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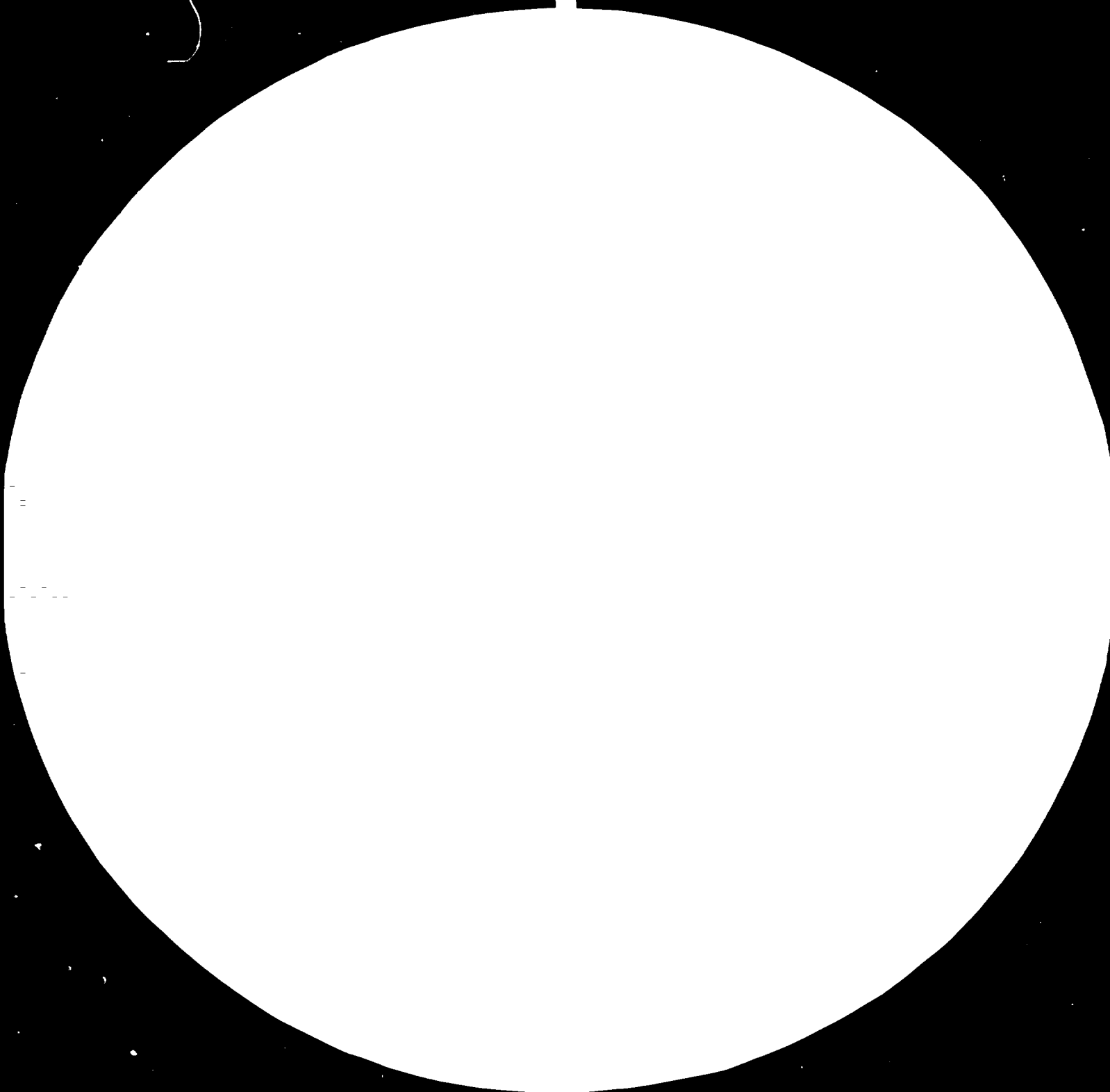
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by the United Nations Industrial Development Organization,  
acting as executing agency for the United Nations Development Programme

Based on the work of P. O'Brien  
UNIDO Consultant on Transfer of Technology

10 April - 24 May 1981

United Nations Industrial Development Organization  
Vienna

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This report has not been cleared with the United Nations Industrial Development Organization which does not, therefore, necessarily share the views presented.

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## SUMMARY

### Progress of the Project

1. The project has been characterized by a very low level of implementation, whether measured in terms of money expenditures or actual work achieved.
2. The principal obstacle to the work is the latent conflict between the overall objectives of economic policy in Egypt at present and the objectives sought through the establishment of a national registry for technology transfer.
3. The thrust of economic policy has significantly weakened the position of public enterprises in the industrial economy, particularly with regard to their cash-flow situation, and has likewise weakened the position of GOFI where the project is located.
4. Since the earlier consultant input, a group for the transfer and development of technology (TDT) has been formed in GOFI. That group has set its main task as being that of a promotional body concentrating on the technical evaluation of proposed technology imports. The TDT group has therefore adopted a perspective significantly different from that usually prevailing in technology registries and in particular has given relatively less importance to issues of economic evaluation.
5. The interests in the technology field of other Egyptian institutions, especially ASRT and GAFI, have contributed to some interest in the elaboration of a possible legal instrument in the technology field. TDT, as representative of GOFI, is collaborating with other institutions in this work.

### Economic Evaluation of Technology Transfer

6. The original terms of reference for the present work focused on this aspect. In the light of the circumstances described above, the work sought to integrate some elements of economic evaluation with the technical emphasis mentioned.
7. The principal requirement for effective economic assessment of contractual arrangements is the disaggregation of the various components, such that each can be examined separately. To undertake that task, TDT must develop the appropriate information - seeking processes, learn to formulate the right kind of questions about proposed technology imports, and agree on the criteria which should be applied in assessment; the main text of this report examines these issues.

8. The confidence of public enterprises in the work of TDT is a sine qua non for its success. It is therefore imperative that a process of dialogue with the enterprises be stimulated.

Recommendations

9. Available evidence suggests that successful implementation of the present programme is unlikely. In a medium to long term perspective, however, there seems little doubt that the needs of the economy will urge a rapid growth in the number of persons familiar with procedures for handling technological decision-making. It is therefore proposed that the present UNDP project be transformed into a new project aimed at the development of technological awareness on a broad scale.
10. The new programme would seek to train, over a period of two to three years, a significant number of persons who would ensure that similar approaches towards technology transfer were employed in different institutions. The core staff for a future National Technology Office could be recruited from this group of trained persons.
11. The methodology of the programme would be that of the technology workshops already functioning quite successfully in other countries and through the support of various bilateral and multilateral agencies. The workshops, which could be two or three per year with each lasting some six to eight weeks and attended by about 25 persons, would focus on the practical application in Egypt of the technical, legal and economic ideas in this field which have been elaborated and tested in recent years. The emphasis would be on case study analysis oriented towards problems encountered in Egypt.
12. The new programme should be operated through a small co-ordinating group in Egypt supported by a corresponding group within UNIDO/UNDP. This mode of operation would shift away from the focus on a single governmental institution which has hitherto provided the reference frame.
13. The financial outlays for this programme would be unlikely to differ appreciably from those already budgeted for in the present programme.



## CHAPTER I: NATURE OF THE MISSION

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1. The UNIDO programme for the "Establishment of a National Office for Technology Transfer" sent a mission to Egypt in 1980 and its report (DP/ID/Ser. A/245, 15 May 1980) suggested various alternatives regarding the establishment of a national office. That mission represented the second step in the programme, since in late 1979 three GOFI staff members (one each from technical, economic and legal backgrounds) had been sent on study tours.

2. The present mission took place from 10 April - 24 May 1981 and it was sent with the following terms of reference:

- "(i) to examine the possible function of a national centre for technology transfer and to make particular reference to the procedures and processes for the review and evaluation of technology agreements;
- (ii) to consider ways of developing the necessary support and expertise for a national centre for technology transfer to undertake its functions;
- (iii) to define, as far as possible, the information required for carrying out the function and to examine ways of obtaining and analysing such information;
- (iv) to provide advice as necessary on the possible formulation of a technology policy designed to encourage the development of Egyptian industry."

3. It rapidly became obvious to all concerned that the real function of the mission was to keep open a dialogue on a project which was not operating in anything like a satisfactory way. On a long view, time delays had afflicted the activity since its inception. The original short term mission of UNIDO which recommended a co-ordinated system for the registration, evaluation and approval of foreign technology proposals in Egypt took place in 1975; the report mentioned in paragraph 1 above was not prepared until five years after that original mission; and the present visit did not take place until one year after. In the period 1975 - 1981, the whole thrust of economic policy in Egypt has switched dramatically and this report argues that the context created by that

policy renders the implementation, if not the logic, of the UNIDO programme open to considerable doubt. Seen as a project, it shows a very low level of input and output. Though the participating organizations (UNIDO Headquarters, UNDP Cairo, and GOFI) have had misunderstandings which have contributed to low implementation, the central difficulties stem from the fact that current economic policy militates against GOFI as an organization and against screening of technology transfer as a high priority activity. The uphill political and organizational struggle is at the core of present difficulties.

4. In these circumstances, much of the mission was devoted to assessing what might be achieved through the Tripartite Review Meeting (held in Cairo on 23 May 1981) and subsequently. For this reason, the consultant's stay in Egypt, originally scheduled to end on 19 May with return to Vienna on 20 May, was prolonged until 24 May 1981. As part of an effort to increase awareness of problems, a high level seminar was held in Cairo on 20 May (see appendix 1) at which the need for a programme aimed at developing the bases for a national technological capability was emphasised. A sketch of such a programme is presented as appendix 2 to this report.

5. Action within GOFI

Since the 1980 UNIDO mission and subsequent to the drafting of the above terms of reference, GOFI has formed a Transfer of Technology Department (TTD). So far the TTD is operating on a very low profile. No strong statement either of the group's establishment or functions has been made (e.g. no ministerial Order has been issued on the subject); TTD does not have a separate budget; the staff are partly operating on a consultant rather than full time basis with their offices located away from the main GOFI buildings; and TTD will be compelled to create its own space of action due to the absence of clear authority.

6. The existence of TTD represents the choice of one of the alternatives presented in the earlier UNIDO report (in effect, item e, page 98, of that report) though the current conception of TTD does involve some significant variations on the earlier UNIDO proposals.

7. TTD seems to be the response of a small number of experienced staff within GOFI to the question: what constructive steps to improve the preparation, evaluation and negotiation of industrial projects can now be

taken by GOFI within its area of influence? Though as yet TTD has only a limited formal status even within GOFI, and less than 1% of GOFI's technical staff are associated with it, there is a belief that the operation of the group will serve to mobilize similar groups elsewhere. It is claimed that within GOFI itself the group could be replicated quite easily and that in other ministries, parallel sets of experienced and motivated personnel would start up if GOFI could give the lead. If such is indeed the case then there must be tactical reasons for not putting the formation of the group more into the forefront. In any case the hope of the TTD staff is evidently that its actions can serve as the initiator of moves towards a uniform approach in the industrial sector at a later stage.

8. In the prevailing atmosphere in Egypt, the TTD has rightly chosen to put the accent on itself as a promotional rather than regulatory group. Since it has no formal legal support, the co-operation it can expect from the 116 public enterprises within GOFI's domain, as well as requests for assistance which may come from elsewhere, is seen to depend on TTD being able to prove its worth by helping firms to make better technological choices. The emphasis of the group will be firmly towards technical evaluation of proposed industrial investments (whether or not they entail the formation of new companies). a bias reflected in that five of the seven staff now involved are technical persons with one economist and one legal adviser also belonging to the group.

9. This emphasis suggests that TTD will be concerned with the technical structure of industrial investments projects in its area just as GAFI is concerned with the financial structure of joint venture proposals. It is, nevertheless, extremely important that TTD should not neglect the total structure of project arrangements and thus should give considerable weight to their legal and economic structures. As things stand, the impression gained is that TTD work would involve heavy technical inputs in the early stages of project preparation, in order to define the appropriateness of the techniques which might be used, to check on the technical reliability of various sources of supply, to ascertain what kinds of input and output mixes could be expected, and so on, and then to bring in the economic and legal advice at the stages of contractual negotiation and definition. In short, there is to be a sequence for the use of distinct professional capabilities.

10. The tendency to downplay TTD involvement in the full dimensions of contractual arrangements and project organization is certainly due to its fear that enterprises simply will not co-operate in areas which they feel are fully within their competence. Since TTD staff seem to hold the view that legal and economic principles of analysis are the same across all sectors of industry while it is technical knowledge which varies substantially from sector to sector, they feel that it is only through being more up-to-date and comprehensive on the technical side that they can indeed prove their worth. Yet experience with technology transfer in other countries has shown that the arrangements concluded tend to have distinct patterns according to the industrial sector involved; indeed, even the character of the supplier enterprises tends to change in systematic ways according to the sector. Unless the TTD group is justified in its implicit assumption that the public enterprises are well aware of these patterns, then it is a mistake to give such little weight to the legal and economic perspectives.

11. In describing its proposed activities in a letter to the UNDP Resident Representative, TTD has nevertheless offered a scope of activity which extends beyond the project focus. The letter says that the main tasks for TTD will be:

- "a. To register the signed technology transfer agreements.
- b. To review and evaluate technology agreements (industrial technology) through legal, economical and technical screening disciplines.
- c. To follow up technology transfer agreements and to propose solutions for the raised problems.
- d. To administer the transfer of technology to the extent permitted by the policy, with assistance given to the formulators of the technology policy as required.
- e. To give advice and technical information to the Egyptian interested parties during the negotiation and contracting stages.
- f. To be as a link between the industrial companies and the technical research institutes and universities to develop local technology and facilitate the acquisition of the imported technology.
- g. To work as data bank for the technology sources, types and the conditions for its transfer."

