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INDUSTRIAL TECHNOLOGY APPLICATION PROGRAM (ITAP)

FINAL REPORT

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EXECUTIVE SUMMARY - ITAP PROJECT

I. INTRODUCTION

Background

The Industrial Technology Application Program represents a portion of USAID's contribution to the improvement of the Egyptian industrial sector under its Industrial Productivity Program (IPP).

ITAP is also part of a network of other projects, the linkages between which were perceived at the program's inauguration as a pre-requisite to success. The purpose of the ITAP is to:

- o help public, private and joint venture industrial firms to make more productive use of technology in an effective manner;
- o institutionalize Egyptian capacity to provide the above services.

The ITAP Unit was to provide information and technical assistance to industry, both public and private, through in-firm diagnostic studies (DTS) and technology brokerage and information services.

This report is the interim evaluation, two years into the program, the purpose of which is to:

- o assist USAID in deciding whether the quantitative productivity improvements realized to date justify continuation and/or expansion of the program;
- o identify possible deficiencies in the design of the project and in the performance of the contractor; and

provide specific recommendations on how to remedy deficiencies.

The Evaluation Process

The evaluation process is subdivided into two major components:

- o Effective Evaluation: to determine whether programmed inputs/outputs are being achieved; and
- o Formative Evaluation: to assess the impact of the implementation process upon the results of the program.

Practical Constraints and Issues

Certain practical constraints and issues were identified early in the evaluation. These were fundamental to the progress of the program and affected the conduct of the evaluation.

- o Contractor's Interpretation of the Scope of Work. GIT Atlanta proposed "hands on" assistance to industry. The GIT Cairo team was factory floor orientated as were their host institutions. There was little dialogue among the parties and, therefore, "hands-on" intervention became the focus at the expense of the brokerage role.
- o Limited Technology Thrust. As a result of the profiles of the players involved, the ITAP unit has become problem solving rather than technology-transfer orientated.
- o Lack of Formalized Systems. Formalized systems, procedures and management controls within the ITAP Unit are limited and do not produce enough quantifiable information.

- o Resource Allocation. The lack of planning and control has resulted in a sub-optimal allocation of human resources.

- o Program Co-ordination. There was little visible coordination among programs under the IPP umbrella. The lack of coordination has contributed to a depreciation of the value of DTS's undertaken through the absence of relevant financial, management and marketing information.

II. ORGANIZATION AND STAFFING:

Organization

As the Engineering and Industrial Design and Development Centre (EIDDC) had been established for some seventeen years in the field of industrial technology, it was considered the appropriate host institution for the ITAP unit. However, the Unit duplicates rather than complements the efforts of the EIDDC. Interventions have focused on problems capable of solution by the EIDDC and the ITAP Unit's Egyptian staff without technology transfer from external sources.

GIT Staff Cairo

The GIT staff in Cairo, though professionally well qualified, (and this is not disputed or challenged), had fundamental limitations in the context of the ITAP operation and its environment. This is in sharp contrast to the original team proposed by GIT Atlanta.

Egyptian Counterparts

The Egyptian counterparts were seconded, in the main, from the EIDDC. Their experience reflected that institution's product

line--factory floor engineering. The management, product development and marketing background that they lack is not being provided by the GIT team.

Advisory Committee

The Advisory Committee was to act as the steering committee for the program. However, it has only met as a body on two occasions. This has not enhanced the communications or provided the direction necessary for the program.

III. INPUT, OUTPUT & INTERVENTION MEASUREMENT

Diagnostics

The input/output and intervention measurement was based on the December 1984 activity report (AR). The AR indicated that the program was on course to meet its 1987 numerical targets. However, on further analysis it became apparent that the figures were misleading as a result of double counting and interpretation. Furthermore, the impact of the program was focused on plant layout, material handling, process improvement and preventive maintenance.

The evaluation found no evidence that the ITAP Unit had developed:

- o a diagnostic methodology;
- o presentation techniques to demonstrate cost/benefits of proposed interventions; and
- o a system to monitor, review and follow up client needs.

Information Center

The AR indicates that some 1024 information requests had been received to December 1984. There is no definition in the Project Paper of what constitutes an information request. If an information request is interpreted as one requiring research, then 312 requests have been addressed.

Of the above 312 requests 208 (66%) were referred to GIT Atlanta. An analysis of the response time for those requests indicates that over 40% took two months or more for a response.

Industry Registry - Computer Data Base

The Industry Registry as of the end of December 1984 lists 779 Egyptian Companies. However, users consider that only 200-250 of the entries in the register are reliable.

Notwithstanding the contractor's caveats, the implementation of the proposed computerized informations systems is unsatisfactory.

Short-Term Consultants (STC)

Insufficient and to a certain extent, inappropriate use has been made of short term consultants in that:

- o certain short-term consultants from the U.S. have been used as surrogate GIT team members;
- o the requirement for a ratio of 1:2 for U.S. and Egyptian consultants has to date resulted in an inverted 2:1.5 ratio.

Notwithstanding the above, STC, when used in specialist areas, have proved very beneficial and were well received by the ITAP Egyptian staff for the expertise they brought to the program.

Training

The training program, notwithstanding the quality, is well behind schedule. The professional development program is almost dormant.

Promotion

Efforts to promote the ITAP Unit have been pedestrian, with little senior management input. The lack of promotion is, we consider, a function of the Unit's lack of direction.

Client Profiles

Client profiles and the ITAP Unit's technical interventions demonstrate that the Unit's emphasis and strengths are highest in areas of least concern to industry groups, and lowest in areas of most concern. Unless the ITAP Unit can substantially modify the scope and emphasis of its intervention, its impact will not improve.

IV. DIAGNOSTIC SERVICES

Procedures Development

The diagnostic procedures in place bear little resemblance either in their scope, management or communication to those proposed by the contractor. In ignoring financial, staffing and market implications, the DTS's could, if taken as presented, prove at best counter-productive and at worst financially disastrous.

Diagnostic Coverage

The Unit has undertaken a remarkably broad scope of DTS's. However, the DTS's have tended to focus on the engineer's background and interest rather than the needs of the client.

Level of Service

Our analysis of client interventions reveals a very low rate of implementation of DTS recommendations and a correspondingly low rate of satisfaction with the ITAP association. Accepting that there is a gestation period before certain recommendations show tangible benefits, the ITAP Unit must have a capability which matches needed services or products as perceived by the client.

Conclusion and Recommendations

The DTS deficiencies in cost, quality, relevance and utility are sufficiently serious that their continuation along present lines seems unwarranted. However, the framework for providing the service is in place. If the DTS is re-aligned in accordance with the original conception of ITAP there is no reason why this correspondent should not be retained. Specifically, action must be taken to:

- o reaffirm strategic goals and plans;
- o establish management disciplines;
- o set sectoral priorities; and
- o address self-sufficiency.

V. INFORMATION SERVICES

Procedures

No formal documented procedures are in place. We consider that the lack of formalized procedures will cause significant problems for the future operations of the Information Center. This must be rectified immediately.

Services Offered and Achieved

The Information Center is a good, basic library. It is not the Technology Information Center required under the ITAP contract. We recommend that an action plan be developed to turn the library into an Information Center (IC) as a matter of some urgency. At a minimum the plan must:

- o Define User Groups. Access by local business people and engineers and their institutions should be encouraged.
- o Define User Requirements. The Unit must assess, through questionnaires and direct interviews, the manual and computerized information required by Egyptian engineers to bridge the technology gap.
- o Information Center Personnel Requirements. The management and staffing of the IC must be upgraded. In addition, GIT Atlanta on site training must take place and greater clerical support provided.
- o In-house Computer Capabilities. At present the ITAP Unit has the hardware capability to develop a computerized information service. However, little initiative has been taken.
- o Development of In-Country Networking. The IC operates in a vacuum. It must take a proactive role in establishing a formal network of inter-library information sharing.

VI. MARKETING

Level of Effort

GIT's proposal recognized that "major multi-faceted awareness campaign" needed to be designed and implemented to make the program work. Accordingly, GIT put forward action plans to achieve this awareness. As discussed in Chapter III, the marketing function has been pedestrian, and we consider that, on the basis of the 1985 plan, this trend will continue. Past, present and projected levels of marketing activity suggest that the ITAP Unit will be ineffective in preserving existing markets, developing new ones and exploiting the Units potential strengths.

Market Status

The ITAP Unit has no clear market status. Rather, it is attempting to market a non-innovative product range already being supplied by others and to too broad a market namely, the industrial sector as a whole.

The competitive advantage granted in the PP -- technology transfer through U.S. expertise -- is needed but is not being exploited. The fundamental constraint, however, is that at present the ITAP Unit cannot market the product since its present resources are not adequate to deliver it in full.

Strategic Conflicts

The marketing function is a victim of the Unit's lack of strategic planning. The Unit cannot expect to make a measurable impact if it attempts, with no specific product or expertise, to address the total industrial market.

Essentially the ITAP program must identify a segment or segments of the industrial market which it wishes to address in the con-

text of national priorities, arm itself with the products and expertise required for those segments, and prepare a plan to attack that market.

VII. Training Services

Staff Development Training Program

The comprehensive "Continuous Professional Development Plan for ITAP Staff" prepared by GIT for inclusion in their "Life of Project Plan" has not been implemented. The following recommendations should be implemented:

- o Introduce a training program to:
 - match program objectives;
 - meet specific needs of individuals within the Program scope;
 - make use of in country courses where available.
- o Widen the spectrum of the curriculum to include general management, finance and marketing;
- o Give consideration to industrial transfer programs;
- o Develop inter-program staff exchanges;
- o Introduce the revised training program devised by the ITAP Unit for U.S. training;
- o Formalize on the job training; and
- o Introduce individual work programs/projects.

VIII. RECOMMENDATIONS

Organization

The following recommendations should be implemented:

- o The organization must be structured in response to a definition of strategic objectives;
- o Key management responsibilities and reporting relationships must be formalized;
- o Management information systems have to be developed;
- o Targets and performance indicators must be set at the various organizational levels of the ITAP Unit;
- o A task analysis must be undertaken for the EIDDC and its interface with the ITAP Unit;
- o A communications network must be established and formalized;
- o An Executive Committee must be established.

The organization of the ITAP Unit must:

- o provide career paths and professional identity for ITAP personnel;
- o maintain liaison with actual and potential clients;
- o maintain a balance between the cost and quality of services provided;

- o facilitate networking with those who can contribute to and have a stake on ITAP.

Technical Interviews

As indicated throughout the report, profound deficiencies exist in the Unit's technical interventions. Unless measures are taken to correct these deficiencies quickly, there seems little reason to continue operations. Our outline of recommendations are as follows:

- o The present GIT Cairo implementation team is not suited to the task as conceived in the Project Paper and should be replaced by personnel with profiles similar to those in the original proposal;
- o The ITAP product definitions and conditions for their selection must be refined;
- o Every DTS should include an indication of costs, benefits, phasing options and opportunity cost benefits;
- o An organizational integration or diversification must take place to incorporate technology services supportive of finance, management and marketing.

Institutional Options

The ITAP Unit is operating in a vacuum with little competitive advantage. Though in theory they form part of the IPP network of programs, in practice they operate in isolation. The overall strategy of the IPP must be formalized and the ITAP Unit's input to that strategy defined. The placing of the ITAP Unit with the EIDDC must be re-examined to assess whether such an arrangement provides the necessary linkages required to serve both the public

and private sector and the range of skills, including finance and marketing, necessary to provide industry with a complete service.

Overall Strategy

The strategic goals and action plans of the original program design should be re-affirmed and, in the light of the lessons learned, expanded to include perpetual monitoring mechanisms to ensure direction is maintained and momentum sustained.

Implementation of the strategy calls for considerable reconfiguration of ITAP's present product-market-technology posture. Accordingly our recommendations for proceeding are to:

- o Allocate resources according to explicit policies;
- o Consider the industrial environment in terms of the ITAP's technical strengths and weaknesses competitive edge;
- o Identify and quantify the long term benefits between the product and the ITAP Unit's ability to become self-supporting in terms of human and financial resources.

I. INTRODUCTION

BACKGROUND

In the early seventies, Egypt began moving away from a reliance on centralized planning and control of the economy which had dominated its development since the early fifties. Concentration in development terms had in the past been focused on "horizontal development" and had emphasized quantitative expansion in investment rather than exploitation of available resources.

The focus of Egypt's present five-year plan concentrates on the more efficient use and evolution of the nation's present capacity, giving priority to productivity increases in factors of production. The industrial sector is perceived as a central motivator in the drive to increase national production. Indeed, the industrial sector, excluding petroleum, is at present a large and growing component of the national economy.

Faced with the movement toward economic liberalization, coupled with both the opportunity for and the requirement to expand, Egyptian industrialists were confronted with a range of unfamiliar pressures. Paramount among these pressures were greater competition, the need for access to foreign partners, and the GOE's insistence on more efficient performance. To address these changing conditions it was recognized by the GOE and donor agencies alike, that there was a need to make available to industrialists a range of technologies.

Consequently a network of projects was instigated by various agencies, including UNDP and the World Bank, to assist in developing a viable industrial sector in Egypt. The range of disciplines covered, by necessity, a wide spectrum, from financial and operational management to production and marketing, with training and institution building an underlying theme within each functional area.

A portion of USAID's contribution to the industrial improvement scenario, under its Industrial Productivity Program (IPP, 263-0090), is the Industrial Technology Application Program (ITAP). Also included in program is the Management Development for Productivity (MDP) and the Vocational Training for Productivity (VTP) programs, which are discussed under separate volumes of this evaluation exercise.

At the outset, then, it must be recognized that the ITAP is part, not only of a USAID Industrial Productivity Program but of a network of projects, the linkages between which were perceived at the program's inauguration as a prerequisite to success.

