private Sector Officer

5) Provide training for Private Sector Officers in how to use such information services as DIALOG, BRS, IHS, NTIS, etc.

6) Assign Private Sector Advisors the responsibility of analyzing Project Papers to identify opportunities where small budgets should be included for purchasing technical information searches and documents. Technical information dissemination could be an additional tool for Missions to assist in private sector development.

7) Authorize Private Sector Advisors to open a "deposit account" on behalf of information buyers, to avoid currency exchange problems.

The laboratory for testing the most appropriate configuration of training, responsibilities and resources could be Tunisia where the Private Sector Advisor should be supported in his attempt to combine technical components with his other responsibilities.

Demonstration of the Potential for Technical Information to Address Priority Development Issues.

8) Undertake a pilot "information inundation" project to demonstrate the potential for technical information including NTIS, DIALOG, BRS, etc., to address specific priority development problems. "Information inundation" means to subsidize access and distribution of technical information regarding a specific problem via telecommunication, microfiche and other means.

Topics for the pilot project might be chosen from A.I.D.'s Blueprint for Development, such as:

1. Improved techniques for water management, fuelwood production, and natural resource conservation;

2. Agronomic research for drought and pest resistant crop varieties;

3. Biomedical research to improve preventive measures such as vaccines; and

4. Research on key factors that make for effective institutional performance.

9) For some countries, A.I.D. might lobby for the installation of "packet switching".

"Packet switching" is relatively inexpensive and is a telecommunications prerequisite to efficient, fast transmission of data, including bibliographic listings.

A.I.D. Financed Graduate Student Scholarships as a Technology Transfer Mechanism

10) Devise means to provide guidance to A.I.D.-assisted graduate students that combines knowledge of development priorities and employment opportunities in the student's home countries.

A.I.D. Mission staff indicated that they regard graduate scholarship programs as an important technology transfer strategy. One observer entrusted with employing returned participants found that often they are tragically unprepared for their home situations. According to the observer, students often have specialized in obscure areas that do not correspond to problems and opportunities found in their home countries.

11) Provide A.I.D.-financed graduate students training in the use of technical information services such as DIALOG, BRS, IHS, NTIS, and databases corresponding to the student's specializations.

Such training would make them more effective professionals, give them a tool for continued training, and in some cases might result in the students becoming purveyors as well as users of technical information.

Minimization of Damage Caused by Termination of the S&T Information Transfer Project

A.I.D. and NTIS support of the cooperating organizations in Near East countries is apparently at an end. The damage to technical information services caused by ending the project will vary from country to country. In countries where technical information services are relatively self-sufficient, such as Turkey and Portugal, the damage will be small. In countries where there is little NTIS activity, such as Yemen, the damage will also be small since there is little to lose. Damage to information services caused by ending the Information Transfer project is potentially high in countries where self-sufficiency is partial, and dependence on NTIS assistance is still high.

Countries where self-sufficiency is partial, and dependence on NTIS is still high are Morocco and Tunisia. Situations in the core countries are not identical.

In Egypt, there is a strong alternative to the NTIS project in the form of a technical information project supported by the USAID Mission. Also, sales of NTIS documents by the cooperating organization are small. Therefore potential damage to technical information services in Egypt by termination of the S&T Information Transfer project is small.

In Tunisia, high sales have been accomplished by an American paid with NTIS funds, but, Tunisian institutional capability has not been developed. Obviously, damage in Tunisia to technical information services caused by project termination will be substantial. Unfortunately the damage seems unavoidable since A.I.D./NTIS support for the American salesman must end either now or at some time in the future, with the same effect.

In Morocco, due to the S&T Information Transfer Project, a major technical information organization has made a commitment to English language services and outreach to the private and industrial sectors. Sales of NTIS documents have not materialized yet, however, because the salesman is just now understanding the difficult job of selling technical information, and developing a client base. Therefore the damage caused by ending the project in Morocco will be serious; the chance to develop a permanent technical information service for industrial clients in Casablanca will be lost.

Ways to minimize the damage caused by ending the S&T Information Transfer project are suggested below.

12) Morocco: Link the CND/SEMMA effort in Casablanca to an existing USAID project, perhaps the Catholic Relief Service/Executive Service Corps export consulting project in Casablanca. Involve any or all of the following: A.I.D.-funded graduate students or Peace Corps Volunteers who have information science training; and Dr. Andy Cao from the American University. Provide the current salesman further training in information science and marketing.

13) Tunisia: Provide a deposit account to facilitate continued purchase of NTIS documents by the clientele already developed, especially the following:

Institute National Meteorologique
Entreprise Tunisienne d'Activites Petrolieres (ETAP)
Faculte de Sciences Physiques, Project FORESMAT
Centre National de Science et Recherche Technologique
Institute Superieur de Documentation
Institute National Agronomique (Department de Peche)

14) Egypt: Continue to seek an association between APROMAC and ENSTINET.

NTIS should not approve in its present form the proposal made in the APROMAC 1987 Market Plan to use a questionnaire to predict popular reports, and sell "packages" each containing several popular reports. The hoped for result was 100 sales per document, reduced sale prices per report, and increased sales volume. While APROMAC's attempt at innovation is to be congratulated, experience has shown that attempts at selling packages of reports have not generated high sales (for example, in Costa Rica). It is difficult to imagine a single report generating 100 sales within Egypt alone. The value which NTIS brings to a client is the opportunity to choose from among NTIS' vast collection that particular document which meets a specific need. Consequently, pre-selecting "best sellers" would appear to contradict NTIS' value.