The letter further points out that a circular has been sent to all the public sector industrial companies informing them that a new department has been created with the above-mentioned tasks.

12. The list of functions given above indicates that TTD hopes to combine in depth project analysis with the operations of a registry (remembering that such a registry will only be partial because several sectors are no longer under the control of the Ministry of Industry and Mineral Wealth where GOFI is situated). The steps taken so far include the circular letter, a broad contractual survey for 1975-79, the examination of some cases though without the systematic preparation of case histories, and the initial drafting of a questionnaire which would be sent to participating enterprises. This registration process is obviously intended to build up momentum as TTD increases contacts with the firms and gains their confidence. Whether that kind of registration system could be enhanced by its linkage with international networks remains an open question. Under UNIDO's TIES system, it is already GAFI which provides Egyptian data and is thus in a position to receive information from the general pool.

13. A few summary observations may be useful. First, TTD is conceived as being essentially a free of charge industrial consulting group aimed primarily at improving the technical choices and operating efficiency of the public sector firms under GOFI, and secondarily at assisting joint venture firms and enterprises elsewhere which may ask for its appraisals. Like any consulting group, it would have appraisal influence without approval powers. Second, TTD hopes to extend its influence and activities yet the extent to which it can depends not only on its own efficiency but also on the transferability of the know-how which it develops. The public enterprises within GOFI do not necessarily represent a good sample from the technology angle since many existing arrangements do not share the characteristics of those found in the engineering and metallurgical sectors while probable future arrangements may be oriented much more towards the quite different fields of petrochemicals and mineral resources (where in any case the Ministry of Industry is under pressure from those of Housing and of Petroleum, as well as from the ASRT, to maintain its authority). Third, there is as yet no clear strategy which the TTD group would expect to employ in its approach to contracts. Given the emphasis on technical questions, what should be sought is the disaggregation of import arrangements in order to build up domestic capabilities ranging from repair and maintenance of equipment through to design and production of new kinds of equipment. Even if the TTD group does, as is hoped, opt for disaggregation as its methodology, the chances of implementing that are not great due to the chronic absence of incentives for firms to take

technological risks within Egypt at the present time. In this respect, TTD efforts are inevitably subordinated to overall economic policy; as Egypt is now in a phase where that policy creates disincentives for the pursuit of technological self-reliance, so the success of the group's work is circumscribed by prevailing conditions.

CHAPTER II: ECONOMIC STRATEGY, INDUSTRIAL  
CONTROL AND TECHNOLOGY POLICY

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14. The Current Framework for Transfer of Technology in Egypt

The Open Door Policy heralded by Law 43 of 1974 emphasizes the need for additional production capacity in Egypt and seeks the use of more modern technologies (management systems as well as equipment) to realize that production. Though it may be assumed that greater added value as well as added capacity is sought, no specific policies to achieve this have been enunciated and implemented: still less has there been an emphasis on added capability. In short, the Open Door Policy aims at a transformation of the structure of productive capacity without much concern for productive capability.

15. The promotion of foreign investment has been reinforced by a decentralization of administrative powers and in particular through the creation of the General Authority for Investment and Free Zones (GAFI). That Authority is currently the only body which has centralised approval power for foreign investment projects. At the same time the stress on modernization of industrial capacity has been carried through by a privatisation of markets such that there are now four main sectors of industry in Egypt, i.e. public sector enterprises, joint ventures (with both public and private Egyptian capital), large scale private industry, and small scale private industry.

16. Since its formation, GAFI has approved (up to 31 December 1980) a grand total of 1,287 projects of which 956 have been in the inland area. Of the latter number, one-quarter has been in the two sectors of tourism and investment and finance; while if contracting, chemicals, food and beverages, and banking are added, then those six sectors alone account for about 57% of the total number of inland projects. Only 5% of the projects are in engineering and a mere 2.5% in metallurgical production. Given that several if not most of the engineering projects are of the assembly type, it is clear that the role of the "industrializing industries" in the foreign investment process is minimal. On a value basis, the skewed nature of the sectoral distribution is still more pronounced; about 35% of all foreign capital has gone into investment and finance, and tourism, while if banking and services are also added, then those four sectors alone account for more than 55% of the total foreign capital invested.

17. These recent changes imply a loss of the relative importance of GOFI in the institutional context and also, but to a lesser extent, in the real area of industrial production. One-hundred and sixteen public sector enterprises remain under the direct control of GOFI and it was estimated that in 1978 those enterprises accounted for about half of the value of production of the national industrial sector. The earlier UNIDO report had noted that in terms of contractual operations "In calendar year 1979, it is estimated by GOFI that it 'reviewed' 96 agreements in the process of approving about 800 projects. Of these, 87 were for the sole purchase of machinery, eight for the combined purchase of machinery and technology, and one alone involved a straight-forward licensing agreement for foreign technology." (p. 78). The TTD staff were able to elicit information from 68 of the 116 public enterprises regarding their contracts for technology in the period 1975-79 and 20 of the firms did conclude contracts in that period, some of them having as many as 11 separate arrangements.

18. The net impact of Law 43 has been to set in motion a series of changes of direct relevance both to the use of modern technology in Egypt's industrial sector and to the institutional arrangements affecting that technology. First, there has been a sharp increase in the number of arrangements and in particular of their packaging with foreign investment. Due to the emphasis on augmenting production capacity, much of the technology has been embodied in new machinery and there have been few separate contractual agreements to cover technology per se. Second, these arrangements have been subject to rapid administrative processing, especially through GAFI (a point emphasized by GAFI advertisements in the foreign press which state that it "is the competent body responsible for granting the privileges specified in the investment law to newly established projects. GAFI will look into your queries or proposals and will answer you immediately with no delay"). The focus of such limited evaluation as is undertaken by GAFI itself is on the proposed financial structure of the projects and on the expected rate of return. Although the proposals are sent to GOFI for technical appraisal when they are in the industrial sector, such appraisals are frequently overruled by the GAFI decision. Third, many public sector firms are being forced towards joint ventures as they seek to obtain cash and technology to survive in wider markets. Their difficulties are compounded by their history and the present policies. Historically, the public sector as a whole has employed about 60% of the industrial work force, has provided three-quarters of the



country's industrial output and about 90% of industrial investment. The operation of public sector firms, however, has always been strongly controlled with regard to the pricing of inputs and outputs, such that their possibilities to generate internal operating surpluses have been small (a report by the Central Auditing Agency showed that in 1979 public sector profits were only around 6%). Now that the government is cutting off public funds as a source of financing, the firms are being driven towards either the domestic capital market, where average interest rates are at least double the average profit rates for the sector, or the joint venture arrangements. Yet from the foreign investors' point of view, the most attractive opportunities relate to public sector firms which have been performing well in their own markets. The danger is, therefore, that the inflows of investment and technology will run to those areas where the Egyptian public firms have been successful. One example of a prospective joint venture of this type was that between Thomson-Brandt of France and the profitable Ideal Domestic Electrical Appliance Company, which was only prevented through union and parliamentary resistance. Fourth, the control space of GOFI has been reduced. The rule which permits the public firms themselves to evaluate proposals of less than L.E. 0.75 mn, gives them much more autonomy from GOFI; the number of such firms under GOFI's control is falling relatively because of the fragmentation of administration, which means that major industries in the public realm now come under other ministries e.g. pharmaceuticals under the Ministry of Health, agricultural equipment under the Ministry of Agriculture, and so on; these other ministries have their own approval powers and thus GOFI is excluded from several key areas for imported technology; and finally the fresh circumstances of political economy emanating from the post-1974 policies have tended to give GOFI a much less prominent place. By its constitutional functions and its actual behaviour, GOFI has always been in part a planning organization, in part a project decision maker, and in part an industrial consultant. Those skills, or at least the way they have been developed in GOFI, are not so widely appreciated under current policies.

19. The general approach towards foreign investment and technology has now been in force for about seven years and was reinforced by the further pressures on the public sector coming from policy measures in 1980. However, the policy itself has generated various difficulties. First, though many fewer project proposals are rejected than in the past, the rate of implementation

of approved projects both in GOFI and GAFI is much lower than used to be the case for projects approved by the former. Second, there seems to be some disillusion that not enough useful technology is in fact entering the country, partly because much of the investment is related to tourism and infrastructure on the one hand and simpler consumer goods manufacture on the other, and partly because the foreign investors operate with very quick payback periods such that they are not so interested in genuine and sustained transfers of capabilities. Third, and related, is that the re-equipment of firms and sectors offers no clear prospects of sustainability in the sense that Egyptians themselves develop the individual and collective skills for reproducing and improving the technologies involved. Fourth, the absence of uniform procedures at project level, a coherent strategy at programme level, and a clear quantitative and qualitative picture at economy level mean that it becomes steadily more difficult to retain some grasp of what will be the results of the present process. Even foreign investors seem to be uneasy since for them the question of market control is crucial and on this it seems to be felt that there are inadequate guarantees by the government. It should never be forgotten that a foreign investor, once he is through the open door, would like to close it so that others cannot dilute his market control.

20. The mood of preoccupation which underlies the surface buoyancy of the current approach has been reflected in the proliferation of visits from abroad and the formation of groups within Egypt concerned with issues of technology, industrialization, and of science as it relates to them. USAID and the EEC have been, and continue to be, actively involved in the creation of information systems pertaining to technological and scientific developments abroad, while various international organizations (of which the present mission is a part) continue to work on the more specific issues of the actual influence of foreign technology on the industrial system. These efforts are disparate and lack serious integration both with regard to the internal coherence of actions within Egypt and the external co-ordination of the assistance.

21. The existence of severe institutional fragmentation implies more than the absence of synergetic efforts by the constituent elements. It means that in practice the efforts within GOFI are taking place at a time when the various organizations are jostling for positions and thus conflicting with each other. The TTD within GOFI has to carve out a position for itself, to defend that against others, and then, if it believes in a national policy, to try and extend its influence into other relevant institutions. It is

understandable that in this national context the approach of the TTD has been so low profile. The feeling that TTD is operating in an enclave is reinforced by changes which have taken place outside Egypt with regard to technology policy and appropriate ways of handling it.

22. The idea of creating a National Registry or National Centre for Technology Transfer is a product of the 1970's. Certain conditions prevailed at that time and it is worth recalling them in order to illustrate how different the present Egyptian context is. First, policy packages were frequently introduced covering new approaches to foreign investment, technology and industrial property (for example, Argentina, India and Mexico were tackling all three, Brazil and Spain were handling two of them). The policy packages had as one of their objectives the disaggregation of technology; that disaggregation was designed to permit both a fairer appreciation of the financial consequences of projects and agreements tying together investment, technology and industrial property, and to serve as a springboard for the improvement of domestic technological capabilities under foreign stimulus. Second, the national policy packages were accompanied by international negotiations covering codes of conduct towards foreign investment, technology transfer and transnational corporations, the reduction of restrictive business practices in international transactions, and the refurbishing of the Paris Convention on Industrial Property. These international negotiations have now lost most of their force and any agreements stemming from them are likely to be very modest in scope and content. Third, in some of the countries which implementing policies towards technology transfer (Brazil and the Republic of Korea being examples), there were reasonably strong internal structures in which the bonds among science, technology and industry were quite tight. Hence the prospects for converting a selective policy towards technology import into the generation of domestic demand for technological services were good. This condition is not fulfilled in Egypt at present. Fourth, the 1970's were also marked by some optimism that the international division of labour would alter in ways favourable to developing countries. The practical signs were to be found in the policies of OPEC and the rise of the Newly Industrialized Countries (NICs), while the NIEO and the Charter of Economic Rights and Duties of States were at least documentary evidence that further advances might be made. The abrupt shift in the economic climate in the later half of the past decade has greatly weakened the optimism. More specifically, it has weakened the bargaining power of many developing countries in that they are, even more than before, competing with each other to attract foreign investment and technology.

Thus while the open door policy may contribute to further fragmentation of the productive and institutional structures of Egyptian industry, it cannot provide any guarantees that adequate inflows of foreign assets will be forthcoming.

23. The four positive conditions just described, two referring to national dimensions of technology commercialization and two relating to international conditions, do not apply in Egypt. The circumstances in which the TTD group will have to operate are thus quite unfavourable as compared to what has been attempted elsewhere. There is a lack of systemic support within the country (and indeed some opposition) and a lack of encouragement from ongoing international initiatives.

24. The splintering process in administration has meant that no overall policy towards technology exists nor is there any unity or harmonization at the project level. Both project approval and project appraisal are carried out in diverse locations and even where GOFI is called upon to appraise projects under the wing of other ministries, the influence of its appraisals on final decisions is limited. As noted earlier, there is not a one-to-one correspondence between project approvals and their implementation. Furthermore the interrelations among various projects are not well-defined with respect to input/output linkages, time sequence of operations, or size. The TTD emphasis will be at the project level and aimed at better decisions regarding choice of techniques. In particular, attention would be given to the separation of strictly technological aspects of a project (e.g. patent licensing, management services, training, etc) from the financial and equipment supply dimensions. Moreover, the hope would be that, taken as a group, projects would fit better together and that their spread effects, especially with regard to industrial skills, would be enhanced. Consequently the work of TTD would have to go into detailed evaluation of projects and thus would differ markedly from the check list approach used in the transfer of technology registries in other countries.