The ITAP was designed to assist the Egyptian industrial sector in developing increased productivity and employment. The purpose of the ITAP is:

- o to help public, private and joint venture industrial firms to make more productive use of technology, and to identify, assess, and introduce new suitable technology in an effective manner; and
- o to institutionalize Egyptian capacity to provide the above services.

The ITAP was to provide information and technical assistance to both the public and private industrial sectors, firstly through in-firm diagnostic studies. Secondly, the ITAP would provide technical information and help industrialists identify and arrange for assistance from qualified Egyptian specialists, or when the latter could not be identified, from U. S. specialists.

In July 1981, USAID approved a grant of \$10 million to establish an Industrial Application Program Unit within the Engineering and Industrial Design and Development Centre (EIDDC) of the Egyptian Ministry of Industry and Mineral Wealth.

The ITAP Unit (the Unit) was to be assisted during most of the life of the Project by a U.S. technical assistance team of three industrial engineers, including a team manager, and for two years by a technical information specialist. An external Advisory Committee formed of representatives of the industrial and financial communities and of the public and private sector would advise, assist, promote, and evaluate the ITAP and its implementing Unit. It was expected that the Unit would:

- o directly assist companies;
- o serve as a broker for assistance when it could not directly assist companies; and
- o inform the business community of technological developments.

An integral part of the ITAP program was that the progress of the project should be evaluated during both its formative years and at the completion of the technical assistance contract. This report is the interim evaluation, two years into the project. Its purpose is to:

- o assist USAID in deciding whether the quantitative productivity improvements realized to date justify continuation and/or expansion of the project;
- o identify possible deficiencies in the design of the project and in the performance of the contractor, and provide specific recommendations on how to remedy deficiencies;
- o provide through inter-project comparisons recommendations on how USAID/Cairo could more easily relate its productivity-improvement projects in order to maximize their individual and joint effects.

The contractor assisting the ITAP Unit during most of the life of the project has been a U.S. team of industrial engineers and technical information specialists from the Georgia Institute of Technology (GIT).

The Evaluation Process

The statement of work prepared by USAID for this evaluation project is pragmatic in its approach, recognizing the complexity in the individual projects themselves as well as the program area in general. Specifically the statement of work directs the focus of the evaluation to the following questions:

- o Goals and purposes. Are there productivity improvements? Is there organizational development? Has there been improved uses of technology?
- o Outputs and inputs. Have specific quantitative tasks been achieved or will they be achieved in the span of the project's life?

The evaluation was subdivided into two major components:

- o Effectiveness evaluation: to determine whether the programmed inputs to the project and the predetermined articulated outputs have been achieved or are on course for achievement;
- o Formative evaluation: to determine what has taken place in the course of the program in order to assess the impetus of the program's operation and its consequences which, if negative, will provide a basis for shifting or changing the program, or if positive, can be enhanced to achieve greater output.

By adopting this dual approach we were able to identify factors within the operation of the project that have either succeeded or failed to produce measured results and to focus attention on the program components and processes in a remedial mode rather than concentrate on the deficiencies or otherwise of outcomes.

The purpose of the evaluation was to test the effectiveness and efficiency of the program, in terms of the Unit's own ability not only to meet its quantifiable objectives, but also to attain, in the longer term, the program's ultimate goal of industrial expansion and employment generation.

The effectiveness evaluation focused on inputs and outputs in terms of evaluable lists and data bases contained within the Unit and assessed levels of service from the client's viewpoint. Specifically this aspect of the evaluation sought to determine whether the Unit has a comparative advantage in terms of:

- o Accessibility: Are the services required obtained relatively easily and when needed?
- o Acceptability: Do clients believe the system works for them and turn to it when in need?
- o Comprehensiveness: Are the services broad enough to ensure that needs are met?
- o Sensitivity: Do clients perceive that their needs are understood, that the system is responsive to those needs and that they, the clients, come first?
- o Completeness: Is there follow-through with the client to ensure that needs arising after initial assistance are met?

The formative evaluation followed from the effectiveness evaluation. The latter may quantify the best efforts of the ITAP Unit; the purpose of the formative evaluation was to verify the unit's understanding of the purpose of the program and its direction, as reflected in how resources were allocated to the varied components of the program.

The final stage of the evaluation process was to identify options available to USAID on the future of the ITAP Unit, measured against the original assumptions under which it was created and given its present status within the network of projects in the industrial sector.

In essence the evaluation was concerned with:

- o measuring the effectiveness of business performance by evaluating actual performance against relevant criteria, so that areas of weakness capable of improvement could be diagnosed for subsequent remedial action;
- o analyzing the conduct of the program in terms of goal attainment, actions implemented, and measures of actual performance;
- o considering the approach to the program in terms of objectives and targets, organizational issues, decision-making, and control and information system;
- o assessing the impact and relevance of the program's outputs in terms of its original objectives.

Practical Constraints and Issues

In general, definitions of evaluations assume that programs are to be measured against their stated goals. Inherent in this concept is the notion that there are some goals which have a value attached to them and the task of the evaluator is to first identify and then determine the program's success in reaching the goals.

A precondition for testing any program is a well articulated program with clearly specified goals, with a rationale linking the program to its goals. Notwithstanding the former, even if a program is clearly defined, there is no assurance that it is implemented in the prescribed manner.

During the ITAP evaluation it became apparent that the program as implemented did not represent in its totality the program which we expected to evaluate. Accordingly, a fundamental task at the commencement of the evaluation was to assess whether the relevance of the data to be evaluated was compounded by a poorly administered program or a design fault in the program itself.

It is important to discuss the issues raised at the commencement of the project because they are reflected in the conduct and focus of the evaluation. The basic issues addressed were the:

- o contractor's interpretation of the scope of work;
- o limited technology thrust;
- o formalized systems;
- o resource allocation;
- o program coordination;
- o value of random sampling techniques.

We discuss the above issues in greater depth in the following paragraphs.

Contractor's Interpretation

At the outset we consider that the Project Paper (263-0090-2) is ambiguous and to a certain extent contradictory in that there are multiple conflicting goals and alternative implementation paths.

On the premise that the ITAP and its related projects in the productivity improvement network have as their overall goal the expansion of the industrial sector and the creation of employment through that expansion, the project paper states:

- o "increased productivity in the industrial sector will result from the selection and introductions of technologies that are appropriate and -- at least as important -- more productive use of present technology" and that
- o "expansion of the industrial sector will result from growth of individual firms and the establishment of new ones."

The improvement in productivity and control generally result in higher plant capacity utilization, better quality product and reduced labor content. To the extent that improvements in product quality and plant capacity lead to expansion of the firm, higher employment levels may result. Accordingly, the Unit was faced with two sets of conflicts:

- o the conflict of productivity and resource allocation against employment at the national level;
- o competing implementation alternatives, such as up-grading versus replacement of plant.

Equal emphasis is placed on rehabilitation and the transfer of up-to-date technology, each segment requiring differing expertise.

Further, there is a degree of contradiction in the referral system envisaged by the program. The Unit was perceived as a technology broker. However, references to providing "direct assistance" to clients can naturally be interpreted as "hands on" assistance. In fact, GIT regarded in their proposal direct assistance (hands on) as the major emphasis in achieving industrial awareness in the field of technological developments.

The situation was compounded by placing the Unit in EIDDC, which for some twenty years, with the assistance of various donor agencies, had been providing technological assistance to Egyptian industry at the shop floor level with departments specializing in:

- o product design and development.
- o processing equipment design.
- o engineering (production technology & tool design).
- o process design.
- o workshops (for prototypes).
- o heat treatment and material testing.
- o training.
- o small industry development.

Against this background GIT Atlanta placed within the ITAP Unit a group of engineers who are engineering orientated, factory floor specific, not part of the GIT establishment, with little experience in developing countries and with leadership inexperienced in organizing and managing the delivery of technology services.

From our early discussions with the GIT Cairo team, it became apparent that there was no formalized dialogue between Cairo and Atlanta. For example, the Cairo Team had no copy of the original

proposal prepared by GIT Atlanta. Accordingly, the Cairo team implemented the program with a bias towards the functions with which they were familiar (hands on shop floor mechanics) and EIDDC were geared to handle (machine part design, material handling and factory layouts).

The brokering role and diagnostic analysis became vehicles for hands on interventions and the information system a support service for that hands on function. As will be shown in the diagnostic analysis at Chapter IV the degree and focus of technology transfer became subject to available time, outside proposal and contract work, and narrowed to the areas of in-house capability with little referral.

Limited technology thrust

The profile of the GIT Cairo team with EIDDC's expertise in shop floor engineering has directed the technology transfer thrust towards those areas where both the individuals and the institutions feel most comfortable technically. Accordingly, the ITAP Unit has become problem solving rather than technology transfer orientated.

The evaluation team, prior to arrival, expected to be evaluating the level and quality of diagnostic services given to a prioritized list of clients, covering a range of technology interventions.

However, as a result of the narrowing of the program's objectives by the partners involved, several components of the project have been delayed and to a great extent have had negative impacts, specifically:

- o marketing services;
- o computer data base support;
- o brokerage;

- o license search;
- o comprehensive diagnostic coverage and referrals;
- o specialist orientated short-term consultancies.

By reverting to the familiar, the Cairo team has, in our opinion, confirmed its lack of understanding of the design of the project.

Lack of Formalized Systems

Appendix A shows the flow chart of activities for the ITAP as specified in the Project Paper. Within this framework the Cairo team were required to prepare specific procedures for:

- o technical interventions;
- o information systems; and
- o training programs.

These procedures have not been designed or developed by the Cairo team.

The ramifications of the Unit's lack of formalized procedures are addressed in the chapters specific to the above categories of activity.

However, in all three areas of activity the evaluation was constrained by the paucity of quantifiable information available for analysis and the lack of strategic planning to meet the set objectives of the program.

Resource Allocation

As a direct result of the lack of planning and control there is a sub-optimal allocation of human resources. It is unrealistic to consider that the ITAP Unit can address the problems of Egyptian industry as a whole.

At the outset we would have expected the Unit to prioritize its market segment in relation to:

- o its comparative advantage in terms of technical expertise;
- o the priority set within the industrial sector by GOE and USAID;
- o client needs and options:
- o services being provided by other institutions;
- o the program's objectives.

At the commencement of the evaluation it was apparent that the Unit was discipline driven and no specific market segments were addressed. The Unit to a great extent became the marketing arm of the Cairo team's technical ability and EIDDC's resource capability.

Accordingly, the evaluation had to distinguish between the formal objectives of the program and the manner in which the program was actually implemented. This approach was essential to avoid allocating a disproportionate amount of man-hours evaluating specific outputs which were outside the original concept of the program.

Program Coordination

The ITAP program forms part of a network of programs funded by USAID, the World Bank and other donor agencies to increase productivity in the industrial sector. The Unit is to complement other projects in the overall program. This fact was recognized both in the Project Paper and the contractor's proposal.

In addition to the Unit's task of referring work to outside Egyptian and U. S. consultants, the Unit was to interact with other USAID funded projects, specifically the MDP program as well as other non-USAID funded projects, specifically the Small and Medium Industry project funded by the World Bank within EIDDC.

This proposed coordination has not been active. Accordingly, the value of DTS's undertaken by the Unit has been depreciated by a failure to address the relevant financial, management and marketing implications, of any technology transfer. A DTS is of little value, even if the engineering input is correct, if there is no market for the product, the client cannot afford the technology, or does not have the management capability to manage the technology. Again the evaluation process had to recognize the intentions of the program design and the contractor's approach to its implementation.

Value of Random Sampling

As ITAP produces several products, promotional activities, responses to information requests, training, DTS's, proposals, contracts, and does so for organizations of several sizes, ownership and industrial sectors, it would have been tempting to resort to sampling techniques in an effort to draw meaningful conclusions regarding the most effective combinations of client characteristics against the services dispensed by the Unit. The obstacles to this approach, however, are:

- (a) no systematic evaluation framework, no documentation or procedural steps have been established and adhered to during the period we evaluated. Much of the information is tortuously developed in anecdotal interviews, often related by the file's inheritor, rather than the now-departed participant;

- (b) the Unit's products tend to be mutually dependent. For example, a contract resulted from a successful DTS's which in turn evolved from an information request or tour.

Statistics associated with 200 DTS's resulted in 20 contracts, of which two or three may ultimately result in implementation and useful contributions. These low yields make it specious to devise an elegant statistical design -- particularly when perhaps 500-1,000 cells or combination of client and the Unit's descriptive variables may be involved.

Accordingly, we conducted a series of relatively structured interviews to develop basic information on each of the DTS's from recollections of individual ITAP staff members. In addition, we interviewed several clients who have had the most contact with ITAP (predominantly those who moved from DTS to contract status). This was done to attempt to corroborate levels of client satisfaction, implementation plans and the quality and scope of ITAP capabilities.

Summary

The basic issues affecting the evaluation process were the following:

- o There is evidence that the contractor did not understand the design of the project and did not implement what it proposed to do. This caused delays in implementation of several components of the project and had negative impacts on other critical areas.

- o The project had no overall guidance and consequently the contractor had to develop and pursue

its own program. In the absence of an effective work plan based on what it proposed, the implementation problem was compounded.

The common denominator attributable to deficiencies in the program implementation is "compartmentalization" within the ITAP Unit, EIDDC and the program network. We address these issues in detail in the following chapters.

II. ORGANIZATION AND STAFFING

Organization

Organizational factors have had a major influence on the program's operation. Organizational factors which effect the ITAP are both structured and climatic.

The EIDDC was established in 1968 with the help of United Nations Industrial Development Organization. The EIDDC has a staff of over 400, including 60 engineers, covering the following disciplines: product design and development; processing equipment design; production technology and tool design; process design; material testing; training unit; small industry, and extensive workshops. Essentially the EIDDC is geared to providing shop floor engineering expertise to industry.