2. Recommendations for NTIS/the Department of Commerce

15) Continue technical information dissemination in the developing world and widen the database to include U.S. academic journals, unpublished Ph.D. dissertations, U.S. technical publications such as Popular Mechanics, and major donor documents.

Overseas technical information dissemination benefits U.S. interests at least as much as it does LDC economies. Therefore, the Department of Commerce and NTIS should not depend on A.I.D. support to continue overseas operations.

16) Design user education seminars which focus on solutions to user research problems rather than the inner workings of NTIS.

17) Distribute microfiche-to-paper printers to collaborating agencies and charge no microfiche royalties for documents converted from fiche to paper overseas.

ANNEX 1

NTIS ACTIVITIES IN TUNISIA, 1985 and 1986
The Marketing Campaign

Prepared by: Scott K. Johnson, Regional Coordinator
NTIS Near East Project Field
Officer.

For The Conference Co-Hosted
By NTIS and The Royal Scientific
Society at Aqaba, JORDAN
Jan. 25-28, 1987.

December 10, 1986

Marketing Plans Evaluation for NTIS in Tunisia ('86/'87)

INTRODUCTION

For an effective marketing effort to show some signs of success in our difficult Near East markets the following formula must be followed by an enterprising marketeer.

First of all good, hard knowledge about what NTIS is and what it does is necessary. Also an in-depth understanding of various products and services and especially those appropriate to the individual country market is useful. After the subject of NTIS and its products and services is mastered, our marketeer then should turn his attention to the potential scientific and technical users in the sectors of his market and get to know who they are, what they do, and exactly what their information needs and interests are.

Finally an integrated Promotional or Marketing Campaign is undertaken which communicates the marketeer's knowledge about NTIS to his potential customers. While doing this he stresses various selling points and follows-up to secure the first sales order. Subsequent follow-up should occur to insure additional orders.

In preparing this retrospective (for 1986) and future-looking (for 1987) plan I have chosen to analyze the steps which were completed in 1986 in carrying out my NTIS marketing in Tunisia and suggest that what will most likely occur in 1987 will be slight variations on the same theme, "marketing matrix"/integrated job-step approach. While offering my experience as an example to others, I wish to state my firm conviction that nothing can replace the value of the personal visit in the scheme presented. It is during the time allotted for the visit that the marketeer has the chance to present himself, his organization, and its products and services to a potential client and must convince his host(s) of the intrinsic value of all three.

LEARNING ABOUT NTIS AND ITS PRODUCTS AND SERVICES

In addition to the excellent Information Systems Management workshop offered at different two-week periods in Springfield, Virginia at NTIS and the marketing and online computer searching preparation provided through other seminars, a marketing person can familiarize with and continually refer to several valuable publications to increase knowledge about the subjects he is selling.

Among the publications provided by NTIS to its distributors are several that I have found to be most helpful. They are: The NTIS Cooperating Organization Manual of February, 1986; The User's Guide to NTIS, 1985; The NTIS General Catalog (PR154); A Workbook for Use in the NTIS International Information Network; How to Use the NTIS

Order Processing System, October, 1986, and the literature and guides provided for individual products in pamphlet/brochure form. In rare cases I referred to the ConCon manual.

The Potential Client Base

Once acceptably prepared in the whys and whereofs of the NTIS Information System and its products and services, the NTIS distributor needs to develop a list of potential users of documents and subscriptions to begin contacting. Some of the following sources which I have used to develop my client list for Tunisia are universal in nature and can be adapted to any marketing environment. These sources and where I obtained them are:

1) UNDP Projects and the names of project officers and staff- obtained from a friend at the UN in Tunis.
2) All establishments of the Ministry of Higher Education and Scientific Research - obtained from a friend at the Ministry.
3) The names of the department heads at the Tunisian National Scientific and Technical Research Institute - obtained from the "in-house" seminar on NTIS I gave at the institute.
4) All active projects in USA.I.D., Tunisia and their officers - obtained from a friend at A.I.D..
5) All U.S. companies operating in Tunisia - obtained from the US Embassy Commercial section.
6) The original lists for Tunisia developed by MEMRB of public and private sector companies, organizations, ministries and their appendages.
7) The books Made in Tunisia and Guide Economique de la Tunisie - obtained at bookstores and giving names, addresses, and activities of most major companies by their sector as well as listing most professional people.
8) Newspapers, Magazines, and Trade Journals - obtained through friends or on local newsstands.
9) The national telephone book gotten from the Post Office.
10) Word-of-mouth referrals - obtained during marketing visits or through social occasions.
11) Old ALERTEC/Amtid Mailing lists sent to me by International Office at NTIS.
12) A list of Tunisians with A.I.D.-financed graduate degrees from U.S. universities given by USA.I.D.-Tunis.

GETTING DOWN TO MARKETING OR OPERATING THE PROMOTIONAL CAMPAIGN

Now that our marketeer has his knowledge of NTIS and has established himself a target community of information users, he begins contacting them through a many-pronged promotional campaign in order to communicate his message. The steps of my personal promotional efforts need follow no special order however it is safe to say that some amount of Direct Mail contact should come first.

I. Direct Mail (in my case in French Language)

A. An Introductory letter about the CO's presence as an NTIS

distributor in-country with an initial description of NTIS as a serious, on-the-spot, scientific and technical documentation service.

B. Product-specific mailings with a sample and a cover letter- Ex. Abstract Newsletter, SRIM, Tech Notes, etc.
C. ALERTEC mailings.
D. COPS mailings.
E. Mailings of selected bibliography lists of titles for certain clients.
F. Special mailings to other clients with requests for their own current information needs- A "current awareness" campaign.
G. Sending clients promotional brochures developed at the CO or developed by NTIS such as The Computer Software Directory Brochure, brochures on Cancergrans or on-line searching, or Trade Announcements for NTIS.