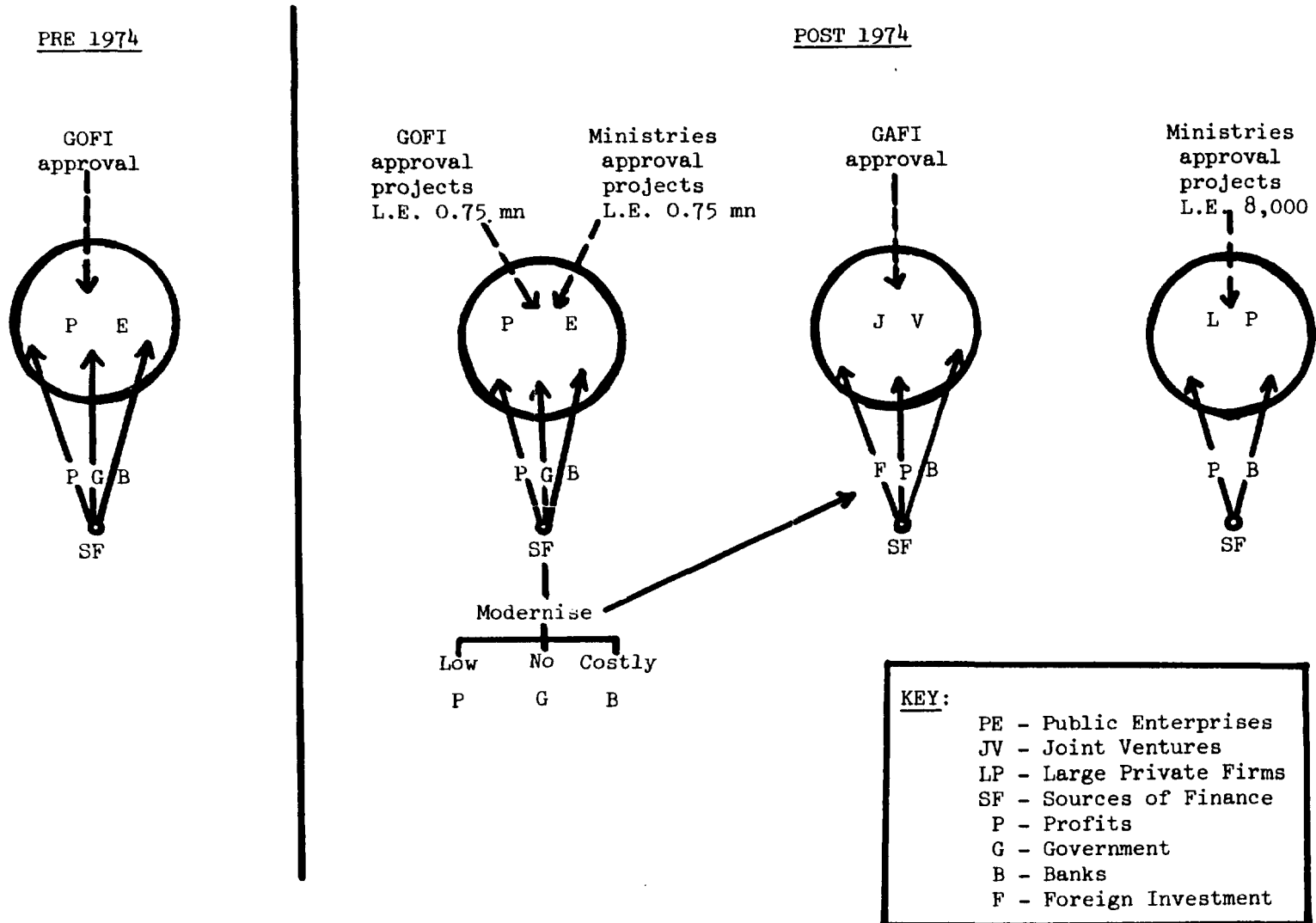
25. It follows that the term 'registry' would not be an accurate delineation of what TTD hopes to accomplish. It also follows that while the group may be low profile institutionally, it is aiming at a high profile professionally. The impression gained so far is that TTD staff feel that successful technical work is a precondition for putting the institution as such into the limelight. The preceding remarks also make clear the limited concern which TTD has at the moment for more general questions of technology policy.

26. Structural Change in the Economy

Since 1974, GAFI has been administering Law 43 which integrates the Egyptian economy ever more closely with the world market. Subsequently there has been increasing pressure, particularly severe during the past 12 months, towards privatization of the industrial sector through the transformation of public enterprises into joint ventures. The pattern of change is sketched in diagram 1 which shows how public firms have found it progressively more difficult to obtain investment funds and to simultaneously remain without foreign equity holdings. Though government policy places strong emphasis on the need for public enterprises to modernise, the chronic lack of funds at their disposal due to the squeeze on their operating surpluses, the sharp rise in local borrowing costs, and the removal of access to public funds, mean that the condition for their modernization is likely to be their privatization. Since many public firms have a strong market position in terms of the share of domestic sales accounted for by them, the terms of barter are clearcut. Egypt hands over market control, the foreign firm provides cash, fresh equipment and technology.

27. The switch of corporate status from that of a public enterprise to a (public) joint venture is also a shift of administrative status; all joint ventures come under GAFI as far as project approval is concerned. While GOFI retains appraisal influence, the financial pressures conditioning modernization imply the loss of approval power. An impression of the dimensions of loss can be judged from the fact that the total capital investment of just nine joint venture projects currently in progress and/or starting for the period 1980-81 - 1984-85 amounts to about L.E. 1,000 million, or approximately one-eighth of the total investment projected for enterprises affiliated to the Ministry of Industry and Mineral Wealth during the planned period. Among the projects involved are several extremely important technological investments e.g. the production of newsprint from bagasse, the production of sponge iron, fabrication of special steel, manufacture of capital equipment in industries such as textiles and cement. More generally, the investment projects for the affiliated companies (which, to repeat, include public sector firms, joint ventures and private enterprises) show that two-thirds of the grand total of L.E. 8 billion is expected to come from the foreign component.

Diagram 1: The Open Door Policy and the Transformation of the Industrial Sector



28. It is necessary to stress that GOFI remains closely involved with the joint ventures. The point is that its powers are being ever more segmented. GOFI retains approval as well as appraisal power over those projects of 116 public enterprises which do exceed L.E. 0.75 million: for all other affiliated firms the GOFI role is one of appraisal and that, in turn, is being weakened since GOFI rarely receives the total picture of a project. Instead it is asked to appraise bits and pieces such that the situation could easily arise where GOFI does not give negative appraisals to individual items yet would give a negative response if it were evaluating the project in its entirety.

29. When an enterprise moves from the purely public realm into the joint venture arena, it is not only the ownership of equity which alters. Management practices may well change and with them the nature of the firm's linkages with other companies. In particular, it is possible that the joint venture makes very different use, both in numbers and tasks, of domestic supplier and buyer industries. Unfortunately the present author has no detailed information on shifts in the pattern of linkage; one study which should be undertaken is precisely to determine the differences in the character of internal and external connections of public enterprises and joint ventures. Similarly, the shift in ownership structure may also herald a shift in product mix such that the new firm is no longer supplying the same groups of domestic consumers as did the old one. Given that joint ventures in the area of consumer products are likely to be dictated by prospects for the foreign partner to sell towards upper income brackets, the chances are that changes in the product mix will be regressive.

30. The sectoral bias of foreign investment towards service sectors, tourism and consumer goods, coupled with the quick payback periods sought by the foreign partners, have led to an internal brain drain which has taken skilled technical staff away from activities of technological development and into commercial work as such. There is, after all, no reason why the private joint venture sector should be interested in the development of technical capabilities within Egypt. The firms are in the business of making profits and only incidentally will that coincide with the growth of domestic skills. The fact that such firms have their own sources of foreign exchange similarly makes it easier for them to acquire foreign items when necessary. For a public enterprise it must make application to the Central Bank to receive the allocations it desires. This is by no means simple as,

despite roughly \$1 billion in reserves, there is an acute shortage of foreign exchange in Egypt as can be judged from the fact that the current differential of the black market price of dollars over the official rate is around 25% and rising.

31. The economic changes are accompanied by shifts in the relative strength of the institutions involved in technology policy actions and discussions. Those shifts are examined in the next section.

32. Institutional Change

It appears that the initiative to form the Consultative Committee for the Draft Code on Technology Regulation was taken by GAFI. This alone is indicative of the shift in power which has taken place among the major institutions connected with industry and technology. Both GOFI (formed in 1958) and ASRT (1971) are, within the new environment of the open door policy, institutions in search of their true role. It is the youngest institution GAFI (1974) which currently has strong backing at the highest level. Whether and for how long this situation may persist is open to discussion: but the reasons underlying the weakness of prominent institutions need to be kept in mind.

33. GOFI. Most of GOFI's problems can be deduced from earlier remarks. The clientele over which it has approval power is both smaller than it was and weaker in financial strength and competitive capacity. The appraisal activities which it undertakes are receiving much less attention than they should, partly because the appraisals can only respond to the proforma enquiries of other institutions and partly because those institutions themselves are not really concerned about the same issues as is GOFI. More generally the thrust of political economy is now to downgrade both the function of industrial planning and the role of the public sector - because of its identification with both things, GOFI is not as well regarded as it used to be. This has direct implications for its relations with firms. In the past GOFI enjoyed most of those links as of right; nowadays it has to convince the firms that it can perform a useful service for them.

34. TTD. The group is within GOFI and thus is affected by the conditions just described. In addition, however, there are various indications that TTD and the rest of GOFI are not quite on the same wavelength. There is some evidence that TTD receives only half-hearted support for the growth of its



staff and tasks, that some initiatives regarding technology have been taken by GOFI without even informing TTD, and it still remains to be seen whether GOFI will stand by TTD recommendations in those projects which do come under GOFI's own approval authority, let alone outside appraisals. These points, added to those above, need to be borne in mind when assessing the likely demand for TTD services and thus its opportunity to play an active role. Both within GOFI and vis-a-vis the firms, TTD will have to wage an uphill fight to create requests for its services.

35. ASRT. Thus far it has apparently not been able to form a strong internal group on technology, which may be related to the fact that as a body which covers all sectors and all activities in the science and technology area, it has been unable to focus strongly on specialised tasks. Thus it has changed its name on various occasions during its 10 years of existence, a detail itself suggestive of the continued search for an appropriate focus. It has developed important relations with external bodies, including multilateral and bilateral government groups and international organizations, but so far these have not been turned into spearheads of change. ASRT does have direct links with industry through a contract system where industrial users have a strong say in the content of projects yet it has not been in a position to follow the route of obtaining the vast bulk of its funds through its services to industry (as has been the case, for example, of the Korean Institute for Science and Technology). In some ways ASRT is the institution which comes closest to new technological developments, genetic engineering and so on. However (and recognizing that these are still early days to judge), there is as yet little evidence that ASRT will be in a position to successfully distribute information to Egyptian enterprises on these developments or to make the bridge between information and productive use.

36. Patent Office. Formed in 1949 and nowadays affiliated to ASRT, it is both the oldest body of those directly involved in the Consultative Committee and the one which has, on its own admission, the least direct involvement with the productive system within Egypt. By definition it is a data bank holding more than three million patent documents of which but 14,000 relate to patents registered in Egypt. Ninety-five per cent of the patents are foreign held and domestic firms apparently make hardly any use of the Office for information purposes. The linkages of the Office are therefore almost

entirely external and the main function which the Office currently performs is to provide conditions in which foreigners will be assured that their industrial property privileges are recognized and upheld in Egypt. In this sense the Office fits with the present thrust of economic policy. Discussions have revealed that the Office would hope that a new law on technology could propose ways in which its information potential could be employed to assist domestic industry.

37. Several institutions besides the ones described here have an obvious interest in the shape and content of a legal instrument on technology. Many ministries have approval powers for projects of industrial enterprises affiliated to them, and the universities are known to have initiated, or be initiating, programmes of research with relevance to the use of technology. The remainder of this chapter will, nevertheless, focus on the organizations described above i.e. the emphasis is on GOFI (and especially TTD as part of it), GAFI and ASRT (including the Patent Office). The preceding statements are enough to suggest there is a pronounced and growing fragmentation of interested institutions in Egypt, with divisions running along the lines of economic sector, type of activity (e.g. production, development work, etc), and kind of institution. If a three-dimensional matrix of interactions could be drawn, it would reveal few and weak internal ties among the many cells but would most likely show that each cell was trying to encourage some kind of 'special channel' of communication with external organizations. A major function of the process leading towards a technology code must be to break down the mistrust in internal relations.

38. The diverse histories and objectives of the main institutional actors imply that they have distinct conceptions of what constitutes a good performance and thus of what they might expect from a law.

39. GAFI has approved (up to 31 December 1980) a grand total of 1,287 projects with the accent on swift administrative decisions, rapid inflows of funds and analysis concentrated on financial issues rather than technical evaluation or even post-approval monitoring of projects. The space of operation wherein GAFI has real power is clearly defined and thus far its activities are fairly successful if judged on its own terms. What might it want from a new law? It may wish to extend its operating space in ways additional to the natural extension it is now enjoying through the pressure

on public enterprises, or it may want to persuade other organizations to follow similar criteria to its own. Yet deliberations over a law on technology are not necessarily the most effective way for GAFI to achieve such aims. There is another possible motive viz. that GAFI itself might want to encourage discussion of the use of a wider range of criteria than it has employed hitherto. The reasons for this could be that GAFI recognizes that even if the number of projects approved keeps on rising, there will come a time (perhaps fairly soon) when the number of projects actually in operation will stabilise and the impacts of that stock will have to be examined more carefully. This optimistic interpretation would, if it were correct, imply that there is some ground for supposing that GAFI and GOFI could work towards harmonization of conditions for project appraisal.