As the EIDDC was established in the field of industrial technology it was perceived as the appropriate vehicle for the ITAP concept, in that:

- o The expanded portfolio of desired technology transfer interventions would be a natural extension of the EIDDC services;
- o Specific training in the broader spectrum of diagnostic services would bridge the gap between the factory floor and the executive suite;
- o The introduction of industry specialists through STC's would provide the ITAP staff as well as EIDDC the opportunity of applying technology to specific industry needs;
- o The brokerage function would add to, rather than extend the services provided by the EIDDC; and

- o The Unit would serve as the required "one stop" institution for company chairman with technology problems.

In essence, the ITAP unit was to complement the EIDDC and accelerate its potential impact on the expansion of Egyptian industry.

Unfortunately, as discussed in the previous chapter, the background to the program's implementation in terms of perceived objectives and staff capabilities resulted in the misplacement of the ITAP unit within the EIDDC. In effect the unit duplicates rather than complements the efforts of the EIDDC. The transfer of technology as it exists adds little expertise to the EIDDC's technological portfolio.

Notwithstanding that by its exposure to the industrial sector through its DTS's it has identified and formulated dormant requirements within companies, the focus of those requirements has been limited to those interventions that are capable of solution by the EIDDC engineers and the contractors.

GIT Staff - Cairo

The GIT staff averaged in excess of thirty years post-qualification experience. However, we consider that this experience is largely inapplicable to the ITAP needs, in that:

- o Only one team member (Cohrs) has resided while working in a developing country;
- o None have managed organizations whose purpose was the delivery of technology services;

- o The managerial and organizational development (institutionalization) experience of team members has been in large, capital intensive, high-tech businesses;
- o Only L. Tessner was experienced, according to resumes, in performing diagnostics;
- o Few show strengths in training per se, except Tessner;
- o None have experience with new product development, manufacturing innovation, materials handling, methods improvement, quality control or plant management of the type which is readily transferable to the Egyptian industrial environment.

The above stands in sharp contrast to the strong team described in the GIT proposal. Regrettably, the only member of that team who is on site is Cohrs performing diligently and effectively as a librarian, but not as an "information specialist" in the modern sense, nor as a trainer or contributor to institutionalization.

The GIT Cairo team put forward in the GIT proposal offered a combination of thirty years developing country experience and a "complete range of skills in management, industrial contracts, technical specialities, training, public contract, information use and work with counterpart individuals and institutions". As stated above, only Cohrs has substantive developing country experience and the paucity of technical expertise of both Cohrs and the other team members is illustrated at Figure 2.1.

Egyptian Counterparts

The Egyptian engineers average 10 years post-qualification experience with some 60% coming from EIDDC, having spent an average of five years there. Their experience and training is fundamentally in industrial engineering applications: materials, handling, production machinery (selection, maintenance, spare parts design) and plant layout -- although their formal education spans the broader disciplines of physics, electrical, mechanical, civil, chemical. We consider the Egyptian profiles to be a good basis on which to build ITAP Unit as originally conceived, although more product development and marketing background would have been helpful.

The resumes are lacking in details but from interviews it appears that the Egyptian counterparts are bright and energetic, if somewhat disillusioned by the management, priorities, and organizational climate which has evolved.

Advisory Committee

An Advisory Committee consisting of representatives from private and public firms or organizations and the U.S.-Egypt Joint Business Council was established by EIDDC to provide the ITAP with policy recommendations, to follow the implementation of the project, and to assist in both promoting and expanding its activities.

Unfortunately the Advisory Committee has to date, met only twice, thereby removing what was seen as a vital element in the development of the ITAP Unit.

The failure of the Advisory Committee to meet on a regular basis is indicative of the general lack of communications surrounding the implementation of this program.

III. INPUT/OUTPUT AND INTERVENTION MEASUREMENT

ACTIVITY LEVELS ACHIEVED

The activity achievement report, reproduced in summary form at Appendix B, quantifies the activities achieved against the targets budgeted by GIT for the program to December 1987. The activities are divided into five distinct functions:

- o Diagnostics.
- o Short-term Consultants.
- o Information Center.
- o Training.
- o Promotion.

We describe the performance of each of the above sub-activities in the following paragraphs. For macro-assessments we refer to the achievements from the project's inception to the end of December 1984. However, for micro-analysis we have referred to the Monthly Reports and the capsule summaries contained within them, for the eleven months from January to November 1984.

DIAGNOSTICS

A diagnostic study (DTS) is an assessment of the technological obstacles and opportunities within a particular company, usually in relation to the request at hand. The purpose is to identify ways in which production and productivity can be increased through suitable technology, taking into account managerial/organizational and operational aspects of the company.

The activity report to the end of December 1984 (the AR) shows that:

- o 234 companies were contacted against a budget of 185; resulting in
- o 180 diagnostics being conducted against a budget of 140; resulting in
- o 61 proposals being conducted against a budget of 63; resulting in
- o 20 contracts being signed against a budget of 23.

From the above management information it would appear, on the surface, that the project was on course to meet its 1987 targets of:

- o 500 companies to be contacted;
- o 375 diagnostics to be conducted;
- o 150 proposals to be submitted;
- o 50 contracts to be signed.

However, further analysis of the figures indicates the following pattern:

- o Of the 234 companies contacted, 57 contacts were to the same companies. Each contact with a company is given a DTS number. Therefore, a company that receives three contacts will be logged with three DTS numbers. The actual number of firms contacted was 177.
- o Of the 180 diagnostics conducted, 50 were duplicate entries; 5 entries were contracts from inception with no DTS being conducted; and 13 entries

resulted from information requests but did not lead to a DTS per se. Thus, the actual number of DTS's conducted was approximately 112.

- o Of 61 proposals prepared, only 58 appear on the proposal log. The value of proposals made equaled LE520,325. Sixty four percent of the scope of work addressed in the proposals covered four specific areas: plant layout, material handling, process improvement and preventive maintenance.
- o Of the 21 contracts signed, two were canceled. Eight of the contracts were for short-term consultants, 8 for EIDDC, and 4 for ITAP alone. Seventy five percent of the contracts were for industrial designs, plant layouts, preventive maintenance and material handling. The total value of contracts signed was LE91,860.

In terms of professional man-hours utilization for the 1984 calendar year, the man-hours incurred as diagnostic and related activities are set out at Appendix C.

The capsule summaries in the monthly reports for the eleven months to the end of November 1984 shows that from the diagnostics conducted during that period there were 237 requests for assistance. We have grouped these requests into the following activities in Table 3.1 below.

Table 3.1: Analysis of Activities by Technical Fields
1984 (January-November)

	<u>No.</u>	<u>%</u>
Materials Handling Systems	19	8
Quality Control	15	6
Preventive Maintenance	14	6
Layout Improvements	13	5
Manufacturing Process Control	8	3
Ancillary Plant Equipment	8	3
Energy, Water and Work Management	25	11
Manufacturing Processes	16	6
Equipment Adjustment, set-up and operation	14	6
Training in Appropriate Technology	7	3
Jigs, Dies and Molds Utilization	6	3
Environmental and Industrial Safety	6	3
Manufacture of Replacement Parts	5	2
New Process Design	14	6
Equipment Specifications and Supply Sources	10	4
Feasibility Studies	17	3
Search for Joint Venture Partners	6	3
Start-ups	3	1
Selection, Design, Specification	24	11
Marketing	<u>2</u>	<u>1</u>
Total	237	100

The summary of the above activities by industry, as perceived by our analysis is the following Table 3.2 on the following page.

A purely quantitative, uncommented analysis generates a biased picture of Egyptian sectional interest in the program. A qualitative analysis indicates that the strongest element emanates

from the metallurgical, food processing, leather, construction and electrical sectors:

- o The interest of the Egyptian textile industry would appear to be heavily solicited and its concern limited to the treatment and disposal of effluent from dyeing and finishing operations. Two contracts in this sector were signed by the same public firm and are not related to textile technology.
- o Interest from the food processing sector covered a range of issues from can forming equipment to hygiene standards.
- o Interest from the leather industry concentrated on effluent waste problems in tanning operations, product specifications and design for export; the EIDDC proposed an interesting project of designing and constructing a central, economical effluent waste treatment plant serving several small-scale tanneries in one geographical area.
- o The automotive industry requests concern the automotive components for the future Egyptian car.

The evaluation found no evidence that the ITAP Unit had developed:

- o a diagnostic methodology to conduct in-plant studies;
- o presentation techniques to make clear to the clients the benefits resulting from a more appropriate technology; and

- o a system to monitor, review and follow up clients' needs.

Due to the fact that there is no formal reporting structure, no follow-up and no progress reviews, there is no way to demonstrate how the industrialists were helped in cases that did not develop into a "proposal" and, eventually, a "contract."

INFORMATION CENTER

The Activity Report for the Information Center through December 1984 is shown in Table 3.3 below.

Table 3.3 - Level of Activity Achieved

Activities	Total Project to Date	Total Budget to Date	Total Budget to 1987
Library Books	1130	975	2080
Library Periodicals	185	164	170
Library Audio Visual	74	50	140
Information Requests	1024	1250	4700
Industry Clipping File	418	300	650
Industry Registry	779	1100	3400

In addition to the above Information Center activities, a computerized information system was to be developed to provide timely and accurate data for and about Egyptian industry and the services available to meet those needs. In particular, the system was to include Egyptian directories of:

- o industrial enterprises in all categories with an identification system by type of product as well as by other standard categories;
- o consultants and professionals by discipline, experience and areas of specialization;
- o manufacturer's agents and material suppliers with the products and services they provide; and
- o information center acquisitions.

The full implementation of the computerized data base was made subject by the contractor to the purchase of a "supermini". Notwithstanding this caveat, the contractor would input a limited directory of Egyptian industry while continuing to prepare the source data for the remaining applications.

The acquisition of books, periodicals and audio visual materials appears to be well on schedule for the 1987 target. From a brief review of the library catalogues, coupled with interviews with the engineering staff, we consider the activities in this area to be satisfactory.

Accordingly, we focused our attention on the areas of:

- o information requests;
- o industry registry -- computerized data base.

Information Requests: the Activity Report indicates that some 1024 information requests had been received by December 1984. Requests are divided between minor requests, such as book titles, photocopies of pages from text books or periodicals; and documented requests, which require research by the resident librarian or a referral to GIT Atlanta. Our analysis of the performance reports reveals that of the 1024 information

requests, 312 were documented requests of which 206 or 66% were referred to GIT Atlanta. However, we consider that the 66% figure cannot be relied on as the recording system within the Information Center is not uniform. This lack of uniformity is a result of the lack of formalized systems within the Information Center which we discuss in detail in Chapter V.

An analysis of the 312 documented requests is contained in Table 3.4 below.

Table 3.4 - Documented Requests Actioned

Month	Requests sent to GIT			Requests Actioned Informally			Grand Total
	1983	1984	Total	1983	1984	Total	
Jan	0	11	11	1	9	10	
Feb	18	12	30	0	4	4	
March	13	7	20	5	4	9	
Apr	8	13	21	6	3	9	
May	3	6	9	9	-	9	
June	9	8	17	4	-	4	
July	9	6	15	2	-	2	
Aug	10	7	17	4	3	7	
Sep	2	13	15	6	4	10	
Oct	6	8	14	10	1	11	
Nov	5	18	23	18	2	20	
Dec	2	12	14	11	-	11	
<u>Total</u>	<u>85</u>	<u>121</u>	<u>206</u>	<u>76</u>	<u>30</u>	<u>106</u>	<u>312</u>

There is no description in the Project Paper of what is an information request, and accordingly no distinction between minor requests and documented requests. If an information request is interpreted as one requiring research, then 312 requests have been addressed.

The 206 GIT documented requests are further analyzed in Table 3.5 by originator type.

Table 3.5 - Request to GIT by Originator Type

Type	1983	1984	Total	% Total
Client Company	30	85	115	56
Other Companies	10	13	23	11
ITAP Internal	13	6	19	9
EIDDC Staff	8	7	15	8
Dr. Mazhar	20	3	23	11
Private Citizens	3	5	8	4
Other	1	2	3	1
Total	85	121	206	100%

The above analysis indicates that client companies, contacted through promotional/DTS visits are the major users of the Information Center, with few inquiries from noncontacted companies. This is, we consider, a reflection of the promotional activities undertaken which will be analyzed in the final section.

During our interviews with the ITAP Unit staff a great deal of criticism was leveled at the lack of timeliness of information requests channeled through GIT Atlanta. Set out in Table 3.6 below is an analysis of that response time.

Table 3.6 - Analysis of GIT Response Time

Age Analysis (Days)	No. of Requests		% of Total Answered		Cum %	
	1983	1984	1983	1984	1983	1984
Under 10	6	9	7.1	7.4	7.1	7.4
10-30	12	37	14.1	30.6	21.2	38.0
31-60	23	30	27.1	24.8	48.3	62.8
61-90	14	13	16.5	10.7	64.8	73.5
Over 90	30	6	35.2	5.0	100.0	100.0
Sub Total	85	95	100	78.5	100.0	78.5
Not Answered	-	26	-	21.5	-	100.5

The above analysis indicates that over 40% of the information requests take two months and over for a response and in the case of 1984, 21.5% of the requests remained unanswered. We discuss these aspects in greater detail in Chapter V.

Industry Registry -- Computer Database

The Industry Registry as at the end of December 1984 lists 779 Egyptian companies. The information input to the registry was collected from newspaper cuttings, the GOFI register and El Haram Publications, together with information gained from the ITAP Unit's direct contacts. The users consider that only some 200-250 of the entries in the register are reliable. The Chamber of Commerce alone has 1,500 companies on its register, all of which have to pay a fee to be registered. The ITAP staff consider that they are not able to match such institutions, if for no other reason than the level of manpower required to input the data.