II. Personal Visits (Marketing Sales Calls)

A. Introduce NTIS and self by phone and take an appointment.
B. Explain in more detail NTIS products and services.
C. Leave promotional materials about products in the user's language as well as lists of potentially interesting documents, COPS lists, Abstract Newsletters samples.
D. Invite the potential client to visit the CO office or get in touch with the visiting CO or any other CO in the country at any time; mention inviting them to appropriate upcoming user-education seminars. Tell them about other S&T information sources, places to go locally to make on-line searches, offer to help them prepare on-line search strategy.
E. Follow-up by providing a customer information profile Pro forma bill to the already-visited company.

III. Telephone Contacts

A. To initiate a commercial relationship and request an appointment for a personal visit.
b. To follow-up on a previous marketing call.

IV. User-Education Seminars

A. Display NTIS promotional materials prominently and always use a participant sign-in sheet for follow-up.
B. Give a short verbal presentation of NTIS.
C. Give the video presentation of "The World of NTIS" or the slideshow (or both interspersed during the hour and a half allotted time.)
D. Give a products and services presentation of the four or five most appropriate ones.
E. Discussion/Question and Answer period.
F. Refreshments served before, during, or after seminar.
G. Follow-up using the participant sign-in sheet. ("In-House" Seminars are the same as the above-mentioned

presentations except they are perhaps a bit shorter in time and tailored to meet the needs and activities of the host organization. The participants can include people from other companies in the same or related fields. Follow-up should occur to obtain personal visits with the participants appearing on the sign-in sheet.)

V. Publicity

A. Befriend a journalist and editors of trade magazines.
B. Visit magazine editors and newspaper editors.
C. Offer NTIS as a subject or story of interest and try to secure their interest in the NTIS service to obtain "human-interest" stories in their local (international) publications.
D. Ask the local U.S. Press Attache's office for promotional help, newspaper articles, press conferences for visiting NTIS officers, displays in their libraries' windows, etc.

E. Pay for small newspaper ads, short spots on the radio if the radio in your country does commercial advertising.

F. Try to be invited as a special guest on a local TV program dealing with S&T or information subjects or ask a friend who is participating in such a program to mention NTIS.

G. Ask to post announcements about NTIS and your CO in public libraries, university libraries, or documentation centers.

Evaluation of 1986 Marketing Plan

In looking back over 1986 and in keeping in mind my efforts at mixing the above-mentioned elements of my marketing strategy I would like to point out the highlights or strong points of my program. Let us keep in mind the extremely tough political and economic climate being experienced by Tunisia this year.

Highlights

1) Continual updating and strengthening of my potential user lists.
2) Good direct mail contacts via ALERTEC, COPS, and several single product promotional letters.
3) Better established contacts with the local media including an article in a major monthly magazine.
4) Several in-house seminars given in Tunisia ETAP (oil and gas regulatory agency), National Scientific Research Institute, the Cartography and Topography Institute, The "Culture of Science and Technology" Seminar hosted at the Urban Studies Institute.
5) Developed better contacts at A.I.D., U.S. Embassy, USIS, Arab League and Alecso.
6) Carried-out 140 personal visits, averaging twelve per month. In addition to generating sales these visits give excellent exposure to NTIS on the Arab scientific and technical information grapevine and provide me new contacts by referrals.

Lowlights of 1986

1) The continuing lack of enthusiasm and relative uncooperativeness of CNUDST and its director continuing the poor Tunisian public CO tradition of its predecessors CNI and STD.
2) Relatively low sales to direct mailings percentage and sales to personal visits percentage.
3) Premature funding cutbacks from USA.I.D. due to the enforcement of the Gramm-Rudman bill.

My marketing plan for 1987 will have for its main goals to increase the personal visits by one-third over 1986 levels and work on improving the relationship of NTIS with CNUDST especially in light of the possible cessation of NTIS private sector activities in Tunisia. I will personally call on potential clients within the CNUDST Ministry to promote NTIS. This will be difficult as CNUDST as a Tunisian organization is typically lethargic and unenthusiastic about its own service, and therefore cannot be expected to be anything more towards NTIS and its service. If a user has his NTIS document and its accession number already identified, he will always be able to order through CNUDST. CNUDST just isn't currently doing anything to talk up its affiliation with NTIS and help people locate its documents.

I will also try to focus on the UNDP and A.I.D. projects for my marketing as well as the large companies and universities and their information centers in Sousse and Sfax.

User-Education seminars with CNUDST (to be held at the USIS center in Tunis), the Faculty of Science, the National Engineering College as well as a seminar in Alecso's documentation center are also 1987 goals. Hopefully "In-House" seminars can be arranged at the SIAPE/ICM chemical industry group, at SITEP or SEREPT oil companies covering the petroleum Industry, at INAT or INRAT for the Agricultural field, and at CNI/IRSIT or the National Computer Science College.

A few ALERTECs "Made in Tunisia" to promote NTIS french language documents will be developed. Also I will try to concentrate on getting some better Tunisian publicity for NTIS via publications such as "Mowassafat" of the local standards bureau, "Energie" of ETAP, "FLASH" of UTICA, "Conjuncture" of the Ministry of Plan and Finance, and la "Presse" in cooperation with the USIS's Press Attache's office.

Some additional statistics:

- Personal visits made in 1985- 280.

- "In-House" seminars to date in Tunisia include those given at: The Society for the Management of Energy, The National Nutrition Institute, The Peace Corps, Societe Tunisienne d'Electricite et Gaz (STEG), The National Scientific Technical Research Institute, The

National Office of Mines, The seminar entitled "The Culture of Technical Innovation" in conjuncture with M. Thierry Gaudin, Under Secretary of Innovation and Industry of France, and the Public Library of the French Mission to Tunisia.