40. ASRT has roughly 180 projects defined by end users currently in progress, it has several successes in this regard to its credit, and it has been working on the development of information systems and issues connected with technology policy. Indeed, in a January 1980 document entitled "Memorandum on Co-operation between ARE and EEC in the Establishment of an Egyptian Centre for Transfer and Development of Technology", ASRT proposed 22 functions that the Centre might perform and among them included compilation of a national registry of all transfer contracts in the public sector, co-operation with concerned bodies in the formulation of national policy guidelines and the development of arrangements for the regulation of processes and operations of horizontal transfer of technology, and formulation of a national technological strategy and subsequently a technology plan. Discussions with ASRT indicated that it is participating in the creation of a legislative instrument in the expectation that such a law would combine matters relating to the technology import process with the provision of measures for generating technological capabilities within Egypt. ASRT clearly anticipates that one outcome of the legal process would be the eventual creation of a National Centre on Technology and that the institutional base for that centre should only be decided towards the end of the discussions (though ASRT explicitly indicates that it does feel that it would be a good base). Unlike GAFI and GOFI, ASRT is not involved in investment projects and is presumably not too worried about divisions of responsibility over approval and appraisal powers. Yet this has two implications. First, to the extent that, because of ASRT's

industrial contract system, it can combine with GOFI to ensure that the unpackaging of projects leads to greater use of domestic potentials, then it is likely to be sympathetic to GOFI's approach towards appraisal. Second, if ASRT were to be the National Centre, then it is hard to see how its divorce from project decision-making would permit it to do much beyond the registry work.

41. GOFI has the longest experience of appraisal and approval of complex investment projects, is the organization which is closest to the management of these large enterprises, and whose criteria of everyday action (including the people that GOFI's staff are in contact with) relate to the long term maintenance and building of industry. At one and the same time GOFI is the organization which has most to offer and which has most at stake in the shifting responsibilities towards technology. What can GOFI try to obtain from the deliberations? It shares with the ASRT the idea that the law should be a step towards the creation of a National Policy and a National Centre, and that for the moment the crucial issue is how to obtain meaningful agreement on them. It shares or more accurately may share with GAFI the view that criteria for appraisal of projects and (hopefully) eventually for approval should be harmonised. As a step towards this, the TTD group within GOFI is hoping that the law may assist in the creation of similar departments in other ministries using similar criteria for the treatment of projects. It sees that step as indeed part of the move towards a National Centre. At a deeper level, GOFI probably expects or hopes that the law would recognize its profound responsibilities in the technological aspects of decision-making. Seen in these terms, the division of responsibilities which emerges would thus be as follows. For investment decisions, approval power would be spread among GOFI, several ministries, and GAFI according as the enterprises involved were public on the one hand or joint ventures and private firms on the other. Appraisal would be divided such that financial structure of joint ventures would be within GAFI, while technological appraisals for all kinds of enterprises would come to GOFI. ASRT would be in the business of developing links between domestic research establishments and industry and would tie in with requests coming from GOFI regarding the availability of domestic potentials. All three institutions would be building their own particular kinds of information networks but probably only ASRT might actually try to create data banks.

42. These features of the technology landscape suggest that a substantial degree of conflict among institutions exists and that even under the more co-operative scenarios (as in the preceding paragraph) the degree of division of responsibility and possible inefficiency of work might be substantial.

43. A Legalistic Approach to Technology Policy?

The basic questions to ask of a legal process, as of any other approach to policy, can be simply formulated. Who takes the initiative to set the process in motion and why? What is the law supposed to accomplish? Whose interests is the law likely to represent? When is the law supposed to take effect? What constraints are likely to impinge on the operation of the law?

44. The questions are inter-related. The purpose of a legal instrument is shaped by the groups or institutions seeking its elaboration and the timing of the process in turn reflects the aims of those groups. The legal process, in short, must be seen as a totality and it cannot be separated from the conditions in which the economy is developing. The initiative for working towards a law may come from pressures by private groups wishing to generate situations favourable to themselves, from a presidential directive, or from a process involving several public institutions with hitherto ill-defined or partially conflicting responsibilities. Since any Draft Code on Technology Regulation in Egypt would presumably involve some allocation of administrative responsibilities as well as determination of the content of the law, the institutions participating in the drafting (GOF, GAFI, ASRT, and the State Council for Legislation) have obvious interests in the outcome of the deliberations. It follows that the process itself may be at least as significant as the final result; the time spent in that process (and thus the date at which any new law might come on the statute books) is thus a function not only of the complexity of the subject but also of tactical moves made by participants in the light of their strategic aims.

45. One or more purposes could be served by a law on technology. The law might be seen as the outcome of a policy debate, in which case its main function would be to codify a fait accompli, or it might be regarded as the starting point or continuation of a fresh approach to policy, in which case the legal instrument could serve to create space in which the new lines of action could be worked out. Subject to this distinction (which is often represented by the strategies of conflicting participants i.e. some groups

might want the law to enshrine policies already in force while others may wish it to be the signal for a new departure), the law may provide for the establishment of new institutions and/or the elimination or modification of the functions of existing ones. At the same time the law will give a procedural orientation to work on technology i.e. there will be either broad guidelines of how institutions should function or detailed statements of what is to be accepted. Following on from these purposes the law will most probably describe the sanctions and rewards for compliance with the policy.

46. The groups whose interests are affected by a technology code can be divided into four, according to whether they are domestic or foreign, public or private. Perhaps the critical debate concerning economic policy in Egypt at present relates to the strength and influence which the domestic public sector should have. GOFI is, as part of the Ministry of Industry and Mineral Wealth, the institution most identified with that sector. Hence its strategy towards a technology law must reflect the continuing importance of that sector as a vehicle for introducing, incorporating and diffusing technological improvements into the productive system of the country. The position of GAFI in particular must, by reason of its terms of reference, relate more to ensuring that a technology code does not interfere with the interests of foreign private and public investors as they have been described in Law 43. The discussions now underway in the Consultative Committee regarding the technology code must therefore be seen as part of the wider debate over the relative roles and purposes of the domestic public and foreign private controlled parts of the industrial sector in Egypt.

47. As that debate continues, so the timing of a legal instrument on technology acquires greater significance. Currently other laws, of which the most significant are Law 21 and Law 43, partly circumscribe the possible domain which a technology law could have. The cumulative effect of past laws, and in particular Law 43 and subsequent measures, may have served to take the ground from under the feet of a new law. In other words, one reason why some groups could support the technology initiative would be that it acts as a smokescreen to divert attention from the other processes. If this was so then the fact that a new law will have the same formal status as the previous ones would not be too much help. In practice an implicit hierarchy of laws would have developed and indeed the very publication

of a new law might act as a limit to what could be achieved in that area. TTD may have to demonstrate, by its work on particular projects and the publication of one or two analytic studies, that the new code should allow Egypt to profit from foreign technology just as foreign technology profits from Egypt.

48. The legal approach towards a technology policy suffers from various constraints. A major one in the Egyptian context is that the dominant impacts on decision-making in the technology field stem from overall economic policy rather than from specific actions to do with industrial technology. In other words, the relative costs and benefits of seeking out and utilizing domestic capabilities rather than foreign ones have been strongly biased in favour of choosing the latter. Furthermore, due to the limits imposed by international relations, certain significant areas of industrial technology e.g. many military technologies, are excluded from the ambit of a new code. At a more technical level, there may be a tendency for government institutions to conduct their discussions about a law in some isolation from the real problems facing enterprises. TTD, as part of GOFI, has a particular responsibility and advantage in this regard since it can and should maintain a close dialogue with the public, joint venture and private firms in its area of responsibility in order to ensure that the legal drafting reflects issues of relevance to them. By the same token, TTD can do much to ensure the clarity and technical applicability of any provisions which are drafted as well as to make reasonable estimates of the administrative resources required to implement the law. These practical matters are of the greatest significance and, to repeat, TTD is probably much better placed than other institutions to bring knowledge about them to bear on the drafting of a code.

49. The points made in this section can now be summarised. First, the legal process must be seen as one among several processes which are all affecting the formation of explicit or implicit technology policy. Second, the critical factors at work in the present Egyptian environment relate to the determination of the government to pursue and extend the open door policy. This has a marked unfavourable effect on the utilization and generation of domestic technological capabilities. Third, the public sector is under siege; since it has particular responsibilities for technological development, any new code cannot be seen in isolation from changes in the situation of public

enterprises. Fourth, international interests, private and public, are involved in and affected by policy changes in Egypt. Institutions within the country have more or less close relations with subsets of institutions outside, such that the internal legal debate is partly shaped by those relations. Fifth, important areas of technology transfer are excluded from the law because of political factors. Sixth, TTD has some advantage as well as a responsibility to see that the legal discussions do not take place in isolation from the realities as perceived by firms themselves.



CHAPTER III: THE ROLE OF A TECHNOLOGY TRANSFER  
DEPARTMENT WITHIN GOFI

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50. Public Enterprises and Technological Development

The starting point for TTD's strategy should be the recognition that public enterprises must, in the Egyptian context, be the critical organization for technological development. The enterprises should be sectoral spearheads for introducing new technologies; intrasectoral spearheads for diffusing them internally; and intersectoral spearheads for making the Egyptian input-output matrix more dense and with stronger flows. From the technological viewpoint, no public enterprise is an island. Its job must be to create technology multipliers in the system for which three conditions are required. First, the enterprise must have the right to lateral or horizontal transfers of technology within Egypt. Second, the enterprise must build its own capabilities to do this and must encourage the development of similar capabilities elsewhere. Third, there must be local recipients who can benefit from the internal transfers.

51. These two basic principles i.e. that the public sector firm should be instrumental in introducing technologies and in diffusing them, have several implications. Those implications are strongest when public firms in strategic and infrastructural industries are considered, yet they are also relevant in the basic consumer goods sectors where public firms also operate in Egypt.

52. New technology can be introduced on the basis of domestic developments or foreign imports. Technology policy should give strong emphasis to the association of public enterprises with domestic research institutions in the local generation of technology. This may mean that part of the funding through ASRT for contract work should tie together public enterprises with the research institutions. In import operations, the fullest involvement of public sector firms should be sought e.g. through making them prime contractors in arrangements where foreign suppliers are involved. In this way they should become associated as much as possible with the introduction of technologies and thus bring knowledge of them into the public domain. In the same spirit emphasis should be given to the growth of public industrial consulting firms, which may of course begin as departments of particular enterprises, then become affiliates of them, and at a later stage branch out

on their own. The point is that whether these consulting operations are organizationally inside or outside of public production enterprises, consulting firms can harness the imported knowledge and diffuse it internally. Consequently future work should explicitly envisage the development of fresh public institutional forms to encourage internal diffusion of technology. The incorporation of imported technology can also be improved through organizations of public enterprises working together to purchase technology and then diffuse it. The concentrated bargaining power of several enterprises can thus be used not merely to alter financial conditions but more particularly to change the circumstances regarding internal diffusion.

53. The emphasis on public enterprises as agents of technological diffusion requires that certain features of technology arrangements be explicitly dealt with in any technology code. First, contracts must contain adequate guarantees such that recipient public enterprises really do receive the technology which is described in the agreement. Second, that technology must be put into agreements which are separate from machinery supply contracts. In this way there will be sharper delineation of the various kinds of know-how, licensing, management service and other aspects of foreign technology inputs. Third, the contract must contain full provisions for rapid training of Egyptian staff so they can master not only operation and management of the technology but also its reproduction and transmission. Fourth, given the three previous conditions to help the public enterprise fully incorporate the technology, then there must be no restrictions on internal transfer of it. Fifth, it follows that the public enterprise must have full rights to use the technology subsequent to expiry of the contract. Sixth, they must similarly have full freedom to modify or adapt the technology to Egyptian conditions and then transfer it internally. Seventh, the internal diffusion process through the agency of the public enterprise will be enhanced if the firm can obtain an exclusive license. This prevents repetitive imports of the technology within Egypt and creates the most adequate market conditions for the public firm to spread knowledge.

54. In practice, it is frequently not possible to obtain control over the core elements of a technology in the early stages of handling it. Public enterprises must therefore be encouraged through the law as well as by other means to follow systematic procedures for unpackaging technology projects. The greatest progress will probably be made on the peripheral parts of the

technology and in these every effort should be made both to utilize domestic suppliers of commodities and to master the peripheral parts of the technology so that reliance on importing them is diminished as quickly as possible. More time and more experience are required to tackle the core processes yet they should be seen as the eventual if not immediate target. Once a public enterprise can handle and diffuse the core processes, then it is truly in command of the technological domain in which it is operating.

55. To achieve these sorts of capabilities, however, needs time, resources, and is a risky business. If technological development is recognized as one of the main justifications for public enterprises in developing countries, then analysis of the performance of these firms must recognize their dual function. Public enterprises need two balance sheets; one representing the conventional statement of financial/productive performance, and the other representing capability generation performance. The most troublesome organizational, managerial and even political problems of public enterprises frequently revolve around the fact that no allowance is made for their contribution to social economy. It is argued here that such a contribution can be measured, at least in approximate terms. On the financial side, estimates of probable savings of foreign exchange for technology imports can be calculated; on the manpower side, the training imparted by public enterprises can be calculated in terms of the spread of their staff into other firms and industries; and on the 'pure' innovation side, calculations of the value of new technologies diffused through the economy (and perhaps abroad) can be made. These critical issues are raised here because it is argued that TTD should try to incorporate the strongest set of conditions for supporting public enterprises in their contributions to technological development. Once TTD lets go of that central point, then it has lost much of the justification for the separate character of public enterprises in the system. If that were to happen, then it would not be easy to make any separate case for evaluations of technology performance.