Other inputs to the data basis include the DTS log, priority contacts list, and the audio-visual log.

Accepting the contractor's caveat regarding the implementation of the computerized data base, which we do not consider valid, the level of activity compared with the present computer capacity is unsatisfactory.

Short-term Consultants

The contractors were required to identify and procure both Egyptian and U.S. short-term consultants to:

- o supplement the resident team in developing the data base and information system;
- o assist in the initial promotion campaign;
- o provide detailed and comprehensive technical assistance to meet requirements; and
- o provide short training activities conducted in conjunction with other short-term consulting visits.

An early project activity was to provide the EIDDC with lists of consultant network contacts, including professional societies, speciality consulting firms, industry sources and consultancy information services. These lists were to be organized according to technology sectors.

A prime requirement in the use of short-term consultants was that when U.S. consultants were used, counterpart Egyptian consultants were to be employed. In Table 3.7 below we set out the activity levels achieved to date in the use of Short-term Consultants (STC).

Table 3.7: Short-term Consultants Activity Levels

Origin	Total Project to Date (MM)	Total Budget to Date (MM)	Total Budget to 1987 (MM)
U.S. Consultants	20.5	18.0	70.0
Egyptian Consultants	14.75	36.0	140.0
EIDDC	65.25	82.0	400.0

It is difficult to reconcile the figures contained in the Activity Report with the supporting logs and schedules, but in approximate terms the U.S. consultants man months are based on weeks of five working days and the Egyptian consultants on six working days.

It is apparent that the ratio of 1:2 for U.S. and Egyptian consultants is not being implemented. The failure to implement this policy has a direct effect on ITAP's ability to institutionalize its activities.

As stated in the previous section the register of Egyptian consultants has not been computerized. In addition, the some 120 Egyptian registered consultants were obtained in the main from media advertising. No effort has been made to approach the Egyptian Engineering Society.

At the present rate there is little possibility of achieving the 1987 target utilization of 140 man months of Egyptian STC or 400 man months of EIDDC staff. The latter utilization figure for EIDDC staff would seem to contradict the contractor's request for additional ITAP engineering resources.

Training

The contractor is required to develop and provide training for the ITAP Unit's technical and resource specialists through courses tailored by the contractor in the U.S. The technical specialists' training program would run for two to four months, with a mix of formal instruction and practical experience. The resource specialists' training program would run for eight to ten months, also with a mix of formal instruction and practical experience.

In Table 3.8 below we set out the activity levels achieved to date in the Training Program.

Table 3.8: Training Components Achieved

Description	No. Trained To Date	No. Budgeted To Date	No. Budgeted To 1987
Technical Specialists	6	10	18
Resource Specialists	2	3	6
Engineering Managers	10	12	25
Technical Seminars	5	8	20

We will discuss in Chapter VI the adequacy of the training received.

It can be seen from Table 3.8 that the training program, is behind schedule. The situation is further exacerbated by the fact that only four of the six staff members received the two to

four month training programs. The remaining two attended short courses of one to two weeks in the U.S. while accompanying Task Force visits.

From our interviews we understand that the training of engineering managers and technical seminars was well received, although in the case of the seminars there were some logistical problems.

The contractor was required to establish and conduct a continuing professional development program for ITAP staff. An early project requirement (within the first three months) was to assess the staff's professional development training needs and to present a plan for the staff development training program. From interviews with the Egyptian staff members we concluded that no dialogue has taken place on their training requirements.

Promotion

The Contractor was required to develop and execute a continuing project promotion effort to help generate knowledge about, demand for, and use of the services provided by the ITAP Unit. The program was to be conducted through newsletters, television and other mass media, seminars, and conferences. Its other purpose was to increase general awareness of technology and the benefits available from systematic selection, improvement, and proper use of it. The promotion was to spotlight technology developments likely to be of particular interest to Egyptian industry.

In Table 3.9 below we set out the activity levels achieved to date in that promotion program.

Table 3.9: Promotion Activities

Activity/Function	Total for Project to Date	Budget to Date	Budget to 1987
Trade Shows	2	2	4
Technical Symposiums	2	5	14
Productivity Conferences	0	1	2
U. S. Industry Tours	3	5	12

Table 3.9 illustrates that those promotion activities that ITAP inputs to (Trade Shows and Productivity, Conferences), and accordingly occur without ITAP intervention are in line with budget. However, those promotion activities that ITAP had to drive -- technical symposiums (outside EIDDC) and U.S. industry tours -- are falling behind schedule. Further, it would appear from the 1985 work plan that no real effort is being made to bring the program back on schedule.

In June 1983 the contractor presented a promotion plan for the ITAP Unit. Plans at that date included the:

- o Development of a slide presentation. The promotion officer, who left ITAP in February 1985, estimated that this presentation would be ready in June or July 1985.

- o Publication of quarterly newsletters. The first quarterly newsletter was published in December 1984. The next publication is expected in March 1985 but this might be affected by the departure of the promotion officer.

- o U.S. industry tours. These tours have taken place and have been well received and attended but the program is behind schedule. The latest 1985 tour, to Detroit, was poorly subscribed and had only four industrialists attending.

Client Profiles

The ITAP Unit provides a variety of services. In effect, it conceives, specifies, designs, modifies, and formulates requests for information; and provides STC's or training. Any or all of these services are applied to a range of functions, specifically:

- o Product-Market
- o Production Processes
- o Equipment
- o Spare Parts, Tools, Dyes and Fixtures
- o Layout and Materials Handling
- o Maintenance and Repair
- o Waste Management, Scrap Reclamation, Energy Conservation
- o Quality Control
- o Organization and Personnel Training
- o Safety
- o License and Joint Ventures

We examined how these activities relate to the needs of ITAP's actual and potential clientele. An intermediate step was to indicate which of these activities exert greatest impact on the areas of concern to any enterprise. Figure 3.1 illustrates where

ITAP TECHNICAL FIELDS* AND THEIR IMPACTS
UPON AREAS OF CLIENT CONCERN

	Marketing	Product & Market Diversification	Plant Capacity	Product Quality	Production QC	Processing Cost	Labor Productivity	Raw Material Productivity	Plant & Equipment Productivity	Management Productivity	Raw Material & Control	Raw Material Costs	Product Pricing	Regulatory**
Product - Market	•	•							•	•				
Production Process (Selection, Specification, Design, Modification)			•	•	•	•	•	•	•					
Equipment (same)			•	•	•	•	•	•	•					
Spare Parts, Tools, Dies, Fixtures			•	•	•	•	•	•	•					
Layout & Materials Handling			•	•	•	•	•	•	•	•				
Maintenance & repair			•			•	•	•	•	•				
Waste, scrap, energy conservation or conversion		•				•		•	•					
Quality Control				•	•	•		•	•	•				
Organization & Personnel Training			•			•	•			•				
Safety														
License and joint venture	•	•								•				
ITAP EMPHASIS & STRENGTHS	None	Low	High	Low	High	Low	High	Low	High	Low	None	None	None	

* Conceive, specify, design, modify, formulate request for info or STC

**Monopolies, duties & taxes, currency exchange, import-export controls, etc.

the high-impact interventions occur while the bottom row of the figure sets forth judgments as to the relative emphasis and strengths of ITAP in the areas of concern.

Naturally the relative intensity of concern for each area will vary with different industrial groupings, as shown in Figure 3.2. It can be seen, for example, that a large public company which imports its primary raw materials and processes them for the internal consumer market will be intrinsically more concerned with "Raw Material Productivity," "Raw Material Costs" and "Regulations" -- in sharp contrast to the large public processor of domestic raw materials in intermediate markets.

The bottom line in Figure 3.2, transposed from Figure 3.1, when compared to the number of "bullets" column-by-column demonstrates that the Unit's emphasis and strengths are highest in areas of least concern to industry groups taken in the aggregate, and lowest in areas of most concern -- the sole exception being Plant Capacity.

The pattern suggests that the concerns of medium and small firms addressing intermediate markets, and the large, public, domestic-material firms addressing both consumer, and intermediate markets most nearly match in their needs, the Unit's profile of emphasis and strengths.

We consider that unless ITAP can substantially modify its scope and emphasis, client response to its promotion, DTS and contractual work cannot be expected to improve. There is no category of industrial client for which ITAP's present configuration presents a suitable match.

Finally, while the judgments expressed as "bullets" in the tables are judgments only, the patterns which yield the above conclusions are entirely consistent with impressions and conclusions derived from other directions.

Figure 3.2. AREAS OF CLIENT CONCERN

Company Profile	Marketing	Product & Market Diversification	Plant Capacity	Product Quality	Production QC	Processing Cost	Labor Productivity	Raw Material Productivity	Plant & Equipment Productivity	Management Productivity & Control	Raw Mat'l Costs	Product Pricing	Regulations	EXAMPLES (To Be Cross-checked)
LARGE, PUBLIC, IMPORTED MATERIALS, CONSUMER MKT.							•			•		•		Telephone, oil automotive, TV & electronics
LARGE, PUBLIC, IMPORTED MATERIAL, INTERMEDIATE MKT	•	•	•	•				•		•	•	•		Petro-chemicals, fertilizers, paint metal-mechanical, construction materials machinery, flax & oils electrical
LARGE, PUBLIC DOMESTIC MATERIALS, CONSUMER MKT.	•		•		•		•			•	•			Sugar, milk, cheese, oils & soap Other food, beverage, tobacco proc.
LARGE PUBLIC, DOMESTIC MATERIALS, INTERMED. MKT.	•	•	•	•		•			•	•		•		Spinning & weaving
LARGE, PUBLIC, DOMESTIC MATERIALS, EXPORT, MKT.														?
MEDIUM & SMALL PRIVATE: IMPORTED MATERIALS, CONSUMER MARKET					•		•		•	•	•	•	•	Batteries - appliances - pencils
IMPORTED MATERIALS, INTERMEDIATE MARKET		•	•	•	•	•	•	•	•	•	•	•	•	Automotive parts, nuts & bolts (tires & gaskets), wood & paper
DOMESTIC MATERIALS, CONSUMER MARKET	•					•		•			•			Clothing, shoes & gloves, food & beverage processing & packaging
DOMESTIC MATERIALS, INTERMEDIATE MARKET	•	•	•	•		•			•			•		Glass & crystal, refractory & ceramics, dyeing & finishing, tannery, contracting & commercial services, tile & brick
DOMESTIC MATERIALS EXPORT MARKET														?
ITAP EMPHASIS & STRATEGIES	None	Low	High	Low	High	Low	High	Low	High	Low	None	None	None	

IV. DIAGNOSTIC SERVICES

Procedures Developed

The GIT approach to the provision of diagnostic services as outlined in their proposal and specified in greater detail in their June 1983 project paper, is comprehensive.

In summary, the guidelines prepared by GIT for the general sequence of steps for conducting a diagnostic review of a firm and the information needed to be gathered to facilitate an effective assessment of the major problems of the firm, were as follows:

- o Step 1. Meet with firm's officer(s):
 - Give overview of the program; if this has been done, determine if firm understands program and inform them accordingly. Explain cost sharing requirements.
 - Obtain a brief description of company structure (divisions, subsidiaries, etc.).
 - Obtain a brief description of organization (organizational chart may help).
 - Determine key people to talk to regarding marketing, finance, production and engineering.
- o Step 2. Complete confidential manufacturer's data
 - What are the firm's goals and objectives?

- What is the firm's perception of problems and solutions?
- Take a plant tour and be introduced to key people.
- o Step 3. Obtain an accurate assessment of the company's problems with particular regard to:
 - Financial Assessments
 - Marketing Assessments
 - Distribution Channels
 - Manufacturing Assessment
 - Management
 - Facilities
 - Growth Strategies.

In essence, the results of the DTS should enable the client to better perceive some of the company's problems and their potential resolution. In the process, immediate solutions may surface and be applied as part of the diagnostic process. In addition, the DTS may illuminate the need for a short-term consultant, in effect providing a DTS "spec" from which the search can be instituted and the eventually selected DTS given the necessary orientation. Further, the client receives an appreciation of ITAP capabilities and its access to those of others, as well as an understanding of how the diagnostic process can be used in other management functions. Unfortunately, the diagnostic procedures in place bear little resemblance either in their scope, management or communication to those proposed.

Diagnostic Coverage

Considering the background and experience of the ITAP Unit's personnel, a remarkably broad scope of DTS's in the full range of industrial settings have been addressed. Some have been carried

out with quite acceptable quality -- judging from interviews and review of file materials. However, the DTS's have tended to focus on areas corresponding to people's background and interests more than to the pressing needs and concerns of client executives.

These executives are not greatly concerned with waste management or safety problems except when momentarily pressured by (another) government agency. Reducing (subsidized) energy costs or labor costs via productivity improvements may be of interest to national development officials, but not to the manager who is not permitted to reduce personnel and whose labor costs are insignificant. Quality control, improved layouts, preventive maintenance and inventory control may be of greater interest, but customers of a protected monopoly cannot go elsewhere if product quality or delivery delay leave something to be desired. On the other hand, help in obtaining information on foreign producers, their product designs and processes, new markets access, and joint venture or licensing arrangements can be of considerable interest presently, and may subsequently "pull through" the productivity and quality improvements sought at the national level.

Frequently the quality of a DTS has suffered because the internal capability of the ITAP Unit is inadequate to the needs. The pressures to provide instant, tangible answers coupled with the delays and lack of follow-up which characterize the ITAP Unit's acquisition of foreign and local STCs and answers to information requests, combine to induce the ITAP Unit to sacrifice quality for expediency. This is justified and adequate to the need in some cases but not in all.