- Sales to date in Tunisia since September 1984 are: USD 11,500.

- USD 2,621.74 in bad debts recovered from former Tunisian purchaser of NTIS documents.

Note: All mentioned figures are calculated at the rounded, historical rate of 1 USD equals .8 Tunisian Dinar.

ANNEX 2

THE EGYPTIAN NATIONAL SCIENTIFIC AND TECHNICAL INFORMATION NETWORK: PRESENT STATUS AND FUTURE PLANS †

Vladimir Slamecka [1]
Ahmed Abdel Bassit [2]

ABSTRACT. - The paper outlines the overall status and future plans of the Egyptian National Scientific and Technical Information Network (ENSTINET) as of summer 1986. Chapter I contains a summary description of ENSTINET's organizational structure, functions, services, and manpower development. Chapter II presents the planned extension of ENSTINET's mission, during the coming five years, in the direction of a value-added, sectorally oriented public information utility.

1. ENSTINET DESIGN AND IMPLEMENTATION

The Egyptian National Scientific and Technical Information Network (ENSTINET) aspires to be a public information system and service whose overall objective is to assist Egyptian problem solvers and decision makers to access and apply quality data and relevant, current information to developmental activities.

The beginnings of the idea to develop a science and technology information system in Egypt are more than 25 years old. A project to develop a national STI system in Egypt materialized in 1980 as a joint effort of the Egyptian and U.S. Governments under the umbrella of the two countries' Agreement of Cooperation in Science and Technology. In this project, a two-phased effort was sponsored: a two-year systems analysis and design study, and a three-year system implementation. Both phases were directed by the Georgia Institute of Technology, under a contract from the U.S. Agency for International Development. The Academy of Scientific Research and Technology (ASRT) has been the Egyptian lead organization on this project.

The systems analysis phase consisted primarily of extensive surveys, interviews, literature analyses, and workshops whose purpose was to obtain a comprehensive assessment of the information scene and resources in Egypt. The results of this phase are fully documented [1-5]. Based on the outcome of the analyses, a system design study and an implementation plan [6,7] were proposed to the Government of Egypt; the former laid down the principles the subsequent development of a national network of information services in five socio-economic sectors of Egypt. The implementation of this design, which created ENSTINET, has extended from 1983 through 1986 [8-13].

1.1. ENSTINET Organization and Administration

The ENSTINET structure (see Figure 1) is that of an open-ended, centrally coordinated, distributed network of sectoral information service organizations (ENSTINET "nodes"). ENSTINET nodes currently provide selected information services in six of Egypt's vital sectors: agriculture, development/reconstruction, energy, health care, industry, and science/technology. The organizations providing these services are located in, and are part of, their respective sectors, typically reporting to a ministry or similar high-level agency; ENSTINET members are thus said to be autonomous.

The coordinating and administrative functions of ENSTINET are performed through a central ENSTINET office attached to the Academy of Scientific Research and Technology. This office is

† The work reported here was supported in part by the U.S. Agency for International Development, under contract No. NEB-0016-00-2002 with the Georgia Institute of Technology.

[1] School of Information and Computer Science, Georgia Institute of Technology, Atlanta, Ga. 30332, USA
[2] ENSTINET, Academy of Scientific Research and Technology, Cairo, Egypt

concerned with coordinating Network policies and operations, advanced planning and system development, manpower development, and with selectively representing ENSTINET's interests at national and international levels.

The legal basis of ENSTINET are bilateral agreements of cooperation between the ASRT (as the host organization of the central coordinating office of ENSTINET) and the respective host organizations of the sectoral information service nodes. These agreements are executed for specified periods of time, and are renewable at the option of both parties. Briefly, the agreement commits each sectoral information service node to provide, and financially subsidize, a complement of agreed-upon public information services; and to conform to, and voluntarily participate in the development of, administrative and technical guidelines of ENSTINET. On its part, the ASRT commits itself to provide certain levels of advisory and material support to each node, and to furnish the costs of the coordinating and administrative mechanism of the consortium.

1.2. ENSTINET Functions

The design of the initial complement of ENSTINET functions emphasizes database-oriented services and activities. Accordingly, the currently performed functions of the ENSTINET sectoral information service nodes include the following:

- Developing and maintaining national and sectoral databases representing the scientific and technical knowledge produced in Egypt.
- Facilitating efficient access to recorded knowledge in both electronic and traditional form, and located in and outside of Egypt.
- Marketing the information services of ENSTINET and its member organizations.
- Educating the Egyptian public regarding the value and availability of problem-solving data and information.
- Training the professional manpower required to operate the services of this national network.
- Coordinating ENSTINET's participation in national and international information programs.

1.3. ENSTINET's Public Services

ENSTINET was designed and developed to provide from its inception the following set of public information services to the sectoral clientele:

- **Electronic Database Searching.** -- Each sectoral information service node assists Egyptian problem solvers to correctly formulate their data and information needs, and to access textual and numeric databases available in the sectoral subject areas. The searches are conducted online in databases located abroad, and are executed by information specialists who are professionals in the subject fields of interest.
- **Current Awareness.** -- This information service develops "profiles" of long-term subject interests of organizational or individual users, and periodically runs these against latest updates of electronic databases available in Egypt. Three such database updates are available at this time: AGRICOLA, COMPENDEX, and MEDLINE.
- **Document Delivery.** -- ENSTINET users wishing to obtain full copies of documents referenced in the database search printouts are referred, via an online union list of periodicals held by cooperating libraries, to Egyptian document repositories. Documents unavailable in Egypt are secured from abroad in an expeditious manner; agreements for this purpose are in existence with the U.S. National Agricultural Library and the British Lending Library.
- **Egyptian Database Building and Publishing.** -- Each sectoral information service is intended to generate a variety of sectoral databases, both textual and numeric. At this point in time, one major database is under construction -- the bibliographic database of Egyptian S&T literature. ENSTINET has developed a system to issue from this database an abstracting journal [14], including desktop publication software.