56. Project Decision Making

There seems to be agreement that all participating institutions are trying to promote three things: first, more investment, both domestic and foreign, in the productive sector; second, greater cost effectiveness in the design and implementation of projects; and third, a better use of Egypt's technological assets. Improved decision making at the project level contributes to all three. TTD is the group most closely concerned with project decision

making and should therefore move swiftly to show the public enterprises, joint ventures and private firms in its area of influence how their own rates of return can be improved through better procedures. In doing so it can and should produce quickly some cogent studies which show how the improved decision making has affected the performance of enterprises and also how the alternation of contractual terms for technology imports contributed towards better performance.

57. This activity is predicated on the assumption that unless TTD is very active before any law is finalised, then the prospects of that law assigning sufficient weight to the issues important to TTD will not be great. Every effort should be made, as soon as the time is ripe, to publicize TTD's work. Most of that publicity must be within Egypt and directed at other Egyptian institutions, particularly other ministries and ASRT. At the same time inputs from international organizations, especially UNCTC and UNIDO, can be drawn upon to assist in the publicity effort. What has to be emphasized is the capacity of TTD to generate results in terms which are meaningful to the enterprises and which have obvious implications for other administrative institutions.

58. This work should be used to show how a meaningful information network and analytic apparatus is being developed within TTD. In crude terms, the slogan would be "TTD earns you more for your investment". Put more carefully, to the extent that TTD can create a recognized skill in project decision making, it will simultaneously contribute to greater benefits for the enterprises and towards laying the foundations for a harmonized approach towards appraisal of technology transfers. Since TTD will have been signalling the conditions of transfer which are required as well as those which are not, then it will have set the framework for other bodies to follow.

59. The Activities of TTD

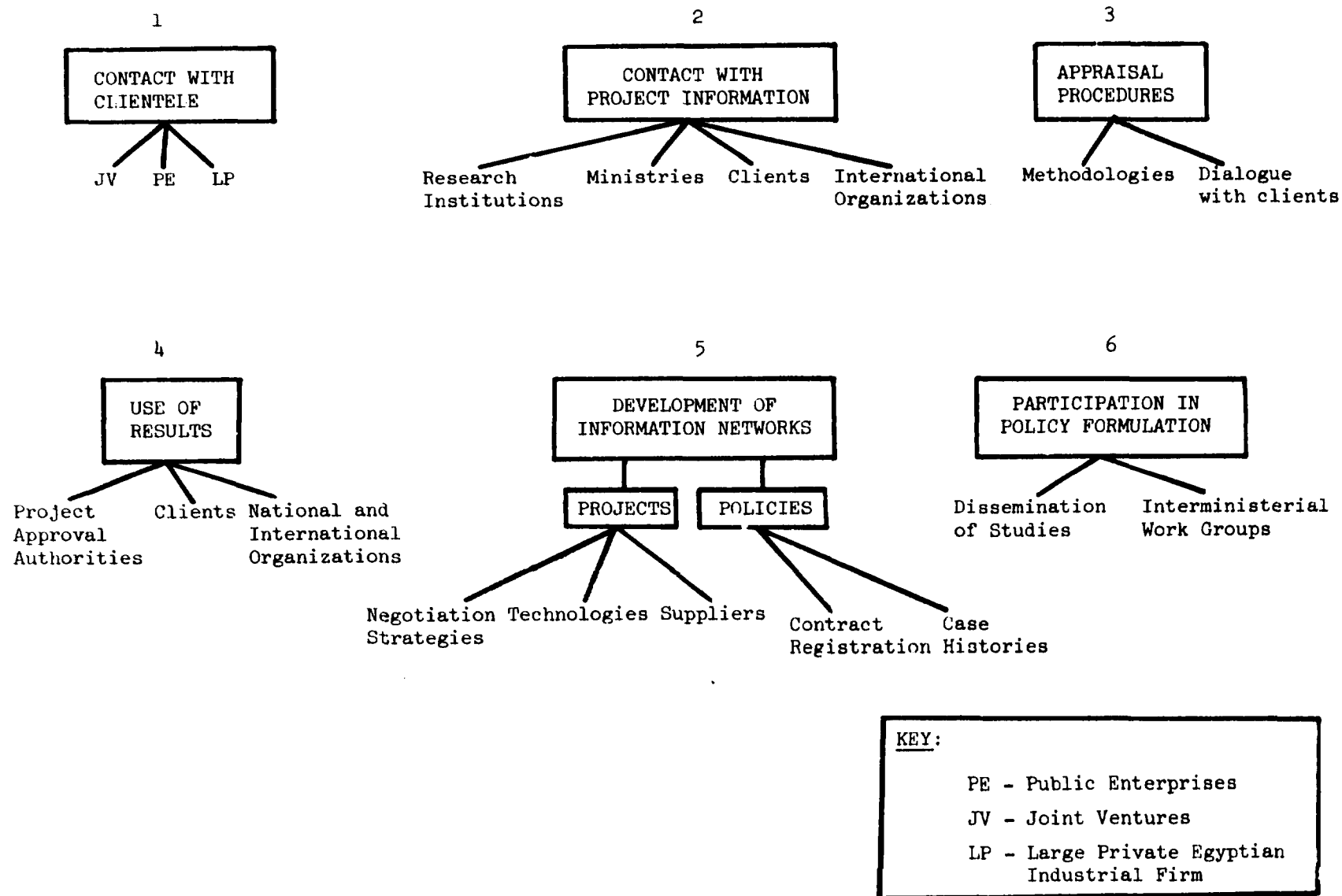
On the assumption that TTD is a promotional body concerned with project appraisal yet seeking also to build a broader information base, and on the further assumption that the medium to long term objective is to contribute towards a broader policy in the technology field, the organization of TTD can be schematically presented as in diagram 1.

60. A glance at the diagram is sufficient to underline how the successful operation of TTD will depend on aggressive behaviour by the group in generating demand for its work (box 1), building up information sources (box 2 and box 5), and disseminating results and ideas both at project and policy levels (box 4 and box 6). Even the elaboration of detailed appraisal procedures cannot be conducted in isolation since they must be approved and improved through close collaboration with the client enterprises. Hence, though TTD may have been created in the relatively closed environment of one ministry, its activities will have to spread very rapidly if its work is to be successful.

61. The diagram further emphasizes a fairly wide range of contacts which frequently involve inputs from outside organizations and people. While some of them may provide that assistance at negligible cost, in most cases there must be more specific reasons to compel or encourage outside involvement. Broadly speaking, there are three reasons why co-operation could be forthcoming. First, sanctions, which could be in the form of penalties for non-compliance or via the withholding of benefits which would otherwise be obtainable. Second, incentives, which could be through direct cash payments or through qualifying the collaborator to receive benefits which would otherwise not be available to him. Third, perception by collaborators of potentially valuable gains to them through, for example, better design, negotiation and implementation of projects for the firms, or the availability of better information for other government ministries. Whereas the sections and perhaps the indirect form of incentives depend on support through the law and/or other ministries (e.g. taxation authorities), the TTD group itself can and must create the perceptions described above as well as possess financial resources with which to pay collaborators. Since co-operation through sanctions is rarely sustainable in the long run, in practice the TTD group will be forced to produce results quickly.

62. Given that the communication channels for TTD work are all of the permissive type, i.e. it informs, receives and advises but does not itself decide, the results it can produce will be of three main kinds. First, improvements in project preparation, negotiation, approval and implementation. Second, contributions towards policy through influencing both the structures and processes by which project decision making affects broader policy issues. Third, through training of staff both in firms and in other government

Diagram 1: Activities of TTD



ministries. The three kinds of results are not likely to be forthcoming with the same speed and intensity since the first three boxes in diagram 1, and to a lesser extent box 5, will receive more attention in the earlier phases of TTD work. Moreover the influence on policy and training is only likely to be felt if the project improvements have been successfully achieved. Hence the time horizon of immediate interest is that pertaining to project work.

63. The project information at the disposal of staff currently assigned to TTD is already quite rich. The staff themselves have detailed knowledge of many of the public enterprises with which they will be dealing and also know well the situation of several joint venture and large private Egyptian companies in certain sectors. Furthermore, their own experience gives them good contacts with reputable sources of technological information in some of the industries with which they are most likely to be concerned i.e. metallurgy, various branches of chemicals, and the wide range of engineering industries. Moreover, TTD is making efforts to remain abreast of technological developments outside Egypt through attendance at technology fairs, creating channels of communication with well-known sources, fairly frequent discussions with individuals working in the field, and so on.

64. The principal criterion which should govern the collection of such information is its relevance to priority projects in the industrial sector with which GOFI is involved. What is required is not yet another data bank, for unfortunately such banks are frequently neither up to date nor (what is worse) much used. Information is not a magic commodity with applicability whatever the circumstances. What industrial enterprises require are specific pieces of knowledge arriving in the right place at the right time and at a cost which they consider acceptable. Hence the TTD will be judged not by the number or complexity of information items to which it has access but rather by its ability to provide specific responses to particular demands at high speed. The obvious route for TTD to follow is therefore to try to generate its early project work with some of the public enterprises it knows best and for which TTD staff feel capable of offering good advice quickly. This approach has the dual merit of offering good chances of an early success while avoiding the probable waste of the group's time and other resources in the collection of technical materials which might not be called for until some time has elapsed.

65. TTD must also give great attention to the proper handling of information with regard to domestic industrial and technological potential. The disaggregation strategy towards proposed projects relies crucially for its success on the possession of quite detailed knowledge concerning the capabilities both of local industrial firms (whatever their ownership structure may be) and of institutions devoted to research with fairly quick industrial applications. Some of this mapping of internal capabilities have already been partially done for some sectors or, if it is not available on paper, seems to be fairly clear in the minds of staff working on those sectors. It does seem that TTD should give priority to the systematization of such data for those sectors in which priority work will be undertaken. A formal procedure for doing this was developed by the secretariat of the Andean Pact for both metal-working and petrochemicals. That procedure and its application took some five years to develop fully but, building on that experience and on the detailed knowledge which TTD staff possess of the industrial sector associated with GOFI, it should be possible to bring to bear such information in a far shorter time span.

66. These observations about the specific nature of information required - to repeat, that TTD ought not to be in the business of creating technological data banks on a large scale but should be streamlined to provide quick responses to well-defined enquiries - must be seen in the context in which TTD will be working. The success of the group depends vitally on its capacity to mobilize and harness the resources existing within GOFI's operational space. Those resources are indeed considerable and in their totality provide knowledge of the Egyptian industrial sector which is probably without parallel elsewhere. TTD must act as the key to opening that storehouse such that the available knowledge can be activated quickly. The very fact of the group's creation suggests that there must be a good degree of willingness to co-operate in the rest of GOFI. Since, like many other things, goodwill is an asset which either can be increased or decreased according as it is used or abused, TTD must develop its 'within house' relations on a basis of mutual support so that TTD is seen as an effective way of canalizing GOFI's technical skills and bringing them to bear on immediate decision making.



67. As diagram 1 indicates, TTD is an information distributor as well as receiver. While the pressure on public enterprises under the present economic policy of the government has understandably led to a certain despondency about the technological capabilities and possibilities of these firms, it is salutary to recall that there are public sector firms which have performed well and have acted as technological fountains within the country. Part of the persuasive force of TTD's actions will come from its ability to bring together such case history material and distribute it within the country. Perhaps the greatest challenge in propagating approaches aimed at making the most intensive use of domestic skills is to persuade people in industry that they really can achieve these things themselves. It is, of course, true to say that the risks involved are usually important and that standard accounting procedures do not give any pluses for the contributions which a firm makes to creating resources of value to the economy (in technical terms, the public enterprise is rarely able to derive financial benefit itself from the external spinoffs it generates). Even so, the fact that these ideas are being discussed in the framework of attempts to improve the ways in which foreign technology is imported means that the public sector firms (though not necessarily joint ventures or private firms) can thereby reduce their demand for foreign exchange and legitimately point to those savings as part of their own drive to economize. Indeed, one effective piece of publicity which TTD can help public sector firms to make is the production of 'alternative balance sheets' showing in simplified form what the costs would have been if the enterprise had not sought local technical expertise.

68. On its current timetable TTD should work up to its full functioning during 1982, at which time work in Cairo will have been completed by consultants on economic, technical and legal evaluation, plus specialized advice on organizational matters; and further visits and training abroad will have been completed. In order to make as much as possible of this initial period into a 'learning by doing' programme, the consultants coming to Egypt and the TTD staff going abroad should work around current case material in Egypt. After all, what TTD is trying to do is not simply to repeat evaluation exercises for which several fairly similar procedures have been worked out in the past, but to design and apply methods of relevance to the actual situation in Egypt. This can only be done when the learning and the doing are combined. This approach has the further advantage that

procedures can be regularly improved in the light of feedbacks from other entities, including the firms themselves. Although the main contours of evaluation should be well-defined from an early stage, regular modification to meet the domestic context is required.