A further deterrent to the quality of the ITAP Unit's DTS's relates to organization. To produce a satisfactory DTS requires balanced, closely integrated contributions of local understanding

of the industrial culture, its barriers and pathways, together with the full range of technology alternatives available internationally. This can only occur through close communication, long-term continuity, collaboration and mutual respect among team members. While such has been the case in isolated instances, unfortunately this essential aspect seems to have not always been appreciated or fostered in the ITAP Unit.

Level of Service

In Chapter III we stated that of the total number of DTS's undertaken, 112 could be regarded bona fide. We set out in Table 4.1 below a breakdown of those DTS's between public and private sector, together with an estimated level of satisfaction, as perceived by the ITAP Unit's personnel.

Table 4.1. Client Designation a Satisfaction Level

<u>Client Companies</u>	<u>Number</u>	<u>Client Satisfaction Level</u>			
		Satisfied	Partial or Unsure	Disat- isfied	
Public	54	9	4	6	3/19
Large Private & JV	17	1	"	1	0/13
Medium	30	9	0	5	4/14
Small	11	0	0	4	4/4
Total Satisfactory level of	112	19	15	16	3/50

Of the 112 DTS's tabulated, only 50 were assigned an estimated level of satisfaction. The least satisfied appear to have been the small private firms. The most satisfied were the medium, then the public firms, as indicated by the right-hand column

which represents the number satisfied minus the number dissatisfied divided by the number rated. There must be a bias toward optimism, which is inevitable in subjective interviewing. However, as the numbers indicate, the bias cannot have been excessive. This is attributable perhaps to a solid engineer-to-engineer rapport which developed, and to the basic honesty and desire to help improve the situation which was projected by both the Egyptian and U.S. staff interviewed.

Table 4.2 depicts for private and public organizations the approximate pattern of their initial interest areas against the focus of the subsequent diagnosis. The pattern must be regarded as indicative rather than definitive.

Table 4.2: Client Interest vs DTS Focus

Initial Interest	Public		Private & JV	
	Client's Pre-DTS Focus	DTS Focus	Client's Pre-DTS Focus	DTS Focus
- Layout	2	6	2	3
- Preventive maintenance	1	6	0	3
- Materials handling	4	9	1	2
- Equipment or process modification	5	6	1	3
- Equipment or process Design	2	2	3	2
- Equipment or process specification	5	7	2	3
- Part or product fab, spec, or design	3	3	4	4
- Part of product Modification,	2	6	4	6
- Waste mgmt or energy conservation	2	7	0	1
- Joint Venture	1	2	1	1
- Information	6	6	0	4
- Quality Control	0	5	0	1
- Unspecified	6	0	5	0
- Safety Problems	0	3	0	1

Whether from objective technical analysis, specialized capabilities and sensitivities or intrinsically different organizational styles, a few application areas are ITAP-advocated versus client-requested. These include layout, preventive maintenance, materials handling, part or product modification, waste management, quality control, and safety problems. Even accepting that the level of data available is limited, certain vagaries preclude

drawing too many inferences. A perceptive client may not express a need he feels the ITAP Unit cannot satisfy and/or if expressed, the ITAP Unit feel is out of their scope, and therefore it may tend to forget in retrospect.

At Table 4.3 below we have attempted, from our interviews with the engineers involved, to establish the level of effort involved and the degree of success achieved in conducting DTS's. Due to the lack of formal procedures and management information procedures the results are subjective, relying on memory and interpretation of client responses.

Table 4.3: Contacted Services. Effort and Implementation

Client Firm Designation	Contact Sources			Level of Effort (man-weeks)	Implementation			Total
	I	E	C		Yes	Partial, No	Pending, Unknown	
Public	6	6	6	164.	1	12	21	-20/34
Private Large	2	1	0	12.	0	2	5	-5/7
Private Medium	9	5	4	27.	3	6	9	-6/18
Private Small	3	0	0	2.	0	0	3	-3/3
	20 12 10			205				

The first three columns tabulate the number of DTS's for clients first contacted by ITAP, clients originally introduced by EIDDC, and clients initiating the contact. To the degree that these figures are indicative of the larger population, it is gratifying the ITAP Unit's efforts have produced so many first contacts. However, this could also account for the poor showing in implementation and client satisfaction, in that most of the clients did not come to the ITAP Unit with preliminary problems identified and with the motivation to get help.

The next column in Table 4.3 tabulates the man-hours estimated for each DTS in the interviews. Public organizations appear to have received the preponderant level of effort in DTS's.

The final four columns in Table 4.3 depict the low level of implementation. Many of the "Partial, Unknowns" may yet come to fruition, but there are no corroborating trends from other sources. Offsetting the optimism bias of interviews, may be future implementations which the client may not reveal to, or remember as coming from the ITAP Unit.

The statistics presented in the preceding section reflect a very low rate of implementation of DTS recommendations and a correspondingly low rate of satisfaction with the ITAP association. The context in which this situation should be considered includes the following factors:

- o The process of acquisition, adaptation, delivery and application of technology is time consuming anywhere. Its implementation and the emergence of tangible benefits typically take 1-10 years in the U.S. and substantially longer in more tradition bound, protected and controlled "enterprises".
- o Undoubtedly, there are DTS's which both the ITAP Unit and the client personnel presently rate as failures, which might come to fruition at some later date, with no recognition of the source.
- o For a DTS to bear fruit, especially when offered by a new organization and new personnel, several hurdles must be surmounted, any one of which can block the end result.

- o ITAP must have and communicate a capability which matches needed services or products as perceived by the potential client including appropriate technical discipline, appropriate labor/capital type of technology solution, and adequate knowledge of industry-unique factors.
 - Prospective clients must perceive the need, believe a solution is sufficiently important for the resources and risks which will be called upon, believe a solution is possible and that the ITAP Unit is the best resource.
 - Similarly, ITAP must perceive the need, value and prioritize its resource commitment, and perform accordingly.
 - An agreement must be struck as to scope, schedule, personnel, performance and resources to be committed.
 - Adherence to the commitment or agreed modifications in process must sustain the activity to its conclusion. In addition to the client's satisfaction with results of the DTS, implementation is contingent on interim changes in priorities, available resources, expectations or perceived value of results, to date and projected. In the absence of closely related prior experiences, the client must rely on his convictions regarding ITAP and the specific personnel he has worked with.

It is difficult, in the absence of adequate documentation, to appraise the results of many man-weeks of work via a single interview with the client and fragmentary discussion with team members. But reinforced by several independent such inquiries and the more extensive DTS interviews, it appears that:

- o An important need for senior technical review of work as it is scoped and committed (whether under formal contract or otherwise) is not being met. Similarly, interim design reviews and measurement against ultimate value are being ignored or handled ineffectively. The result is that conscientious effort at the mid-engineering level is not receiving the review and guidance essential to achieve professional quality;
- o Even when quite well done and communicated to the client, ITAP's outputs appear redundant in that the client has access to the information or services via other path-ways.

Conclusions & Recommendations

A number of DTS's have been produced. The mechanism is established and is operating with relatively broad coverage of client entities addressed. The DTS is integrated with ITAP's companion services of promotion, information requests, and STCs. In Table 3.7 below we set out the activity levels achieved to date in the use of Short-term Consultants (STC).

The DTS deficiencies in cost, quality, relevance and utility are sufficiently serious, that their continuation along present lines seems unwarranted. However, if re-alignments in accordance with the original conception of ITAP are instigated, there is no reason not to retain the DTS as part of the original design. The DTS component should be modified to:

- o reaffirm the strategic goals and action plans of the original design and charge management with responsibilities for same;
- o establish a more cohesive, disciplined management and planning process;
- o emphasize a focused combination of sectorial (vertical) services which are proactively provided, and information services spanning a broad range of disciplines and application areas (horizontal) which are available on request;
- o begin to address the issue of revenue generation and long-term self-sufficiency.

Priorities of DTS's with respect to technical specialization and clientele served, should be articulated closely with the strategic thrust and long-term unique value added of the ITAP Unit.

We discuss our recommendations in greater detail in the final Chapter in the context of ITAP's overall strategic development.

V. INFORMATION SERVICES

Procedures

No formal manual detailing the procedures necessary for conducting the major operations and activities of the Information Center has been prepared. However, an informal system of procedures does exist and individual staff members have been trained in principal functional areas, namely:

- o cataloging;
- o information requests to GIT; and
- o compilation of the Egyptian industry data base.

Cataloging

The Information Center uses the Library of Congress cataloging system for classifying books and audio visual materials and an alphabetical system for periodicals.

Information Requests to GIT

Requests to Georgia Tech have been handled by the GIT team member. The Egyptian counterpart has only recently been trained in the required procedures.

Procedures on the GIT side could not be verified. However, although the contract clearly requires that a status report indicating the time necessary for collecting required information be given within one week of receipt of the request by Georgia-based personnel, this is not being done.

Compilation of Egyptian Industry Data base

No formal procedures for collecting and verifying information on companies included in Egyptian industry data base exists. Information sources include newspaper clippings collected by staff and information collected for DTS's.

As no documentation of procedures exists, transmission of the information necessary to the operation of the Information Center has been informal. We believe that the lack of formalized procedures will cause significant problems for future operation of the Center once the GIT team member returns to the U.S. in October 1985. Therefore, it is recommended that as a matter of some urgency that:

- o manual documenting of all Information Center procedures be prepared in both English and Arabic; and
- o a formal timetable be established for training the Egyptian staff in the skills and procedures necessary for the successful future operation of the Center.

Services Offered

The services offered through the ITAP Information Center can be classified in three broad areas:

- o on-site reference collection;
- o information request, channelled through GIT; and
- o microcomputer-based data bases.

Access to these sources in general is limited to ITAP and EIDDC personnel and their client companies. No attempt is made to encourage the use of the Information Center by non-client local businessmen or engineers.

On-Site Reference Collection

The materials contained in the on-site ITAP reference collection are generally the latest editions of standard American engineering reference texts, handbooks and periodicals. Except for some British texts, particularly in the textile industry area, there are no reference materials on technologies from non-American sources.

Information Requests Through GIT

When information is not available on-site, requests are channeled to GIT Atlanta. The objective of this service is to provide a direct link to U.S.-based library resources, including GIT's Price Gilbert Library, professional engineering societies, U.S. on-line engineering data bases, information from U.S. equipment manufacturers, and U.S. technical experts.

On-site Microcomputer based Data bases

The Information Center currently has two IBM PCs and maintains the following data bases on diskettes:

- o The Egyptian Industry Database;
- o The Diagnostic and Technical Services (DTS) log;
- o The Priority Contact Listing;
- o ITAP Accounting records; and
- o Dr. Mazhar's TV Program catalog.

Level of Service Achieved

The ITAP Information Center is a good, basic American engineering library. However, it is not the Technology Information Center required under the ITAP contract. The contract specified that the Information Center "respond in a timely, efficient and effective manner to the information and technical assistance needs..."

of the ITAP diagnostic work. The ITAP library represents only a partial fulfillment of this objective.

In our interviews with ITAP engineering staff, we were consistently told of the problems, delays and frustrations associated with obtaining any information not specifically contained in the on-site materials. This in turn has caused problems for the engineers in conducting the work of the diagnostics, preparing proposals and completing contracts in terms of annoyance, frustration and waning interest on the part of clients and potential clients.

The sources of the information and expertise necessary to accomplish technology and information transfer are both formal and informal. Engineering "know-how" is partly contained in handbooks and textbooks, computer data bases, journal articles and partly held in the minds of the members of the profession. No one source of information is sufficient to accomplish the objective of technology transfer. The Information Center must be able to tap all the required sources in a timely, efficient and effective manner.

We recommend that a plan be developed to turn the core engineering library at the ITAP Unit into the Information Center required in the Contract. At a minimum, the plan must cover:

- o a definition of the potential user groups and their requirements;
- o Information Center personnel requirements;
- o direct and indirect access to computer databank;
- o development of in-house computer capabilities and data bases; and

- o Development of formal and informal networks both within Egypt and with the U.S.

The following discussion addresses each of these points.

Definition of Potential User Groups

The current principal users of the on-site library facilities are ITAP and EIDDC staff engineers. Access by local businesspeople and professional engineers is not encouraged. In order to maximize the benefit of the facility, it will be necessary to determine the potential target user groups, consistent with the overall objectives of the ITAP program. Potential users for the Information Center should include:

- o engineers from Egyptian public and private sector companies;
- o current and potential business owners;
- o members of the Egyptian Society of Engineers; and,
- o other Egyptian technical libraries, both public and private.

Consideration should be given to inviting professional engineers and members of the Egyptian Society of Engineers to be subscribing members.

User Requirements

Once the target user group has been defined, a comprehensive assessment of the information requirements of the users must be undertaken. We recommend that this assessment be conducted through both questionnaire and direct interview and should address, at a minimum, the following issues:

- o the range of technologies in use in Egypt, the interface between existing and American technologies, and access to information on alternative technologies;
- o timeliness of response to information requests and method of access to U.S. based information sources;
- o in-house data base requirements and linkages to existing Egyptian information sources; and
- o access to information on engineering, design, simulation and other application software packages.

Information Center Personnel Recruitments

Current management and staffing of the ITAP Unit's library is inadequate and must be upgraded if it is to develop into a true technology Information Center. The GIT team member, while recognized as a good reference librarian, has not trained and transferred American information service and retrieval technology skills to the staff. In addition, since the library does not have assigned clerical personnel, the professional Egyptian staff has been required to perform these functions. As a result, the capabilities of the Egyptian staff, at this point, are both untapped and untested. Further, the GIT team member does not have the background necessary to appreciate the information needs of the professional engineer as he functions in the Egyptian environment.