ENSTINET's services are supported by state-of-art information technology, described in a separate paper.[3]

1.4. Personnel and Training

Early in the implementation phase of ENSTINET, a set of guidelines was formulated [15] for the establishment and staffing of sectoral information service nodes. As a broad goal, the guidelines suggest a node staff of about 15 full-time professional, paraprofessional and clerical personnel, with skills to carry out the service and housekeeping functions described above.

Manpower development has received priority attention [4] throughout the development phase of ENSTINET. The major project in this area was a massive public training program consisting of repeated offerings of eight professional and paraprofessional courses, ranging in duration from three days to twelve weeks; in this program, over 800 persons were trained, including the staffs of sectoral nodes. This training was carried out under a subcontract to an Egyptian company, and its objective was to prepare an adequate number of information service and systems people to support the long-term extension of the public information services into the problem solving sectoral communities.

In addition, the central staff of ENSTINET has been involved in giving frequently short courses and seminars, usually about a week in length, on highly specific topics and skills required to operate the sectoral information services. More than 500 individuals have attended these courses on topics as different as database searching, bibliographic description, software administration, and database publishing.

2. NEW SERVICES, 1987 - 1991

The implementation phase of ENSTINET (1983-1986) established a network of sectoral information services whose primary functions relate to recorded scientific and technical information. Because this information exists increasingly in digital form, the emphasis of ENSTINET during this phase has been on the creation and use of electronic databases.

Until very recently, national information systems were invariably library-oriented, and as such their mission has remained stagnant and restricted -- to facilitate the organization and use of recorded information. National information policy, bibliographic control, documentation, and physical information resource issues continue dominating the mission of these systems. In contrast, ENSTINET differs from such national information systems in two important aspects. First, it is a network of information *services*, not one of physical information resources. As such, it is a network of autonomous information brokers or vendors, only loosely connected with the library enterprise. Second, the information technology that sustains the network's services is a generic computer/communications network that is capable of accommodating a host of other information-related functions and services. ENSTINET is thus positioned, from an organizational and technical standpoint, to consider the delivery of additional, value-added services to its sectoral clientele. It provides an unprecedented opportunity in Egypt to tie together, via electronic communications, problem solving organizations and individuals, and thus to become a single network for formal and informal communication within and among Egyptian problem-solving sectors.

2.1. Proposed New Functions

The new functions proposed for implementation by ENSTINET during the next five years are elements of the generic concept of "electronic mail". Electronic mail, or E-mail, is a non-interactive communication of messages by electronic means; included in the phrase are computer-based message systems, electronic document distribution, and facsimile.

It is intended that two E-mail services be implemented: text mail, and electronic bulletin. They

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[3] Slamecka, V. and Kamel, R. H., "Information Technology in the Egyptian National Scientific and Technical Information Network."

are briefly summarized below.

- **Text Mail.** -- The ENSTINET computers, located in the sectoral nodes and at the ASRT, have text mail built into the operating system software. Text mail is currently in limited use among the staffs of the nodes and their management. By extending its availability to ENSTINET users, any organization having access to a communications terminal will have the ability to exchange messages with any other ENSTINET member organization. In this manner, organizations and individuals can forward memoranda, documents, requests for database searches, and output of retrospective and SDI database searches. Since the recipient can save the messages addressed to him, text mail allows him to maintain an electronic archive of this correspondence.

  A particular application of text mail by ENSTINET should be the transmission of search requests to sectoral information service nodes, and notification of the user when the search was executed.

- **Electronic Bulletin.** -- The "bulletin board" is a one-to-many communication form; that is, a means of electronic "broadcasting" of messages. It is highly suited to the sectoral orientation of ENSTINET for dissemination of official news, announcements of events, organizational activites, open positions, and similar messages. The bulletin may be used to disseminate variable data (such as daily prices of agricultural commodities), and selected research results. Individual institutions and problem solvers use the system to inquire for data or information from others in the community. The electronic bulletin can be used efficiently for surveys, such that the data collected already comes in machine-readable form.

Jointly, these two services go a long way toward providing efficient, economical, and secure communication among organizations and problem solvers related by interest and/or organizationally.

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[14] Kabesh, A. *Egyptian Science and Technology Abstracting Periodical: Survey and Procedure for Implementation.* Cairo, Egypt, ENSTINET, ASRT, 1985. (Unpublished report)