69. From early 1982 onwards, therefore, TTD is expected to be operating at full capacity. Subsequently its effectiveness will be judged by others in terms of its ability to produce relevant results at reasonable cost and within a fairly short time horizon. What would be the nature of those results? Two sorts of impacts should be anticipated. First, within, at latest, a twelve month period TTD should be able to point to at least two or three cases in which its influence on project design and negotiation has been decisive and produced positive results. Second, its initial contributions to policy discussions should have made an impact which would decisively shape some of the legislation and subsequent institution building in Egypt. Those results in the policy field will most probably be required by early 1983 if not some time before. The stress on outputs of this type comes from the character of TTD itself. Since it is a consulting organization within government, its future depends not on its ability to register financial gains (as would be the case with a private industrial firm) but rather on its capacity to extend its area of influence both on projects and on policy. In other words, unless TTD expands its operations then it is likely to become an institutional dead letter.

70. If the above requirements are met, then TTD could expect to be covering a much broader field of activity by some two to two-and-a-half years from now and it is to be hoped that this would lead to operations on a national scale. Discussions have indicated that Egyptian institutions concur in wanting the creation of a National Centre for Technology which would simultaneously link the import of technology with the build up of domestic capabilities and encourage developmental work on new technologies within Egypt. TTD could be in a position, with the time horizon suggested above, to provide the expertise necessary for accomplishing the first of the twin tasks.

71. The preceding paragraphs clearly relate TTD work towards the policy situation in Egypt. This is done in the belief that TTD can only isolate itself from the policy debate at its own peril. Any country which is

going through a phase of rapid foreign investment runs the potentially severe risk that such technology as does arrive will not be absorbed. This is because the incentives for domestic firms to handle the whole process are weak in such phases, and because an internal skill drain takes place to suck the technical staff away from the sectors, activities and firms where they can most fully employ their technical capabilities. Consequently the country runs the further risk that the process will become, for at least some time afterwards, non-reversible. Egypt is now incurring those risks and TTD is one, if not the only, group which is seeking practical, project-oriented ways of ensuring that not too many capabilities are under-utilized or even lost altogether. To state this is not to make a plea for a strategy of technological protectionism (even though there is much to be said for such a strategy given Egypt's industrial and scientific resources). The point is a cruder one: unless steps are taken now to mobilize the resources the country has subject to the constraints of the open door policy, then the advantages attributable to that policy will not be realized. TTD must make its voice heard in that respect.

72. One further dimension to the technological panorama needs to be kept in mind. There are many indications that various important changes in the nature and indeed definition of numerous industrial activities are currently taking shape in the core industrial countries and that their effects are spreading elsewhere. TTD is bound to consider these when offering assessments on the range of technical options open in certain new projects. In doing so it will be making implicit if not explicit appraisals about the quality of technology which industry in the country could or should absorb. Those appraisals alone amount to a policy recommendation of considerable significance, and the choices made will affect the technological status of Egypt in relation to other countries. Though at present the country's choices with regard to certain fields, including military technology, are already apparent, the advice offered in the 'industrializing industries' could have greater long-term consequences.

73. The broad sketch of TTD activities is intended simply to provide a focus for discussion and subsequent work. It is in any case clear that as with any new group the definition of activities comes best through the iterative process of practice. However, the sketch has tried to pinpoint the main target areas and the kinds of relations which will have to be built with

other groups. It has also served to indicate a time horizon for achievement of results and to suggest some of the mechanisms which might be used. At no stage, however, should it be forgotten that this attempt at creating one building block towards an edifice of technology policy is being made at a time when macroeconomic strategies are what really determine technological choices in Egypt.

CHAPTER IV: THE ACTIVITIES OF TTD:  
OPERATIONAL PROCEDURES AND ECONOMIC  
EVALUATION

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74. Objectives and Framework of Action

TTD will focus its work on the evaluation of technology transfers into Egypt. The entry point to evaluation will be receipt of a contract which it is required to appraise, a procedure which necessitates supporting information about the technological options considered, about the Egyptian importer and the foreign supplier. The objective of TTD's work, however, must be to influence the process by which technological choices are made in Egypt, whether by public enterprise (PE), joint ventures (JV), or large Egyptian private firms (LP). The success of TTD's work in the short to medium term can thus be measured by the number and importance of cases in which, after its appraisals, improvements are made to agreed contracts; in the longer term, the measure of success must be the degree to which enterprises voluntarily approach TTD to request its advice in the search for and evaluation of technology. Success would be achieved when firms themselves have fully absorbed the technology of evaluation and handle things so well that the majority of contracts coming for appraisal can be accepted without much modification. In short, TTD itself is offering a managerial technology which must be properly diffused and thoroughly transferred within Egypt. Diagram 1 shows the process.

75. It has long been recognized that knowledge is a form of power and that bargaining over knowledge (technology imports) depends for its success on the exercise of power. Four kinds of power affect the outcome of a bargaining process, namely: (i) political power; (ii) asset or resource power; (iii) information power; and (iv) negotiating power. They are inter-related e.g. the political readiness to deal with foreign suppliers affects the size and nature of operations they can conduct in the domestic market and thus the use which is made of resource power. TTD is, through its involvement in the Consultative Committee for a Draft Code on Technology Transfer, making a contribution to ensuring that the directions governing policy permit a fuller use of Egypt's other powers. But in its operations TTD will have to concentrate on building information and negotiation power. A central thesis of this report is that the search for and use of information

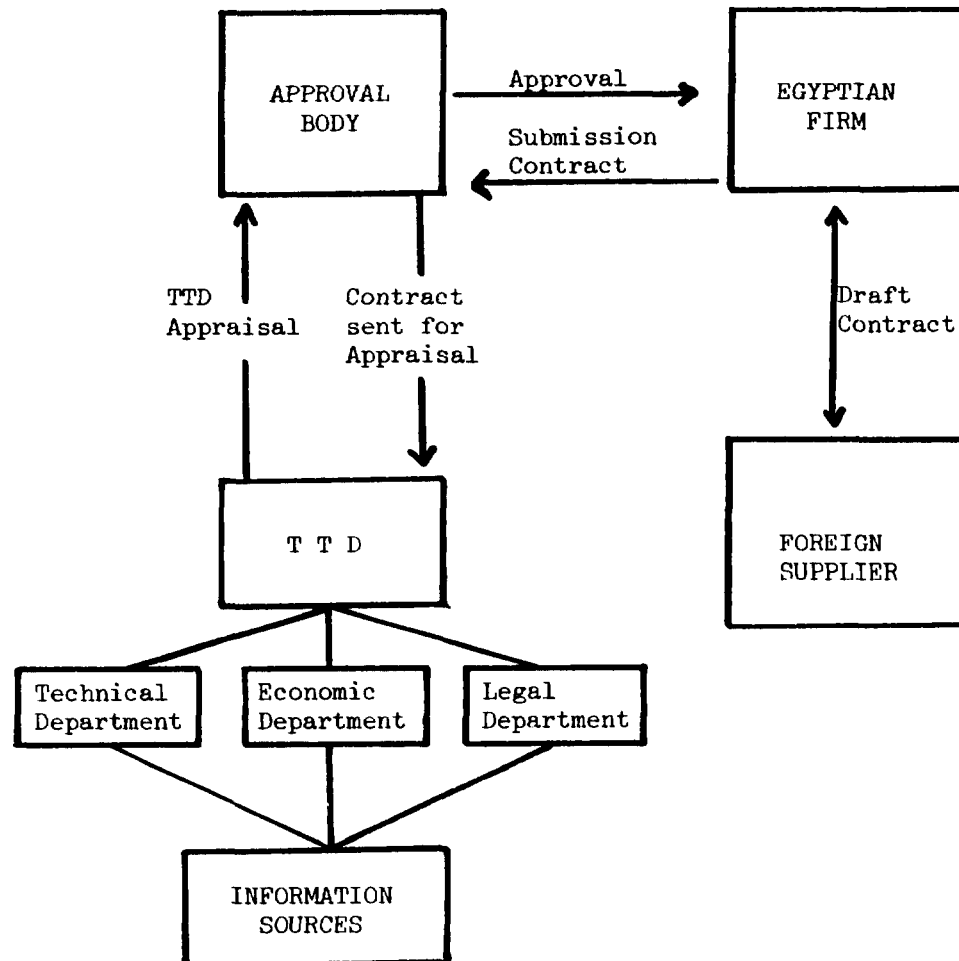
is a critical activity of TTD; the extent of negotiation power of the firms will depend on TTD's capability to help them mobilise relevant information.

76. If the process on which TTD is embarking is successful, then its own power to influence and power to advise will grow. This will affect not only the behaviour of the firms but also the action of other government institutions as they appraise and approve industrial projects. Ideally the result would be harmonious action among them such that each was fulfilling an assigned task according to internally consistent criteria; diagram 2 suggests one possible organization of activities involving GAFI, ASRT and the other ministries which have responsibilities in the industrial area. The guiding principles behind that diagram are: (i) TTD in GOFI appraises the bulk of contracts affecting PE, all contracts with JV and the bigger contracts (more than L.E. 8,000) of LP in the industrial sector; (ii) smaller TTD within individual ministries do the same thing (technological appraisal) along the same lines for the firms under their jurisdiction; (iii) GAFI recognises the TTD capacity and thus does not try to create a "parallel capacity" of staff to handle technological questions; (iv) all ministries and organizations retain the project approval functions they now possess; and (v) ASRT becomes the central registry for all contracts, which is of course used as a basis for elaborating inventories of domestic skills and requirements.

77. The best internal and external organization of TTD's work cannot be decided a priori. The suggestions made above, and those presented later, should be seen as initial points in an iterative process where adjustments are made in the light of experience.

78. TTD is both conditioned and helped by the existence of structures inside and outside Egypt which shape the kinds of tasks it will perform and the sort of information it can draw on. Those structures are summarized in the following paragraphs.

Diagram 1: TTD and the Contract Appraisal Process



PHASE 1:

TTD appraises but does not work with the Egyptian firm prior to Draft Contract (except for PE projects in GOFI area of x LE 0.75 mn and LP x LE 8,000)

PHASE 2:

Confidence develops between Egyptian firms and TTD; the firms consult with TTD prior to preparing a Draft Contract

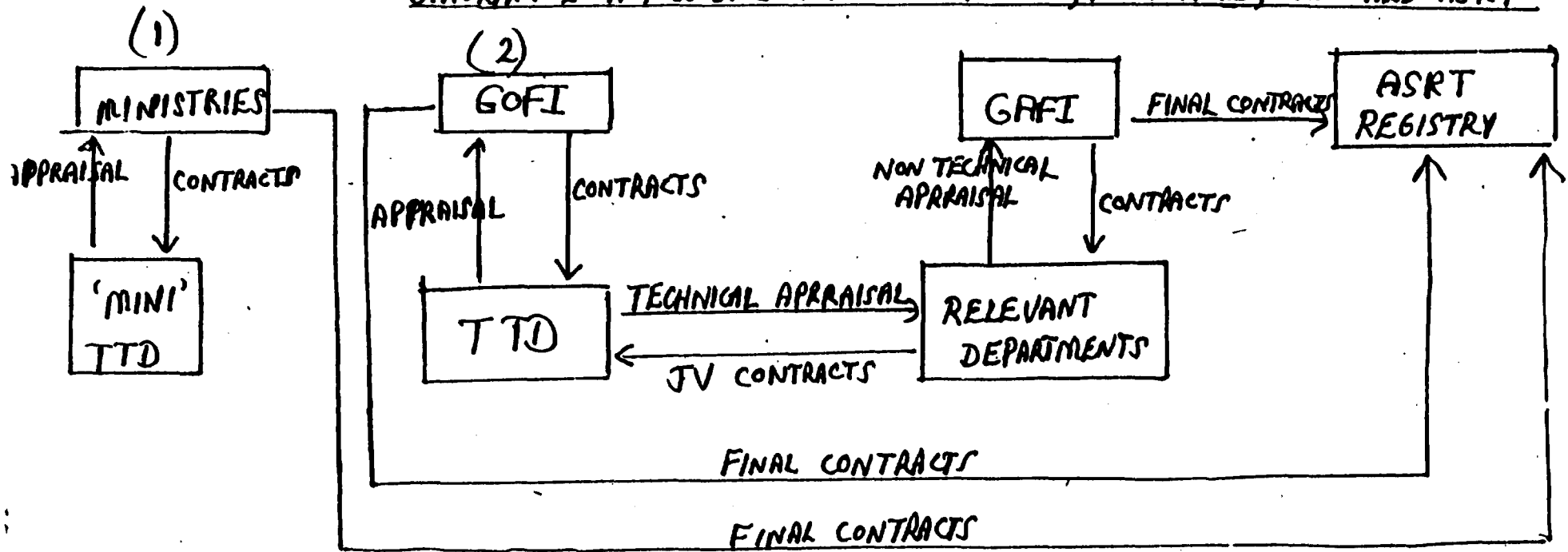
79. Industrial Enterprises in Egypt

Chapter III argued that PE have a responsibility to spearhead the incorporation and diffusion of foreign technology in Egyptian industry, and that in fact the overwhelming proportion of complex technologies and/or large projects continue to come through the PE route despite the rise of JV. But it also argued that PE are under strong and growing financial pressures which may make them more resistant to outside advice. In short, PE conception of their objective function, of who they are answerable to and how, may differ from the ideas TTD is trying to promote. If TTD wants simultaneously to assist PE under cash constraints and encourage the development of domestic technological capabilities, its advice will have to be sharpest in areas where cost effectiveness to PE and the use of local resources can be shown to be mutually supporting aims. It is unlikely that many PE can be persuaded, at least in the near future, to take risks of a technological kind.