Given these considerations, we recommend staffing changes for the Information Center as follows:

- o place an Egyptian engineer as head of the information services with direct responsibility for:

- quality of request;
 - coordination of effort;
 - continuity of response phases;
 - quality and relevance of response; and,
 - materials acquisition decisions.
- o place an Egyptian librarian in charge of administration of library portion of Information Center with administrative responsibility for:
 - merging the EIDDC collection with the ITAP;
 - cataloging;
 - purchasing process;
 - on-site reference requests; and
 - interfacing with outside technical libraries.
 - o assign the Computer Services Manager the responsibility for developing design and implementation plans for in-house data bases and information systems as defined under user requirements assessment; and
 - o provide sufficient clerical staff to support Information Center requirements.

GIT-based support staffing must also be reassessed in order to ensure that user requirements as defined in the assessment are met.

In addition, we believe that a greater appreciation of the working conditions, requirements, and possibilities on both the U.S. and Egyptian side is necessary to promote sound working relationships and to maximize the potential for effective communication between personnel based here and in the U.S. Therefore, we recommend Egyptian Information Center personnel be sent to the U.S. for training and suggest that, in addition, the

Egyptian engineer placed as head of the Information Center visit the corresponding GIT center and the U.S. headquarters for VITA.

Development of In-House Computer Capabilities

The Information Center's two IBM PCs are currently not being utilized to their fullest. With the addition of the VAX mini-computer and two IBM PCs, ITAP will have significant computer capabilities that should be exploited to their fullest to assist all aspects of the project. We recommend that the Information Center take a proactive role in obtaining and providing information on the availability and application of engineering, finance, word processing, database, and other relevant software packages. At a minimum, this should include:

- o acquisition of U.S. software directory;
- o establishment of contacts with U.S. professional engineering societies that sponsor software trade shows; and
- o utilization of Egypt-based computer company representatives to obtain information on capabilities of software packages.

The Information Center also has the responsibility for developing the Egyptian industry data base. At present, this data base has been assembled from information sources, particularly newspaper clippings and the data on the individual companies has not been verified. We recommend that a reassessment of this data base be undertaken with consideration given to:

- o defining the purpose and use of the directory;

- o determining alternative existing sources of similar information and the potential for obtaining and utilizing these data bases; and
- o establishing procedures and assessing the personnel requirements for building, verifying and maintaining this data base.

We also recommend that the potential for development of additional data bases be evaluated. At a minimum, these could include in-country consultants and specialists.

Development of In-Country Networking

The ITAP Information Center has not taken advantage of the significant information resources existing within Egypt possible through developing and nurturing both formal and informal networks. We recommend that the Information Center take a proactive role in locating and establishing contact with these in-country sources. In particular, the Information Center should take the lead in the establishment of a formal network of inter-library information sharing and an inter-library loan network. Potential members of this network could include:

- o industry chambers;
- o the armed forces libraries;
- o the Egyptian Society of Engineers; and
- o universities.

VI. MARKETING

Level of Effort

The Georgia Institute of Technology in its proposal realized that in order to successfully implement the program a "major multi-faceted awareness campaign" needed to be designed and implemented. The proposal mentioned a range of specific awareness channels and communication delivery systems and concluded correctly that it expected that the most effective awareness effort for ITAP to be evolutionary since relative effectiveness of various delivery systems are difficult to predict.

The proposal stated specifically that the resident team leader would:

- o design a promotional campaign to suit the needs of EIDDC and Egyptian industry;
- o identify key industrial leaders and intermediary agents;
- o develop a plan for personally meeting as many of the above as possible;
- o assemble a mailing list;
- o produce an action newsletter;
- o produce a prospectus; and
- o demonstrate to the industrial public the workings of an industrial extension service and present case studies of productivity awareness with audio visual aids provided by GIT and adapted to the local environment.

The GIT proposal addressed the question of reactions to market signals, implicit within which would be its ability to recognize those signals, "often ignored by dedicated engineers". Rather than approach the total market, GIT would segment the market in terms of need and economic attractiveness.

As illustrated in Chapter III the level of activity in the marketing/promotion function has, to date, been pedestrian. This trend is, we consider, likely to continue with the level of effort in the 1985 Work Plan limited to:

- o one slide presentation;
- o two display boards;
- o the Cairo Fair;
- o six press releases;
- o six seminars outside EIDDC; and
- o four U.S. Industry Tours.

During our evaluation we were unable to assess:

- o the extent to which the marketing function, for there was no plan, was integrated to the Unit's overall plan;
- o what the specific marketing objectives were or whether the quantified activities were realistic;
- o the specifications of how the objectives were to be met by any plan;
- o the methods for collection and use of data on:
 - market structure and segmentation
 - market growth
 - market trends

- market share
 - competitor comparison
- o methods used for determining fee policies and their impact
 - o the degree of client satisfaction.

We consider that the marketing function, save for the efforts of the ITAP President, is embryonic and consequently ineffective in preserving existing markets, developing new ones and exploiting the Unit's potential strengths.

Market Status

Notwithstanding the former, the level of impact in the market that the Unit has achieved has been diluted by the limited and unattractive product range offered to far too large a market, the industrial sector as a whole.

The Unit is not offering a wider range of services than that which, to a great extent, is already available within EIDDC specifically or from competent industrial engineers within the industrial sector generally. To the extent that the ITAP Unit is not marketing innovative services to industrialists, it is not bringing technology transfer to the executive suite. Rather it is remaining on the factory floor and working with factory managers and are not makers of the corporate policy.

Fundamental to the marketing issue is that the ITAP Unit is unsure of its product. This is reflected in the focus of technical effort discussed in prior chapters. The Unit as it stands has little competitive advantage. However, the program as designed should avail them of that advantage. The need for technology transfer was perceived from our interviews and design research is still required.

The ITAP Unit has, to date, fallen short of meeting that need. Indeed, its present resources limit its capability of fulfilling that need and accordingly create the constraint of marketing a product that cannot be delivered in full.

Strategic Conflicts

At the outset we consider that though the ITAP Unit has achieved a degree of recognition within the industrial sector this has been achieved:

- o in general through the initiatives of its President;
- o through word of mouth from clients and the ITAP Unit's and EIDDC's staff;
- o through U. S. Task Forces and external seminars;
- o through the presence of short-term consultants addressing issues of particular interest to Egyptian Industry in general or specific sectors within it.

The mechanisms for marketing ITAP are embryonic but they do exist. It is the use made of those mechanisms and the products offered and the market addressed that is in question. Essentially the ITAP program must as part of an overall strategic plan, identify a segment or segments of the industrial market which it wishes to address in terms of natural priorities, arm itself with the required products for those market segments, and prepare a marketing plan to attack that market. Only in this way do we consider that a measurable and visible impact can be achieved, both in terms of cost benefit ratios and transferable intervention models. The recommended marketing plan must:

- o Reflect the ITAP Unit's strategic plan. As with the organization structure the marketing plan must run parallel with projected strategies and long term goals;
- o Grow from a tangible data base. Information must be first collected and continually maintained on:
 - market structure and segmentation
 - market growth areas and national priorities;
 - market trends and national priorities.
- o Ensure that the market segment addressed is attracted by the resource base marketed
- o Where possible, coordinate with other programs to portray a wider range of services.

VII. TRAINING SERVICES

Staff Development Training Program

The purpose of the ITAP staff development training program, is to develop the staff's professional capabilities to work as consultants, to carry on the diagnostic and technical assistance activities, to maintain and operate an information center, and to raise the productivity of industrial firms.

The above goals were to be accomplished by a combination of informal and formal training. The informal training would primarily consist of on-the-job exposure to experienced ITAP Unit staff and GIT team members. The formal training was to be in the form of specifically tailored training programs, short courses, seminars and conferences.

The "Continuous Professional Development Plan for ITAP Staff" prepared by GIT for inclusion in their Life of Project Plan was comprehensive. Unfortunately, the implementation of that plan has fallen short of expectations, capsulated by the GIT Cairo team leader's request for GIT Atlanta to prepare a formalized course on diagnostic procedures together with a request for a training manual to be prepared covering the following:

- o diagnostic systems and procedures;
- o procedures to be followed in responding to information requests;
- o proposal inputs; and
- o documentation flows.

The identification and initiation of this requirement two years into the contract is, we consider, a poor reflection of the degree of training received by the ITAP Unit. Discussions with ITAP staff revealed a basic disappointment with the level of training received. Except for the recent intervention of the Egyptian training officer, no staff members had received a periodic evaluation of either their performance or their training needs. In terms of the training modes put forward, performance is discussed in the following paragraphs.

On-the-Job Training

All the ITAP Unit staff considered that they received very little on-the-job training from the GIT Cairo team. The most beneficial source of on-the-job training was from the STCs. The common denominator in the failure to provide on-the-job training was that problems addressed were often outside the discipline of the GIT team member. Notwithstanding the former, criticism was leveled at the fact that little attempt was made to demonstrate how to address a problem per se.

Formal U. S. Training

Although this program is behind schedule, the four technical and two resource specialists have derived some benefit. The shortcomings identified by the first and to date only batch of trainees who received their training in 1983 have been addressed and suggestions put forward to GIT Atlanta for a restructuring of the course. The basic change in emphasis is towards more practical and less theoretical training.

In effect the training program put forward at the commencement of the course needs to be implemented. We consider that the following recommendations should be implemented:

o Introduce a training program to:

- match program objectives as specified in the Project Paper and focused in the strategic plan. In particular if the computer data base is, as we consider it should be, implemented and expanded, then the operators of the system require intensive application training rather than, as is the case at present, learning by trial and error;
- meet specific needs of individuals within the program scope. If an individual is receptive but his/her background is weak in potential areas of technical focus, then emphasis must be given in the training program to bridge that gap both on and off the job.
- take greater advantage of training courses available in-country at various institutions. In the longer term the benefits derived will outweigh the delays in DTS completion and/or commencement.

o Widen the spectrum of the training curriculum to:

encompass general management, financial and marketing awareness. The ITAP Unit staff must be made more aware of the implications of technology transfer in the production function on the business as a whole.

o Consider the establishment of an industrial transfer program. This would involve seconding ITAP staff to scoped industries for a period of some six months; or an industrial exchange program

whereby an ITAP Unit team member exchanges position with an engineer in one of the scoped industries for a period of six months.

- o Develop inter-program staff exchanges. Staff members of the ITAP Unit would transfer to, say, the MDP program for a period of six months to develop his managerial skills, improve liaison between the projects; and avail ITAP and the MDP program with needed extension support skills.
- o Introduce the revised training program devised by the ITAP Unit for U.S. training. The deficiencies of the training programs to date have been identified by the participants and articulated by the ITAP Unit. What remains is the implementation of those recommendations.
- o Formalize on-the-job training. Staff performance reports should be completed at the end of each DTS, to make individual staff members aware of their performance, strengths and weaknesses on a continual basis. On a six-month basis individual DTS appraisals should be consolidated into a six-month staff assessment interview with the functional engineering head, training manager and team leader.
- o Introduction of individual work programs/projects. Staff must be set tasks and their implementation of those tasks monitored and their development guided. Specifically the Information Center staff have had their initiative suppressed in addressing

projects that need to be implemented within the unit. They should be given a task analysis on the method to implement their projects and their progress monitored.

VIII. RECOMMENDATIONS

Organization

In principle, the ITAP Unit can be organized by:

- o technical discipline (mechanical, electrical, chemical, etc.);
- o services provided (DTS's, contracts, information services, etc.);
- o clientele addressed (textile, metal-mechanical, food processing, etc.)

The criteria for organizational design should include consideration of which configuration works best in order to:

- o provide career paths, development and professional identity for ITAP personnel, and facilitate communication;
- o maintain proper liaison with actual and potential clients;
- o maintain proper quality-cost balance of services provided; and
- o facilitate networking with contributors to and stockholders of ITAP.

Because of ITAP's small size and highly professional staff, the organizational configuration per se is less important than the organization's climate, management style, clarity of goals and paths for their attainment.

We considered that the following recommendations should be implemented:

- o The organization must be structured to support strategic objectives. Strategic objectives both internally and for the overall program must be articulated. The structure of the ITAP Unit should be interfaced with those strategies in order that the organization's growth and communications run in parallel with the overall goals. In addition to structuring the Unit by technical discipline, the organization must be augmented by managers of the services provided and the communication required at both a client and program level.
- o Key management responsibilities and reporting relationships must be formalized. The role of the GIT Cairo team should be restructured, placing them in advisory roles leaving the line functions to be filled by the Egyptian staff; job descriptions and reporting relationships must be formalized and areas and degrees of responsibility identified; ITAP's staff members must recognize their relationship and lines of communications with the overall EIDDC organization.
- o Management information systems have to be developed to convey information to the right people. Management must be furnished with the information they require to operate their areas of responsibility.

The paucity and nonspecificity of the present management information together with unclear lines of communications are a prime factor in the overall breakdown of communications and suppression of initiative within the ITAP Unit. Comprehensive and meaningful management information is essential to the ITAP Unit if it is to control its future performance.

- o Targets and performance indicators must be set at the various levels of the ITAP Unit. It is essential that staff are aware of the strategic purpose of the Unit and their relation to that overall strategic plan. The motivation and performance of staff in the Unit to date has been affected by their lack of understanding of and their expected contribution to the aims of the program. As part of the management information system, quantitative and qualitative targets must be established, plans conceived and implemented, and divergencies monitored and where necessary corrected.

- o A task analysis must be undertaken for the EIDDC and its interface with the ITAP Unit. This is required to avoid overlaps or duplications; provide a logical division between departmental activities; establish a structure within the organizational framework; and create well-defined and workable relationships to ensure that the skills in place are consolidated to develop a competitive and more extensive product range.

- o Establish and formalize networks of communication. This must be done downwards, upwards and laterally across functions, meetings, committees and coordinators. There is a clear need for strengthened

linkages between the team leader and the various entities he serves. There is an urgent need for formalized communications between programs in both the overall and day-to-day strategies of program implementation.