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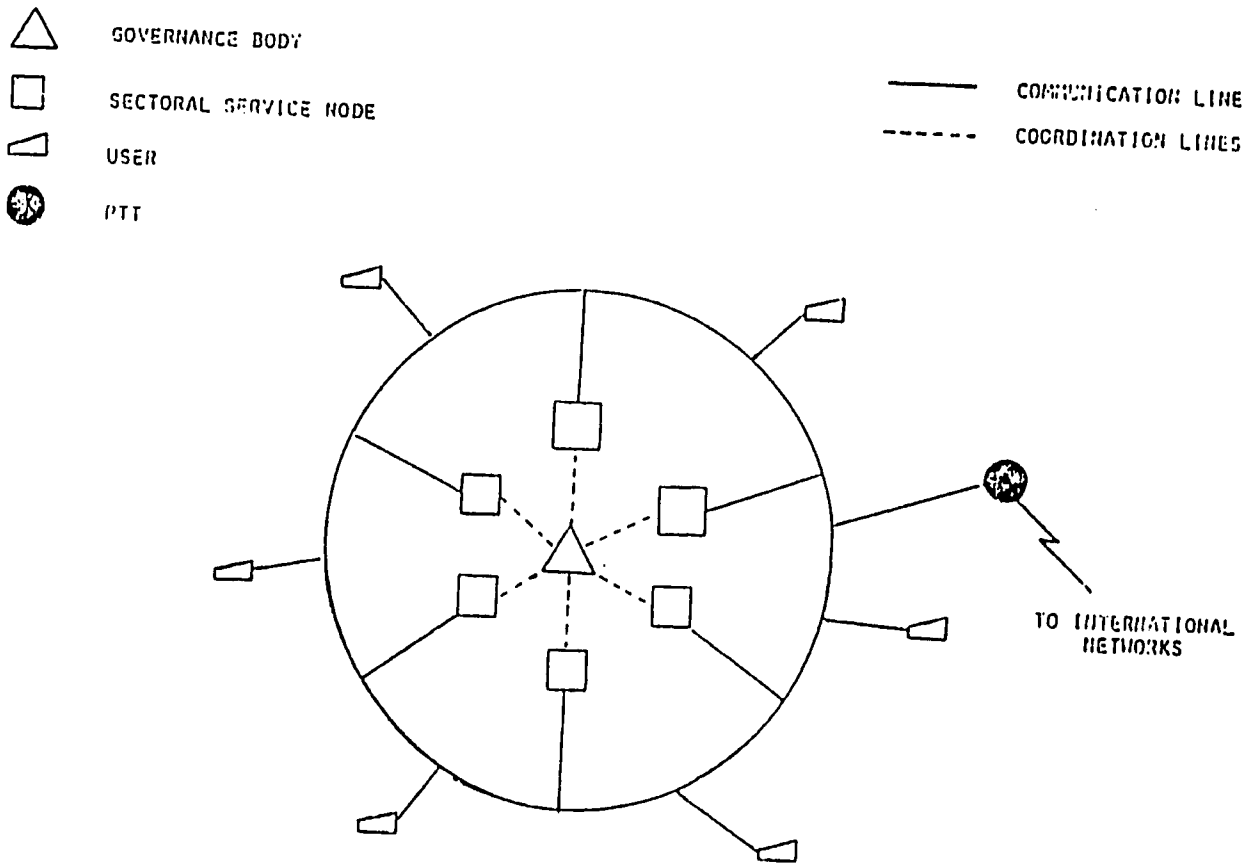

FIGURE 1. THE EGYPTIAN NATIONAL STI NETWORK

Details of the cost of individual services and of the central coordinating agency functions are broken down and appended in Tables 2-6.

4. DISCUSSION

As Table 1 shows, the operating budget for ENSTINET in 1986 is slightly less than one million dollars (equivalent to LE 1.3 million), of which about 21 per cent needs to be in hard currency funds. This is in close agreement with the original 1981 estimate of overall financial requirements of the Egyptian national STI system, and substantially below the percentage of the national R&D investment other developing countries are said to budget for operating such a system (however, one must note that a number of sectors are not included in the present network). The average operating budget of a sectoral information service node is about $125,000 -- a sectoral investment that seems very reasonable.

Table 1. ENSTINET Income Sheet

Function	Cost/Income Category	Expenditure ($)	Earned Income ($)
Sectoral Information Service****	Database building*	58,500	
	Online searching**	182,320	74,074
	Foreign doc. delivery***	37,200	37,200
	Support services****	466,134	
	Subtotal	744,154	111,274
Central Coordinating Agency	Personnel	144,051	
	Equipment	20,000	
	Supplies, travel	50,000	
	Other	6,307	
	Subtotal	220,358	
	TOTAL	964,512*****	111,274

* Assumes 6,000 records/year
** Assumes 4,000 searches/year
*** Assumes 8,000 documents/year
**** Assumes six sectoral nodes
***** Includes $206,800 in hard currency

Table 1 also shows that given the present-day complement of information services, ENSTINET can exist only if heavily subsidized by the government, host institutions, and donor agencies: only 11.5 per cent of its total expenditures is now recovered as earned income from information service fees. The central coordinating agency is at present fully subsidized. For developing countries, this conclusion is not surprising because they receive no discounts toward the cost of industrial-country data and services, yet cannot pass this cost to their clientele. Public information systems thus must be viewed as a social good, and the public sector be expected to assume responsibility for subsidizing the deficit in their operations.

A closer scrutiny of Table 1 reveals that a substantial part of the cost of sectoral information services is incurred by the "support" functions, notably computing. These functions make a relatively minor contribution to the income-generating services, and thus provide an opportunity for each sectoral node to expand the support facilities into direct services to the user community. This is indeed part of the rationale of future development of ENSTINET and its plans for value-added services such as electronic mail.