80. For JV, the Egyptian partner should be happy to hear ways in which his bargaining strength could be improved since this would increase his returns from the project. The snag is that in many cases the foreign supplier of equity capital and the foreign supplier of technology may be the same entity. As long as the technology dimension of the agreement can be altered without affecting the equity participation, TTD's help will be welcomed; but if tougher bargaining over technology puts the formation of the JV as a whole in jeopardy, things will be different. Three considerations affect the extent to which TTD advice is likely to have an impact. First, the size of the foreign equity holding. In Egypt today, a JV can include very high proportions of foreign capital - in those cases the Egyptian (minority) partner is unlikely to pay much attention to TTD advice. Second, where the JV is formed with an Egyptian public capital, the bargaining power of the domestic partner is likely to be substantial and TTD can play an important role. Third, whether the particular foreign partner is offering more than technology e.g. a special brand name which is likely to give the new enterprise a big advantage in the Egyptian market. In that case the package of technology and marketing factors will probably lead to strong resistance against TTD attempts to alter the arrangement, that resistance being supported by the Egyptian partner. TTD should never forget that, for a JV, there is much more at stake than technology. In Egypt the establishment of JV is to exploit market opportunities, normally



DIAGRAM 2: A POSSIBLE LINKAGE OF GOFI, MINISTRIES, GAFI AND ASRT



using well-known technologies for consumer goods and/or management systems. The interest of Egyptian partners, above all when they are private groups, is to see that the market is exploited and they obtain the profits. That kind of objective function has little in common with the aims of TTD.

81. In some ways TTD may find it easiest to give help to LP. Those firms are not under the same financial pressures as PE nor are they locked into foreign capital as are the JV; as long as TTD can show them that they have much greater scope for seeking out alternative suppliers and negotiating conditions of access to technology, LP can be encouraged to work well with TTD. Moreover, it is unlikely that LP will be looking for particularly advanced technologies. Most of their requirements are in areas where in fact several alternative suppliers can be generated but LP themselves may not know this or have the resources to find the alternatives. These, of course, are precisely the conditions in which a central unit (TTD) can realise the economies of scale traditionally attributed to the search for information.

82. Though the type of firm is a major variable affecting the nature of TTD work it is not the only one. The structure of the sector and market conditions are also of considerable relevance. Inevitably TTD will encounter situations where it must make several appraisals (not necessarily at the same time) of technology imports within the same sector. How should this be handled? One obvious principle, following practice in some other developing countries, is to avoid repetitive imports i.e. where the same technology is imported by different firms. This can be achieved if the first import is negotiated and implemented in such a way as to ensure that the domestically located firm not only absorbs the technology but masters it sufficiently to be able to transfer it to other firms. A second principle is to recognize that, given the the highly skewed income distribution in Egypt, different technologies might in reality be serving different product markets, even though nominally they are within the same sector. TTD should therefore strive to obtain the appropriate mix of technologies within sectors ("small is beautiful - but big is necessary"). It follows that economic evaluation should keep market structure in mind. Government policy proclaims increased competition as one of its goals in the industrial sector yet the reality of that depends in part on technological choices. If a new project brings a technology whose production capacity is comfortably adequate to meet actual and estimated

market demand over the next few years, then encouragement of competition would suggest other firms too should operate in the sector. The result of introducing additional firms however would be that everyone was operating at capacity levels which were well below potential and might even mean that all firms started to make losses. It is no accident that foreign firms interested in JV have placed great stress on negotiating a protected market for their output, for they see that competition will cut into their profits and their capacity utilisation which in turn would mean that the initial choice of scale and perhaps technique of production can no longer be justified. (It was reported, for example, in the International Herald Tribune that "once the factory was producing, Union Carbide discovered that despite a specific undertaking on the part of the government, public sector firms like the Egyptian General Battery Company were negotiating their own competitive joint ventures with other foreign partners.")

### 83. National and International Guidelines

TTD is beginning operations at a time when considerable experience has already accumulated elsewhere on the major elements of technology transfer. Specifically that experience has identified the aspects of agreements which require attention from the economic angle. They are:

- payments for various kinds of technology; their rate, base of calculation, duration and relationship to profitability of the domestic enterprise;
- indirect payments, through compulsory purchasing of inputs and through obligations imposed on the domestic firm to maintain price levels of outputs, expend a given proportion of its receipts on product advertising, etc;
- export and other marketing restrictions;
- exclusivity of rights to use and sell;
- grant back and other provisions affecting the control over improvements made by domestic technology users and their access to new developments by the technology supplier;
- right to freedom of choice over suppliers of related techniques;
- guarantees, performance warranties and their enforceability (i.e. what are the risks against which the agreement effectively insures the purchaser?);
- content of training arrangements;
- composition of management teams;
- extent of information actually transferred.

84. Several countries have set some numerical standards on these issues, above all on payment clauses. Thus administrative practice in Brazil does not permit any royalty or fee remittance where the technology supplier owns 51% or more of the equity of the purchasing firm; if the holding is less remittance may be permitted but in fact seldom is. The money earned in Brazil must therefore be used in that country. For transactions between independent entities, the effective limitation is 5% of projected sales for the duration of the contract, where the base of calculation (net sales) is defined as invoice value less taxes, charges, raw materials and components imported from the technology supplier or any other supplier directly or indirectly linked with him, commissions, return credits, freight, insurance and package expenses, and other deductions which may be agreed on by the parties. On know-how, the Brazilian administration effectively limits payments to 5%, contract duration to five years, and reserves for itself the right to investigate whether and in what ways the know-how has in fact been absorbed. On trademarks, there is again a fee maximum of 1% in relation to net sales (as defined above), and the imposition in contracts of a fixed percentage of sales to be spent by the domestic firm on advertising of the brand name product is not permitted. This is a partial response to the important problem of domestic firms being required to pay the costs of establishing markets which the foreign suppliers will benefit from through their control over the trademarks.

85. In Colombia, no royalty payments are permitted between parents and subsidiaries, which is important since the definition of a subsidiary (foreign company) is that the foreign share be 80% or more (these would be classified as JV in Egypt). Moreover, technology, as distinct from machinery and equipment, cannot be used as an equity contribution i.e. instead of or in addition to actual supply of cash. Maximum royalty rates tend to be 3-4% though for highly export-oriented projects they could reach 7% (Colombia has a general economic policy heavily aimed at promotion of industrial exports), with a duration of three years (five in exceptional cases) and renewal for a further three years. The calculation base for royalties is net sales defined as in Brazil. To encourage links with domestic industry and to promote the spread of the evaluation methodology (c/f paragraph 1 above), the Colombian Royalties Committee (the equivalent of the National Registry) publishes a regular newsletter for businessmen giving details of technologies available etc, and runs courses to train negotiators of local firms.

86. In Argentina, the rate maxima are 5% for patent and know-how contracts, 1% for pure trademark agreements, and a special limitation for the automotive sector of 2%. The difference there is that the definition of net sales does not exclude imported components, which means that the base is not domestic value added but overall value added; since the foreigner may prefer to collect returns through charges for inputs, and can usually collect much more this way, the Argentinian definition is more lax than the others. Profit remittances which exceed 12% per annum of the foreign capital investment are subject to special taxes.

87. In Mexico, provisions similar to those of Brazil and Colombia exist with the additional provision that, due to the extent of foreign penetration of industry, the Registry also looks at agreements between Mexican companies in order to avoid a foreign firm using its Mexican subsidiary to sneak technology in through the back door. All the provisions mentioned here plus some in other countries are presented in Table 1. The table tries to summarise information which is more or less up to date; the provisions and practices change from time to time, so the table is intended as a guide to the existing situation.

88. International experience has also provided the collection of certain information and sector guides which should assist TTD both in operational procedures and economic evaluation. Information on contracts is available through the UNIDO TIES system, which GAFI currently belongs to but to which TTD must become affiliated, and this now covers some 4,000 contracts in 15 developing countries. Information on transnational corporations can be obtained through the CTC, and information on several PE in other developing countries can be sought through ICPE (data which may be helpful in determining what has been negotiated elsewhere). Moreover, at the level of studies and negotiations on sectors TTD can draw on the work of UNCTAD, CTC and UNIDO's Industrial Consultations system. The main possibilities are summarised in Table 2.

89. The next section sets out some of the main issues in economic evaluation and suggests some approaches to them. The idea is to illustrate the principles which should be kept in mind rather than to try and solve specific problems. That discussion is used as the basis for the third section which examines operational procedures.

90. Technology Evaluation: Asking the Big Questions

In Egypt the import of technology usually comes as part of a single contract which bundles together some combination of the following elements: machinery and equipment; industrial property licences; technical assistance; know-how; engineering services; and management services. Only infrequently do the contracts specifically associate the charges for each item with that item - usually some aggregate price is established; or assigned to a particular part of the contract, and on that basis payment is made. An essential step towards evaluation is thus the separation of technology agreements (whatever the nature of the technology may be) from other agreements such that the charges specifically set for technology can be seen and assessed.

91. This separation criterion for agreements will be of immense help to the economists within TTD. At the same time, and before proceeding further on the road of disaggregation, a word of warning. For all types of firms (PE, JV and LP), the technology arrangements are likely to be, in the majority of cases, part of more complex projects involving new investments. It is true that there will be some instances e.g. exploration contracts for minerals, when only technical expertise is involved, and others e.g. purchase of certain capital goods, when only the technological advances embodied in machinery are of relevance. But mostly technology will be just a part of deals which comprise financial arrangements (both equity and loan), market arrangements (including the grant of customs duties to the firm against imports of similar end products) and input pricing arrangements (e.g. the subsidisation of energy use in various sectors). It follows that the technology aspects cannot be seen apart from the rest of the project and should not be decided upon without pertinent information on those aspects. To take a simple example. Suppose that in two sectors where technology of a fairly similar kind is being employed there are contracts which stipulate the same rate of royalty in relation to domestic value added, and suppose also that the per unit import costs are the same in both sectors. In the first sector, however, part of the arrangement in which technology entered stipulated that the firm in Egypt should be protected against competition while in the second sector this is not so. Then the same royalty rate would yield higher absolute receipts per unit to the technology supplier in the first sector than in the second. This higher return, however, would in reality be monopoly profit and not a fair price for the technology. To equalise the

TABLE 1: SOME PROVISIONS REGARDING TECHNOLOGY IMPORTS

| COUNTRY<br>PROVISION | ARGENTINA                                    | BRAZIL   | COLOMBIA  | MEXICO   |
|----------------------|--|--|---|--|
| AFFILIATED FIRMS     |  | No royalty or fee remittance if technology supplier holds $\geq 51\%$ Equity | No payments between the C. technology cannot qualify for equity contribution. | No payments for industrial property and management contracts |
| ROYALTY SIZE         | 5% Patent and Know-how<br>2% Automotive      | 5%   | 3-4%: can reach 7% for export projects  |  |
| ROYALTY BASE         | Net Sales Value without Considering Imports  | Net Sales minus value of imported inputs                                     | Net Sales minus value of imported inputs                                      | Net Sales minus value of imported inputs                     |
| KNOW HOW             |  | 5%: Duration limited to 5 years<br>MPI right to investigate absorption       |   |  |
| TRADEMARKS           | 1%   | 1%   | No payment permitted on prior trademark payments                              | 1-2%   |
| PROFIT REMITTANCES   | Above 12% per annum subject to special taxes |  |   |  |
| AUTOMATIC APPROVAL   | For some kinds of technical assistance       |  |   |  |

TABLE 2: SOME INFORMATION SOURCES

| <u>ON CONTRACTS</u><br>(1)              | <u>ON TECHNOLOGIES</u><br>(2)                    | <u>ON SUPPLIER FIRMS</u><br>(3)                               |
|---|--|---|
| UNIDO: TIES                             | UNIDO: INTIB                                     | UNCTC   |
| ICPE                                    | TRADE FAIRS                                      | SECTORAL STUDIES OF   |
| BUSINESS SCHOOLS<br>(HARVARD DATA BANK) | USER FIRMS IN OTHER<br>COUNTRIES (ESPECIALLY PE) | UN BODIES, US GOVERNMENT<br>AND OTHERS                        |
| SPECIALIST<br>CONSULTANTS               | SPECIALIST<br>CONSULTANTS                        | USER FIRMS IN OTHER<br>COUNTRIES<br>SPECIALIST<br>CONSULTANTS |



conditions the protected market should be changed or, if this is impossible, then a lower royalty should be paid in the first sector. The crucial point is that the discrepancy will not even be discovered unless something is known about market structure; and it can best be resolved not by technology negotiation as such but rather by changes elsewhere in the system.

92. It is agreed that in Egypt, as indeed in most other developing countries, the function of an evaluation entity (TTD) will be appraisal and that it has no veto powers over project approval. In terms of linkages with other bodies which do have that approval power, therefore, the crucial step for TTD is to ensure that its assessment of technology in the context of the project as a whole is conveyed to the approval authority along with TTD proposals for modification. Presumably this is done most easily in the case of those firms, both PE and LP, which come under the approval authority (for industrial licensing purposes) of GOFI. In those cases TTD should be able to explain directly to the approval authorities why certain of the appraisal remarks require changes to the project not in the technology area but elsewhere. Where TTD deals with GAFI as approval authority (JV case), then the design of the documentation which should pass between the two authorities, as well as the extent of information which TTD needs from GAFI, will have to be set out more fully. The discussion below offers some guidance on this issue.

93. The 'word of warning' thus means that disaggregation of the technology package is vital to a proper appreciation of its costs and benefits, but that decisions on what to do will often require 'relinking' with the remainder of a complex project. TTD might, in other words, be the best group to appraise - but it will not always be armed with the best instruments to implement its own recommendations. Though the remainder of this section proceeds in terms of specific aspects of technology arrangements, the totality of the project in which they occur should never be forgotten.