- o Establish an Executive Committee. Its function would be to monitor and control the management of the project against articulated strategies and specific performance indicators.

Technical Interventions

A substantial number of "technical interventions" have been produced by ITAP in the form of promotional visits, DTS's, proposals and contracts, introductions of STCs and responses to information requests. Clients served are representative of Egyptian industry. Delivery processes and personnel are in place to continue this activity. The ITAP Unit itself has been publicized, has helped to sensitize chairmen and middle managers of the firms contacted and has provided support to and receive support from EIDDC.

However as indicated throughout this report, deficiencies exist in these interventions:

- o Much of the promotional and developmental effort, resources and expectations for the future all reside in the DTS activity. Its costs are substantial. The quality, relevance, utilization and potential impact of the preponderance of DTS's is limited.
- o The proposals and contracts (written or informal) which derive from the DTS efforts or prior EIDDC

activity, for the most part are poorly scoped and managed, resulting in uneven quality and barriers to implementation of results.

- o The quality of STC's interventions has been uneven. Well-matched, capable STC's have methodically made their contributions as their experience guided them. Others were poorly selected, inadequately oriented and guided, and contributed little of value and/or the inadequate follow-through precluded any serious implementation of their recommendations.
- o The "information services system" consists of a small library about to lose its librarian, and an information request service which too often responds too late, with incomplete and/or irrelevant information.
- o Training in the U. S. has tended to be poorly matched to individual needs and expectations as a result of inadequate selection criteria and preparations for pre- and post-visit continuity. Plant visits are to the wrong plants, or the wrong people serve as tour guides. Training programs are too academic and/or elementary.

Unless measures are begun to correct these deficiencies quickly, there seems little reason to continue operations. Our recommendations are as follows:

- o The present GIT Cairo implementation team are not suited to the task as conceived in the Project Paper. The present implementing team must be replaced by a team whose individual mixture of skills

give the team composition experience in the acquisition, delivery and application of a broad representative sample of technologies both as promoter and user; extensive experience in industrial management; and some experience in the management of technology delivery service organizations.

The ideal team leader for an ITAP will have had:

- Extensive experience in acquisition, delivery and application of a broadly representative sample of technologies and their applications -- both as technologist and using manager;
- Extensive experience in representative, industrial management posts -- in order to understand and win confidence of client managers;
- Some experience in management of technology delivery service organizations (consulting, R&D, etc.);
- Some in-residence experience, working in developing countries; and

Other staffing characteristics must be dealt with case-by-case, always bearing in mind that ITAP must produce services superior to or otherwise unavailable to the client -- and at costs which the client or other sponsor is willing to pay. More specifically, diagnostic teams must be capable of diagnosing a wide range of industrial organizations, based

on a correspondingly wide range of technologies, drawing correct conclusions as to critical needs and solution modalities. This calls for a mix of generalists (business organization, industrial engineering, etc.) and specialists as needed (food technologist, license brokering) together with intimate knowledge of local industry conditions, firms, personalities and politics.

- o A mechanism must be introduced for senior technical management reviews. The ITAP commitments and performance must be reviewed from a technical point of view on a continual basis DTS reports must be subject to technical appraisal by a senior engineer to ensure their quality and relevance in order that the ITAP Unit build a position of competitive advantage through quality work.

- o Refine ITAP product definitions and conditions for their selection. The ITAP Unit cannot apply the whole range of engineering disciplines to the Egyptian industrial sector in its entirety. Markets must be prioritized and demands identified; the strategic plan must identify and again prioritize intervention strategies in terms of brokerage and/or hands-on intervention and the degree of resource allocation targeted.

- o Every DTS should include an indication of costs, benefits, phasing options and opportunity cost benefits. Too often the value of DTS's has been depreciated due to the lack of cost information. The clients must be made aware of financial implications and options available. For the long-term measurement of success, the ITAP Unit must be in a position to demonstrate in financial terms the

results of their interventions. To a very real degree the technological solutions available will be a function of finance available. Incremental cost benefits need to be identified and charted.

- o An organizational integration or diversification must take place to incorporate technology services supportive of finance, management and marketing. The ITAP Unit cannot make a realistic impact in a vacuum. The client must be aware of the overall business implications of any managerial decision; this topic is the underlying theme of the evaluation.

Institutional Options

Institutionalization can be discussed in terms of two distinct orientations:

- o intrinsic viability - the availability of economic and institutional resources which the organization can utilize to produce a unique added value in its "products" for its "markets;"
- o extrinsic viability - its linkages to external organizations and constituencies.

No operation can operate in isolation. There is a fundamental requirement to undertake regular and perceptive examinations of the environment in which the ITAP Unit operates in order to identify threats and/or opportunities. The ITAP Unit must be in a position to recognize the overall aims of the program and its place in the overall national productivity improvement scenario, in order to identify its strengths and weaknesses to develop optimum use of limited resources.

The challenges of a technology transfer organization functioning in a development context urge that:

- o There be as direct a path as possible from the "market" benefits of ITAP "products" to recharging or maintaining the flow of resources. If this path is too indirect, leaky or ephemeral, the long-term viability is threatened.
- o The products' benefits must be substantial in relation to costs of their production and delivery -- relative to competing sources of the same benefits. Those benefits must be recognized as valuable to the recipient and buyer.
- o The counterpart entity's relationship exhibit strong synergies in terms of complementarity of services offered, clients served, internal operations, in developing the organization.
- o The pattern of external linkages be supportive of what the entity is about.

These above points are cited because they seem to be ignored in ITAP's case. Institutionalization of ITAP would seem to call for these specific initiatives:

- o Organizational integration or diversification of ITAP: to incorporate technology services supportive of management and marketing, not just the factory.
- o Serious attention to revenue generation mechanisms: including adjustment of product-market priorities as appropriate, the use of contingency and royalty payment structure, multi-client sponsorship of projects, joint ventures in computer training with

computer or software producers; subscription fees for on-going information services.

- o A counterpart relationship: augmenting or replacing EIDDC which provides pragmatic linkages to the Egyptian private sector (e.g., chamber of industries).

Overall Strategy

In establishing and carrying out the ITAP strategy, the strategic goals and action plans of the original program design should be re-affirmed, and, in the light of the lessons learned, expanded to include perpetual monitoring mechanisms to ensure direction is maintained and momentum sustained.

Implementation of that strategy calls for considerable reconfiguration of ITAPs present product-market-technology posture.

- o Pro-active, "technology-push" activities. Promotion visits, DTS and identification of STC needs/capabilities ITAP must be focused along sectorial lines, for example, food processing, building materials, agro-industries and import substitution. It may also be proactive in one or two carefully selected technologies, for example, computer applications, distribution and marketing.
- o "Technology-pull" activities. In information services, training, it relies on client initiated requests, predominantly. By remaining relatively passive, but fast and aggressive in networking, it can inexpensively service the full range of technologies and applications.

The ITAP strategy should define and gradually move towards its long-term, unique value-added role.

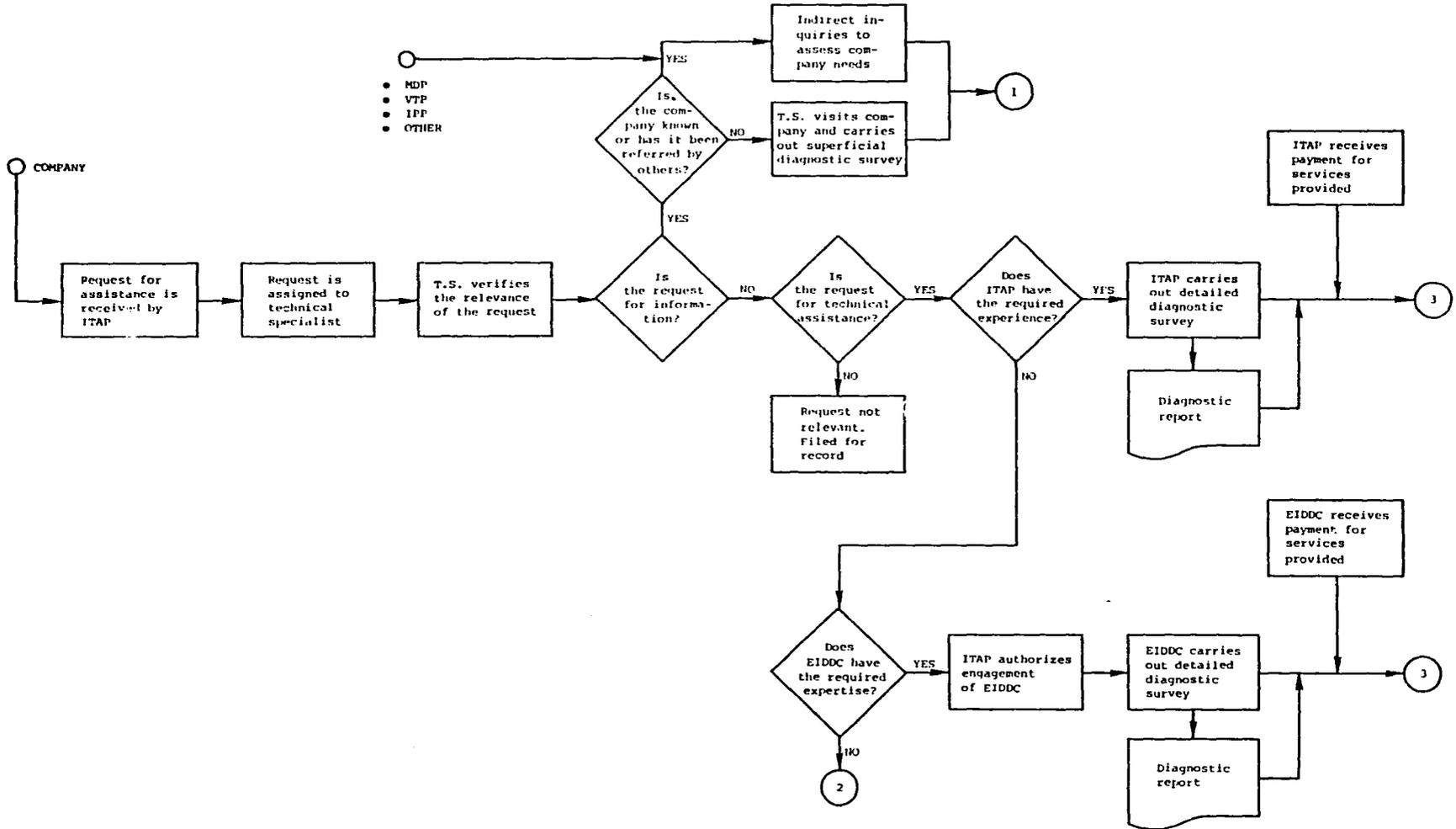
Accordingly, our recommendations for proceeding are to:

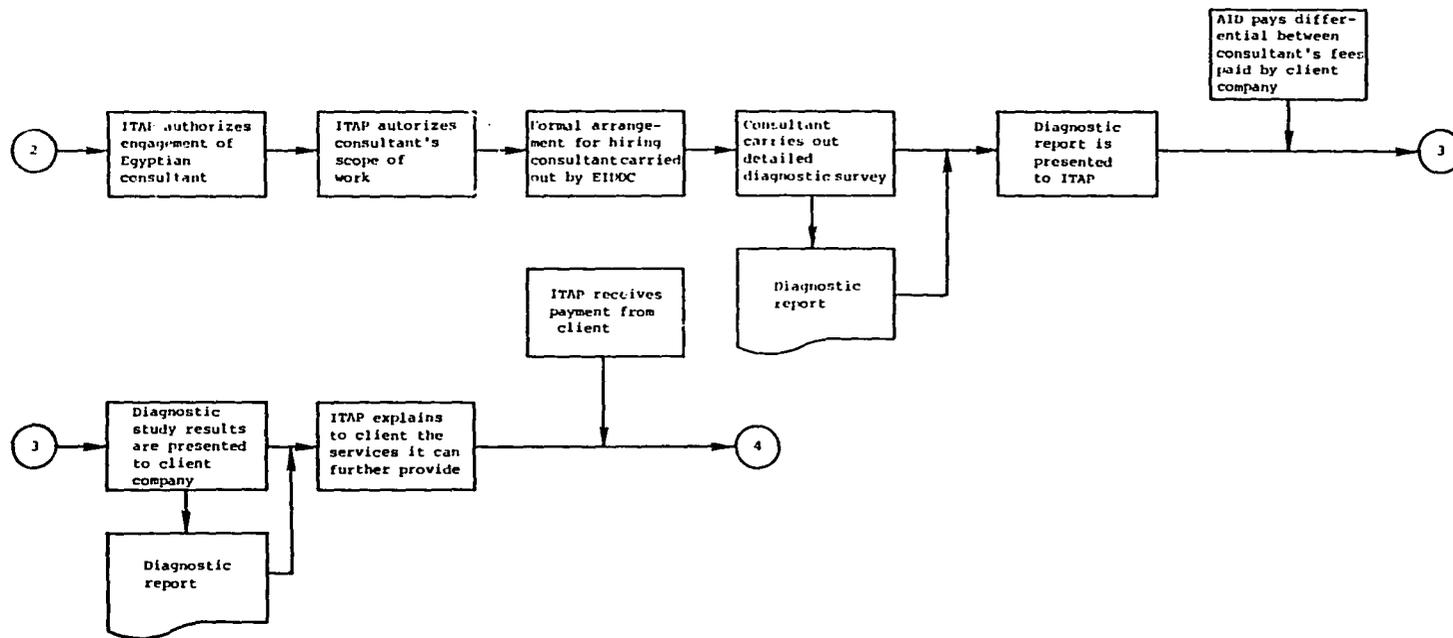
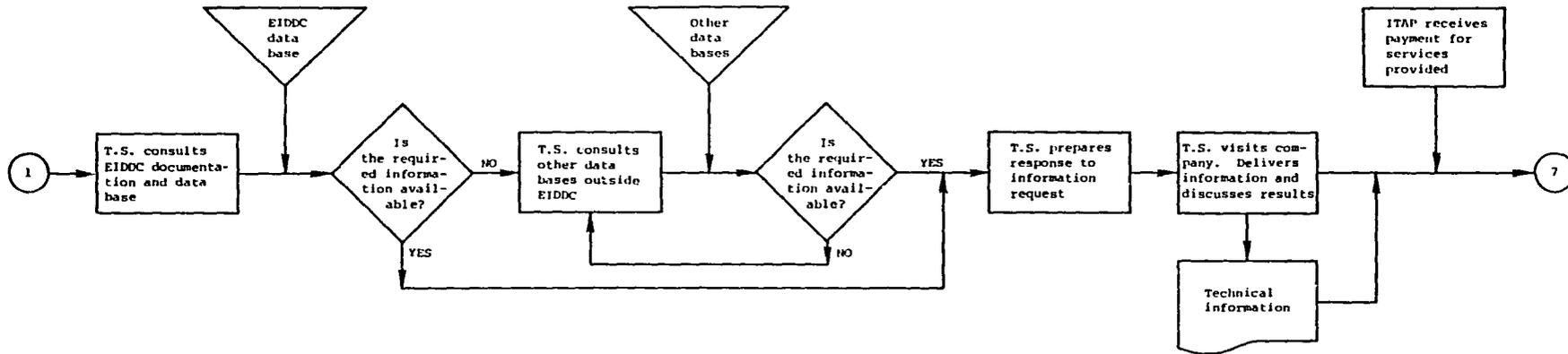
- o Allocate resources according to explicit policies through a systematic approach to policy making with the parties involved in productivity improvement; identifying the external constraints; identifying the need and demand by sector and discipline; setting priorities according to set strategies for intervention type and accordingly resource allocation.
- o Consider the environment in terms of ITAP programs strengths and weaknesses by identifying in the context of the market addressed where the capabilities of the ITAP Unit can be most successfully applied, in terms of competitive edge and impact. ITAP needs to maintain growth in relation to alternative sources of expertise. Integral to addressing competitive edge is the need to ensure that the parties charged with the responsibility of identifying where that market lies are capable of assessing that potential not merely from an engineering aspect but from the needs of the business environment, including marketing, finance and growth potential and national priorities.
- o Identify and quantify the long-term benefits between the product and the ITAP Unit's ability to recharge and/or maintain its resources. The ITAP Unit must ultimately be self-financing if it is to remain an attractive institution and retain its staff. In order to sustain itself it must build a product range attractive enough to attract the industrial sector to pay for its services. If