Paradoxically, the strategy of heavy marketing and expansion of the user community -- that in industrialized countries leads to self-support of information services -- sometimes has an opposite effect

Table 1. Summary Characteristics of Search Service

Variable	4/82-5/85	6/85-4/86
SEARCHES		
Number of search requests	4,305	2,742
Number of search reruns	335	195
Number of searches run at 2 vendors	325	41
Total number of searches	4,965	2,987
DATABASE FILE ACCESSES		
Number of unique files accessed	109	110
Total files accesses	10,530	4,148
Average file accesses per search request	2.12	1.51
HITS		
Average number of hits per search	108.27	121.91
CONNECT HOURS		
Total connect hours	695.10	374.14
Average connect hour per search	0.14	0.13

Table 2. Most Frequently Used Databases

Database	4/82-5/85		6/85-4/86	
	Accesses	% of Total	Accesses	% of Total
AGRICOLA	1,572	14.9	166	4.0
BIOSIS	1,192	12.3	485	11.7
CHEM. ABSTRACTS	742	7.0	147	3.5
COMM. AGR. BUREAUX	1,113	10.6	355	8.1
COMPENDEX	239	2.3	265	4.8
ERIC	213	2.2	198	4.8
INSPEC	197	1.9	103	2.4
MEDLINE	3,616	34.3	1,791	43.2

Table 3. Average Search Cost Breakdown (US$)

Cost Element	4/82-5/85	6/85-4/86
User interview	0.50	0.75
Search logic development	0.50	0.75
Communications costs Egypt to US	0.77	3.55
Online search	16.17	0.43
Database vendors' charge	31.61	36.70
Other costs in Egypt (courier, admin.)	2.50	2.50
Other costs in US (admin.)	3.00	-
Overhead	4.13	0.90
Total	60.38	45.58

ANNEX 3

Morocco	
Mr. Battiwa Lekbir	CND
Mr. Ahmed Idoubba	CND
Mr. Robert Kahn	USAID
Ms. Monique Badaoui	USAID
Mr. George Callen	USAID
Mme. Anina Cherkaoui	CND
Mr. Jbara Abdennaceur	NTIS
Mlle. Samaoui Souad	CND
Tunisia	
Mr. Scott Johnson	USAID (formerly MIT)
Mr. Mark Karns	USAID
Mr. Michael Denning	IRSIT
Prof. Rauf Bennaceur	IRSIT
Mme. Douja Johnson	INAT
Mr. Mohamed Salah Rhomdhas	INAT
Mme. Zaineb Najaar	ETAP
Mr. Ahmed Gdoura	CRS
Egypt	
Dr. El-Said S. Shalaby	APROMAC
Mr. Mohamed Tarek El Sherbini	APROMAC
Mr. Ashraf Serour	APROMAC
Mr. Sharif Acif	USAID
Mr. Michael Stanton	IHS

ANNEX 4

U.S. PRIVATE INVESTMENT POSITION AND TRADE WITH PROJECT COUNTRIES

To serve as proxy measures of the magnitude of technology transfer occurring through private sector channels, data was collected on the U.S. direct private investment position and U.S. Export/Import with project countries (see Tables I and II below). U.S. direct private investment position is defined by the U.S. Department of Commerce, Bureau of Economic Analysis as "the book value of U.S. investor's equity, net outstanding loans to foreign affiliates, for direct investment by U.S. persons to a foreign business in which the U.S. investor has voting control of 10% or more." The significance of this definition is that data collected by the Bureau of Economic Analysis is at book value, which can significantly underestimate the market value of U.S. holdings overseas. Yet, this data does provide an indication of the scale of U.S. private sector involvement in the project countries.

Morocco and Tunisia

There is very little investment in Morocco and Tunisia. In Morocco, most foreign investment is either French or Spanish. The most recent investment was seven years ago by a tire company. Some large initiatives in Tunisia have been cut short recently due to actions of the Tunisian Government. General Motors was going to invest approximately $250 million in the Kairoan assembly plant. The Tunisian Government delayed matters by demanding secondary and tertiary commitments as well; finally, after import restrictions on equipment were imposed, the deal fell through. Marathon Oil in Tunisia will invest in exploitation of a new discovery.

Egypt

There is considerable U.S. investment in Egypt, although perhaps not as much as the country's size might warrant. Notable U.S. investment consists of joint U.S./Egyptian ventures in the defense industry. There is a petroleum joint venture with ESSO and Mobil Oil which produces upwards of 1 million barrels a day. Egypt is self-sufficient in oil, although it exports high grade and imports lower grade. Many U.S. banks have operations in Egypt including Citibank, Chase Manhattan, and First City Bank of Chicago.

Table I
U.S. TRADE WITH PROJECT COUNTRIES
(In Millions of Dollars)

Project Country	U.S. Exports		U.S. Imports	
	1985	1986	1985	1986
Egypt[1]	2,322.8	1,981.8	84.2	123.3
Morocco[1]	279.1	486.5	43.8	46.9
Tunisia[1]	256.1	163.6	13.6	11.4
Cyprus[2]	45.3	53.7	15.8	12.0
Jordan[1]	377.4	332.0	14.6	10.6
Portugal[2]	69.5	63.0	597.9	600.1
Turkey[2]	1,894.5	1,159.6	645.1	690.2
Yemen (Sana)[2]	42.2	83.8	1.4	1.5

SOURCES:

1. U.S. Department of Commerce, Bureau of The Census, office of the Near East (May 1, 1987).
2. U.S. Department of Commerce, Bureau of the Census, Foreign Trade 9-90: Highlights of U.S. Export and Import Trade. (December, 1986)

Table II
U.S. DIRECT INVESTMENT POSITION
(In Millions of Dollars)

Project Country	Years				
	1982	1983	1984	1985	1986
Egypt	1,299	1,421	1,538	1,922	1,798
Portugal	277	219	205	236	283
Turkey	146	121	228	226	224
Tunisia	123	123	77	23	-86
Morocco	23	33	35	35	24
Jordan	*	*	*	*	*
Cyprus	19	21	17	16	13
Yemen	6	8	*	*	*

*Suppressed to avoid disclosure of data of individual companies.

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, Survey of Current Business (August, 1987)

ANNEX 5-1

UNITED STATES DEPARTMENT OF COMMERCE
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Office of International Affairs

December 17, 1987

Mr. Robert Ichord
Agency for International Development
ANE/TR, Room 4440, NS
Washington, DC 20523

Dear Mr. Ichord:

This is a response to MSI's draft evaluation of the Project we managed under PASA number BNE-0049-P-CF-3191-00. We would appreciate it if you would append this statement as an annex to the evaluation report.

On the whole we feel this is a fair evaluation. It generally reflects our own opinion of our successes and areas in which we would have liked to have been more successful. We were completely candid with the MSI evaluating team, and their report reflects what we told them, as affirmed by their own investigation overseas. There were some errors of fact which we have communicated to MSI and expect will be corrected in the final version of the report. Our response to MSI's critique of the NTIS approach on PP. 20 and 21 of their evaluation follows.

Economics

MSI implies that it is unreasonable to assume that the Project Cooperating Organizations can operate on a self-sufficiency basis since NTIS is barely self-sufficient. To say that NTIS is barely self-sufficient begs the question. NTIS is a cost recovery operation by law. It only charges as much as is required to cover its costs, and could charge much more. Indeed our overseas clients pay twice as much for NTIS information.

Almost all NTIS cooperating organizations work on at least a self-sufficiency basis (the ones in developed countries operate on a profit making basis). They also profit from the other business the information activity brings in. Therefore it is quite reasonable to assume that the Near East Cooperating Organizations could operate on a self sufficiency basis, especially since they received USAID funded subsidies which the other Cooperating Organizations don't receive.

We disagree with MSI's assertion that the royalty fee we require of APROMAC for local reproduction of NTIS information is excessive. It is the same fee which all other local reproducers of NTIS information pay, and APROMAC was paying only half price for the SRIM microfiche it was receiving, i.e., $.675 per fiche. There is no reason why APROMAC can't make a profit on its local reproduction service when it paid half price and was required to pay back only as much as everyone else.

Equipment

MSI made a good suggestion, namely, incorporating the supply of microfiche to paper printers to Cooperating Organizations in a similar future project. We fully agree and will incorporate this idea in any future proposal we may make for a similar activity.

User Education Seminars

I was surprised that Scott Johnson did not concentrate on informing clients in the Cairo User Education seminar about the NTIS products and services they could use and how these products and services could help them. He did so in the seminars I witnessed him give. I will certainly remind all our cooperating organizations to relate their seminars to users' needs.

Institution Building

It is true that we have been unable to convince any capable local Tunisian organization to continue the MIT business, but no suitable willing candidate has been found. Scott Johnson is still working to convince J. Bouraoui & Co. to take over the MIT business. In the meantime he is continuing to act as the NTIS representative in Tunisia on his own. He can earn a little extra this way, and the work complements the responsibilities of his present salaried position.

Marketing

Regarding the critique that the needs of the student clientele in Morocco were not met, NTIS does encourage its Cooperating Organizations to seek information from sources other than NTIS and helps them contact such organizations. Furthermore, the purpose of the project is to promote development. Providing technical reports to engineers and other people who are working supports this goal far more than providing reference material to students. NTIS does not handle journal articles; there are plenty of journal article copying services available.

Technical Information and the Private Sector

(p. 36, last ¶) - The 25% commission was phased out towards the end of the Project. However, MSI's calculations overlook the fact that any individual ordering directly from NTIS from these countries must pay the foreign price, double the domestic price which the Cooperating Organization pays. If the Cooperating Organization charges the foreign price, it will make a 100% markup. It can charge the foreign price and even more since it is providing the service of finding and obtaining the information from its clients.

p. 37, first and second ¶ - An ad hoc microfiche document costs $6.50, not $10. If the document is obtained through SRIM (probably more than half the Cooperating Organization's collection), each report will cost only $1.35. The $20 average price per

document is the domestic price, the average foreign price is $40. The domestic price still leaves a margin of $13.50 for ad hoc ordered reports and $18.65 for reports received through SRIM. Foreign price margins are $33.50 and $38.65.

p. 37, third ¶ - (See third ¶ under Economics above.)

Minimization of Damage Caused by Termination of the S&T Information Transfer Project (pp.42-44)

To say that there is little loss from the end of the Project where there are now few sales begs the question. My last visit to Yemen turned the corner there; three or four more visits could ensure a modestly successful operation. The same could be accomplished in Oman if the local AID Mission would let us visit.

Although there haven't been many sales in Egypt, they have been slowly increasing, and the potential sales will be lost if the increase does not continue. I believe that APROMAC can continue on its own, and that the end of the Project, although detrimental, will not devastate the sales effort.

Jordan is another bright hope. The sales of RSS have continued to grow, and they have planned user education seminars to expand their outreach. The end of the Project may hamper efforts there, but will not end them.

In Morocco, sales have begun after the end of the Project due to the final user education seminar given in September. If Mr. Jbara is not kept on by SEMMA, sales can be severely diminished, especially since CND (having no access to foreign currency) orders through SEMMA.

Since we have not been able to interest a Tunisian entity in selling NTIS information, the end of the Project will end the dissemination of information there if Scott Johnson stops selling the information on his own. He is still trying to interest the parent company of MIT in carrying on this activity. Should Mr. Johnson leave Tunisia, we would offer the largest purchasers deposit accounts, but they may not have access to dollars.

The other recommendations made by MSI for reducing the detrimental effects of the end of the Project are good ones, some of which NTIS has already successfully used to keep technology transfer going at the end of the other AID Projects NTIS has managed. We will follow up all of MSI's suggestions to maintain the flow of information to the Project countries to the greatest extent possible.

Sincerely,

John W. Hounsell

John W. Hounsell
Foreign Affairs Officer