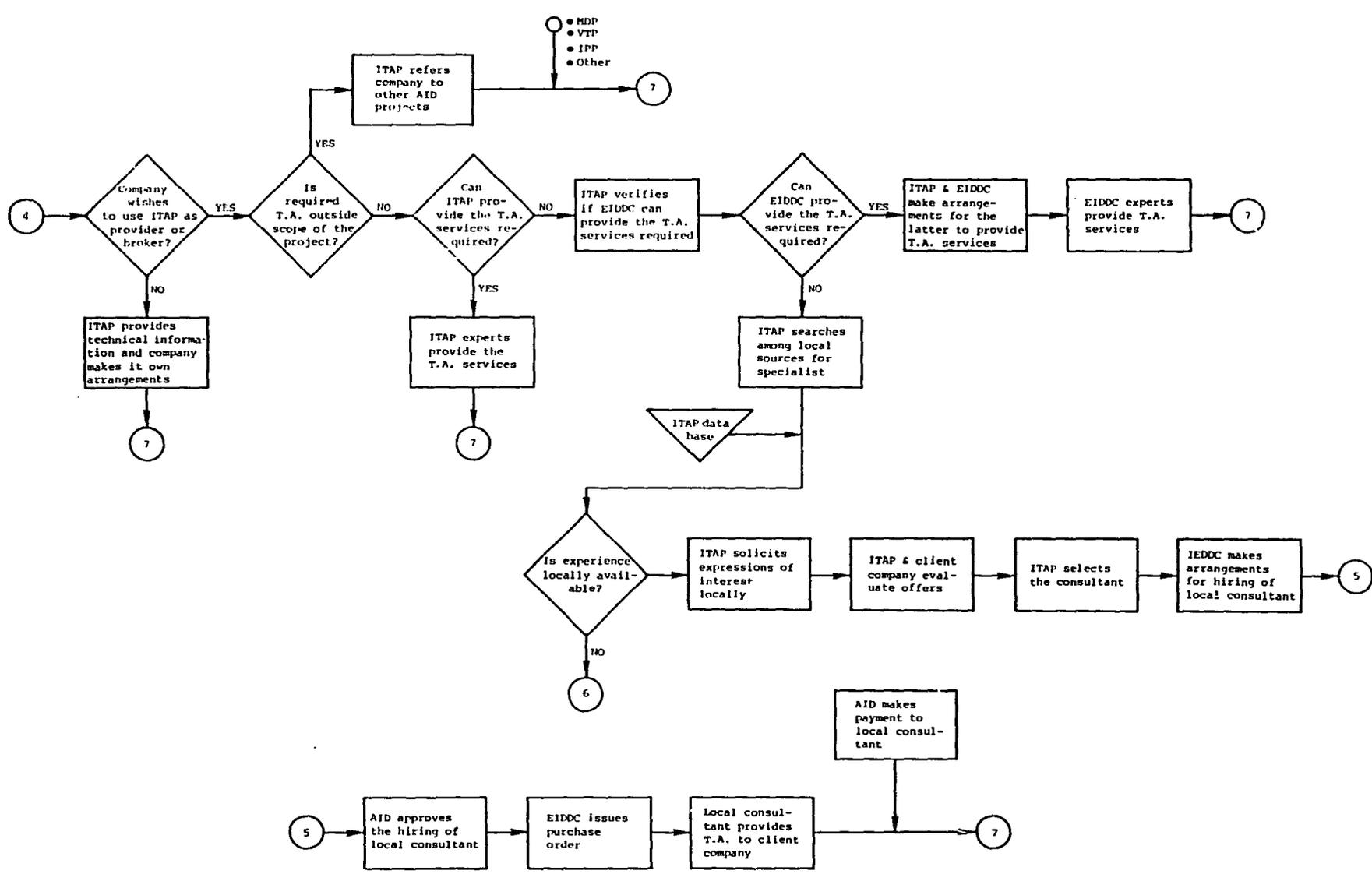
policy dictates that services are to remain subsidized for the sake of national productivity then it will be necessary to consider alternative revenue generating mechanisms, which might include:

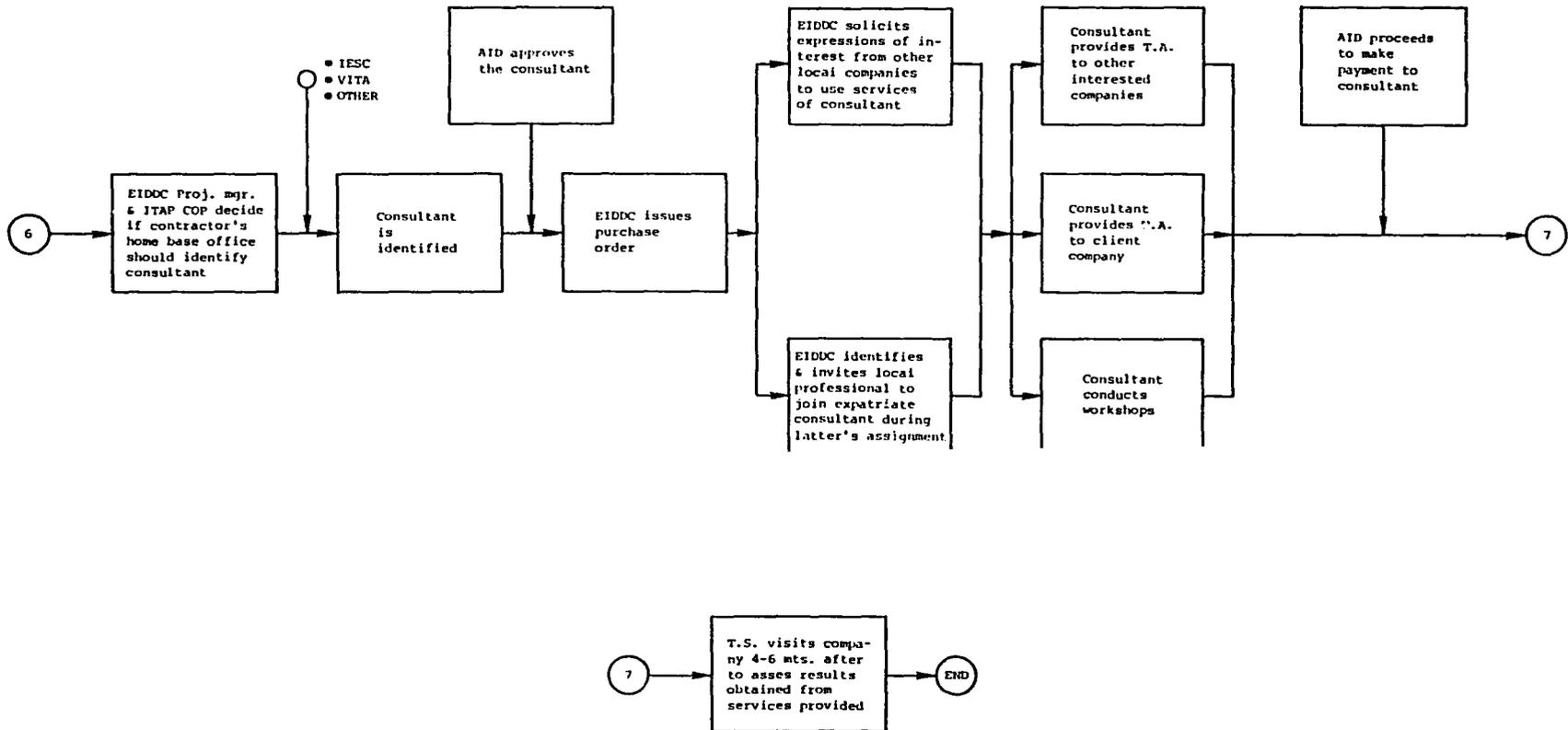
- multi-client sponsorship;
- subscriptions;
- alternative single institutions.

ITAP Flowchart of Activities (According to Project Paper)









Appendix B

<u>Activity</u>	<u>Yearly Budget 1984</u>	<u>Total Project To Date</u>	<u>Total Budget To Date</u>	<u>Total Budget To 1987</u>
DIAGNOSTICS				
Companies contacted	145	234	185	500
Diagnostics conducted	110	180	140	375
Proposals submitted	44	61	63	150
New contracts signed	16	20	23	50
SHORT TERM CONSULTANTS				
U. S. (MM)	12	20.5	18	70
Egypt (MM)	24	14.75	36	140
EIDDC (MM)	50	65.25	82	400
INFORMATION CENTER				
Library books	375	1130	975	2080
Library periodicals	54	185	164	170
Library audio visual	25	74	50	140
Information requests	1000	1024	1250	4700
Industry clipping file	100	418	300	650
Industry registry	600	779	1100	3400
TRAINING				
Technical specialists (18)	6	6	10.0	18
Resource " (6)	2	2	3.0	6
Eng. managers (25)	8	10	12.0	25
Tech. seminars (EIDDC)	6	5	8.0	20
PROMOTION				
Trade shows	1	2	2.0	4
Tech. symposiums (outside EIDDC)	3	2	5.0	14
Productivity conferences	1	0	1.0	2
Industry U. S. tours (12)	3	3	5.0	12
Management review meetings				
	2	3	3.0	8

Appendix C

ITAP: Distribution of Man-hours by Major Work Function -
for All Professional Staff*
(January 1984 - December 1984)

<u>Work Function</u>	<u>Man-hours</u>	<u>% of Total</u>
DTS	12,200.5	32.2
CONS	5,354.5	14.1
I.R.	937.5	2.5
LIBR.	2,659.5	7.0
COMP	1,878.0	4.9
PROM	2,296.5	6.0
TRAIN	6,355.5	16.8
MGMT	4,311.0	11.4
EVAL	841.0	2.2
ADMIN	<u>1,083.0</u>	<u>2.9</u>
Total	37,917.0	100.0%

* Excludes holiday, vacation and sick time.

ITAP: Distribution of Man-hours by Major Work Function
for Engineering Staff*
(January 1984 - December 1984)

<u>Work Function</u>	<u>Manhours</u>	<u>% of Total</u>
DTS	12,192.5	39.3
CONS	5,343.5	17.2
I.R.	10.5	0.0
LIBR.	575.5	1.9
COMP	149.0	0.5
PROM	2,202.5	7.1
TRAIN	4,710.0	15.2
MGMT	3,934.0	12.7
EVAL	829.5	2.7
ADMIN	<u>1,058.0</u>	<u>3.4</u>
Total	31,005.0	100%

* Excludes holiday, vacation and sick time.

Appendix D

ITAP: Distribution of American* Staff Man-hours
by Major Work Function**

<u>Work Function</u>	<u>Man-hours</u>	<u>% of Total</u>
DTS	2,052.5	24.9
CONS	1,001.5	12.2
IR	245.5	3.0
LIBR	756.5	9.2
COMP	246.5	3.0
PROM	739.0	9.0
TRAIN	399.5	4.9
MGMT	2,336.0	28.4
EVAL	141.0	1.6
ADMIN	<u>312.5</u>	<u>3.8</u>
Total	8,230.5	100.0%