94. Machinery and Equipment Purchases

At present much of the technology entering Egyptian industry is embodied in machinery and equipment. TTD does have a role to play in advising firms on the economics (as well as the technicalities) of such purchases. The central questions concerning the purchases are:

- (1) Are there alternative sources of supply for the equipment or is only one firm in a position to offer what is required?
- (2) Is the equipment proven over a range of physical and human environments for a reasonable length of time or is Egypt to be a guinea pig?
- (3) Does the equipment define the product or would alternative pieces of machinery produce the same result (e.g. electricity can be supplied using different primary energy sources and different equipment, alternative computer systems all make calculations but in varying speeds and range of complexity)?
- (4) If alternatives are available, are there objective technical criteria for measuring both the quantity and quality of output and the usage of various kinds of inputs?
- (5) Does the machinery offer much flexibility in terms of the use of associated inputs, and in particular what are the implications of the equipment purchase for the employment of domestic resources in the project?
- (6) What is known about the expected rate of obsolescence of equipment in the sector? Assuming that Egypt is buying, on the whole, average rather than best practice technology, what time lags are there before that machinery will have to be replaced from the economic viewpoint? (This question obviously relates to the purposes of production e.g. an export-oriented industry presumably cannot afford to provide goods which are below standards of its competitors)
- (7) What are the opportunities for technological learning from this equipment, i.e. can it be disaggregated in such a way that Egyptian producers learn how to produce some parts of the equipment? Are some suppliers more willing to accept the disaggregation than others?
- (8) Are certain suppliers willing to provide more detailed documentation (even design information) than others? Put a different way, from the perspective of developing technological capability, are there some potential combinations of equipment purchase with other items of technology (e.g. know-how) which are more favourable than others?

- (9) Does the machinery and equipment supplier have any other interest in the project e.g. he holds equity capital in the Egyptian firm, he is supplying other elements of technology, the purchase of his equipment is financed by a loan from his government which is tied to the project?

95. The common feature to all these questions is that their answer depends on the capacity of TTD to mobilise information. The range of questions is enough to indicate that TTD should not attempt to build a data base on them but rather know where to obtain materials - in the simple sense, the task is to obtain information about information. The information search will provide itself the answer to many of the questions; the next matter, then, is what should be done with the information when available? To illustrate: suppose the equipment has not been widely used elsewhere and in particular has not been employed in a developing country environment - should the purchase be recommended?

96. The very statement of this kind of problem is enough to make it clear that the response is not merely 'yes' or 'no' but a systematic delineation of the factors conditioning the response. Those factors constitute an implicit weighing of items which are of importance in Egypt's industrial environment and at the same time serve to emphasise what should or should not be obtained from the equipment supplier. The listing which follows represents my understanding of the factors which need to be weighed; certainly TTD can produce a more precise one, the important thing is that some statement of criteria be made. Some or all of these factors will have to be considered in relation to any one of the nine questions listed.

- (a) The priority attached to introducing advanced technology in the sector concerned.
- (b) The priority attached to learning how to operate, maintain, repair, reproduce and improve on this kind of equipment.
- (c) The priority attached to employment of various human and natural resources within Egypt.
- (d) The types of product required.
- (e) The willingness to pay.

97. The list of factors is deliberately a short one. By now it should be clear that the evaluation exercise brings together the following elements. First, a set of information which pinpoints the technologically relevant issues (the list of nine questions). Second, a set of priorities which provide the basis for manipulating that information. Obviously there could be at least four rather different sets of priorities given circumstances in Egypt, namely those enunciated in the Development Plan, those which TTD sees as significant, the priorities of the Egyptian firm, and perhaps those of the approval authority to which TTD submits its appraisal. Only by accident would they coincide on any particular technology issue; an important part of TTD's work is to coax other groups towards its operational use of priorities. Third, the detailed guarantees and arrangements which can be negotiated with the technology supplier. In brief, if the equipment supplier is willing to bear more of the risks for introducing a leading edge technology in a priority sector for Egypt, then the deal might go through.

98. This triangular relationship highlights that for the first element (the nine questions) the task for TTD is the collection and interpretation of information: more specifically, the work involves setting the economic parameters which can be derived from data that are partly technical and partly economic. For the third element, the economic task is calculation. It is precisely here that the contents of the contract for equipment purchase become relevant as the basis for computing likely costs and benefits of alternative deals. A few examples will illustrate the kinds of numbers that might be generated.

99. Suppose that, in the light of priorities and information about a new technology embodied in machinery, a PE wants to purchase. Experience with this equipment has only been obtained in a few developing countries and it is known that projects involving that machinery have had significant time and cost overruns due to teething troubles, need to recalculate safety margins because of unforeseen hazards, changes in industrial standards in the main producing country and so on. It is also known that price inflation may affect equipment cost by the time the actual delivery date arrives. Moreover, the equipment is sufficiently complicated and integrated that apparently none of it can be manufactured in Egypt. These conditions imply that (i) local participation is negligible and (ii) financial risks are high. The PE is open to the real possibility that this major step

towards equipment modernisation could turn out to be far more expensive than originally budgeted. It should be a simple matter to enumerate the rise in project costs due to every month's delay in delivery, those costs arising from extra charges for the credit to buy the equipment, late commencement of production, and outlays to other suppliers who may be involved in the project. Moreover, there are no offsetting gains in the sense that domestic skills are being developed since none are employed. A tabulation can then be made relating extra costs to months of delay; since the evidence gleaned from the original collection of data gives some rough basis for assigning probabilities to varying lengths of delay. TTD now has some idea of what is at stake if the equipment does not arrive on time. The contract will have its provisions concerning purchase price, date and form of payment, equipment performance guarantees, and penalty clauses for failure of either party to comply with the agreed conditions (account being taken of the definition of force majeure which could temporarily or otherwise absolve either or both of their responsibilities). The financial loan agreement setting out the credit conditions for the PE to pay for the equipment is likely to be a separate document (sometimes it is attached to the main contract) but its contents are also essential data. With all this TTD is now in a position to estimate whether the contract gives it adequate financial protection against the real risk of delay. By comparing the risks, the costs and the penalty clauses binding the equipment supplier, an assessment can be made of whether those clauses are sufficiently strong. If, as is likely in such cases, they are not, renegotiation is called for and TTD should not be satisfied with the fresh draft of this clause until it produces results in line with TTD calculations.

100. Consider now a different kind of example, where a fairly standard piece of equipment can, it has been established, be imported from different suppliers under fairly similar conditions except that one supplier is ready to assist the domestic firm in breaking down the equipment manufacture process so that the firm can learn how the machine is made - the supplier will charge for this, both for documentation and inputs of time by its technical staff. In effect, therefore, one supplier is ready, at a price, to offer a know-how arrangement in addition to the straight sale of equipment. How much is this worth to the Egyptian firm and to the economy? To the firm the costs are (in addition to the above-mentioned payments to the supplier): the staff time which is likely to be used in learning (i.e. how

long is it likely to take to have the complete transfer); which means that staff (probably highly skilled) will be taken out of production for that time; the additional costs which could arise through internal reorganization of activities consequent on developing the full technical capability; and the risk that the whole operation will not succeed due to unforeseen difficulties i.e. that the investment in skill capability will not yield fruit. The benefits for the firm are the increase in its own manufacturing ability and thus the possibility of selling more advanced equipment in the future; the rise in skill of its staff with beneficial effects on the existing range of outputs; the improvement in negotiating ability which it should obtain for future imports of technology; and the chances this extra capability creates for strengthening the firm's domestic market position. The estimation of the figures of course depends on close consultation between TTD and the firm - the firm, for example, will know what staff it intends to allocate to this training exercise, what their present skills are, and what skill level they expect to achieve when the operation is over. TTD, on the other hand, might be better placed to assess the market situation of the firm and also perhaps the chances that the effort can be carried through to a successful conclusion. Whether or not the firm decides to accept the offer depends on the comparison of these costs and benefits; obviously this is at best a probabilistic calculation and much depends on the judgement of what can be achieved.

101. For the Egyptian economy the comparison is a little different. What to the firm is a risk, namely that the skilled staff might move to another enterprise when they have learned, is for the economy a potential benefit - it represents the internal diffusion of skills. Similarly, for the economy the prospect that in future such equipment can be made internally means that Egypt can avoid some future imports of technology, which is a favourable step. Even if the whole operation does not completely succeed, the fact is that some skills are bound to develop, which again is positive. In short, the incentives for the country as a whole are a bit stronger than for the private firm. At this point we should keep two things in mind. First, part of TTD's function from the economic angle must be to find ways of bringing closer the private and the public estimates of costs and benefits; to put this in other words, TTD would like the private firm to reach decisions which match the social needs. Now there are two ways in which TTD can strive to attain that situation. One of them is to assist the Egyptian firm in negotiating in such a way that the foreign supplier is persuaded to reduce his price to such a point that the risks no longer appear so serious for the

Egyptian firm. The other is to persuade the other authorities in Egypt that the Egyptian firm should in some way be compensated for the risks it is taking. The second way is part of TTD's endeavours to influence technology policy as a whole; if the government can be persuaded that the development is worth the risk, then it can find methods of supporting the domestic firm. In practice TTD has to act along on both ways at the same time, always trying to push towards a configuration of figures such that decisions favouring domestic technological development will be taken. Second, it is much more likely that choices and problems of this type will arise for PE and LP than for JV - only firms of Egyptian capital, whether public or private, are liable to pay this much attention to building local capabilities. For the JV this kind of decision is not going to arise very often, especially because in many cases the foreign equity share is substantial and because the equity supplier and the machinery supplier are the same person. The only way in which the JV might become seriously interested is if there were strong subsidies for undertaking technological learning activities within Egypt (which is not the same as subsidies for R and D). That too is a question of overall policy. For PE, as I have argued earlier, this is just the kind of decision which should be made, since the PE are the instrument for promoting technological development. But in present circumstances in Egypt the PE also may be uneasy about taking on these risks, so TTD must again press for an understanding of the importance of this type of approach. With LP the issue really boils down to the cost and benefit factors described above.

102. These examples have been considered in some detail for several reasons. First, they illustrate how economic calculations regarding machinery and equipment purchases can be approached. Second, existing registry offices and technology centres in other countries spend most of their time on the more straightforward calculations regarding standard licensing arrangements and less attention is given to these matters concerned with risk and technological development. Third, they underline that TTD must engage in a continuous process of collection, interpretation and analysis of data relating both to the firm and to broader aspects of the economy. The calculations themselves are not the difficult part since they follow well-known methods (discounting etc) - the tough bit is to obtain reasonably reliable estimates of the basic numbers and to form, in consultation with the firms, a judgement about probabilities. A measure of TTD's success will

be its ability to handle this activity well. Fourth, the examples show the pivotal nature of TTD's role in linking with other institutions within Egypt. The evaluation process ought not to be simply a matter of passing forms and written assessments from one office to the other. It has to be a dialogue where the case history experience informs and guides policy; part of TTD's success in moving beyond mechanistic calculations will depend on the ways it can find to alter, or encourage others to alter, the parameters of economic policy. Unless there is some commitment to improving the technological capabilities of Egyptian industry through the use of imports as a springboard, then the economic evaluation becomes, in essence, an exercise devoted only to cost reduction and provision of adequate insurance. Though such an exercise does imply careful search for information and of course the need to do the sums properly, it really does not go beyond a commercial assessment.

#### 103. Industrial Property Licensing Agreements

Considerable attention has been devoted to these agreements in studies published by UN bodies and others. In particular, the UNIDO "Guidelines for Evaluation of Transfer of Technology Agreements" examines patent and trademark agreements (Chapters II and V), methods and rationale for royalty calculations (Chapter VII), legal and administrative provisions relevant to those agreements (Chapter VIII), and provides checklists for screening patent agreements or patent clauses in other agreements (Annex IIA) and evaluating remuneration provisions (Annex IIB). Numerical examples of calculations are provided. WIPO has published a "Licensing Guide for Developing Countries", and further offers additional documentation on ways of making such agreements from the economic as well as legal points of view. Moreover, the practices, including numerical standards, of several developing countries have been mentioned above (paragraphs 84 to 87 and Table 1). In addition, ICPE is publishing, as part of its Guidelines for PE in technology transfer, a detailed study of the experience of the Mexican registry.

104. The central questions to ask about such agreements are (I will focus on patent licensing):

- (1) Is the patent valid in Egypt and if so for how long?
- (2) Does the duration of the contract match the duration of valid patent life?



- (3) What information is disclosed by the patents? Is it possible to use that information without the licensor's know-how, or will the patent license agreement require an additional know-how agreement (for which extra payments must be made)?
- (4) Does the patent grant an exclusive or non-exclusive license (a PE, for example, might want an exclusive license to make, use and sell so that it can operate as the subsequent diffusion agent within Egypt)?
- (5) What base is used for calculating royalty payments?
- (6) Does the contract imply tied purchases of raw materials?
- (7) What does the royalty rate represent in relation to the expected profitability of the domestic firm through use of the patent?
- (8) Does the agreement impose restrictive clauses and if so what are they?
- (9) Does the agreement have a 'most favoured licensee' provision such that the Egyptian licensee would have the conditions of the agreement improved if another licensee (elsewhere) negotiated better terms with the licensor?
- (10) Does the agreement 'bundle together' several patents, only a few of which are really useful to the Egyptian firm? Does it try to impose additional, cumulative charges for all of these?

105. This set of questions concentrates heavily on the economic aspects, though of course technical and legal ones enter (e.g. disclosure as a technical matter, and validity as a legal one). As always, the list must serve as the informing principle for the collection and interpretation of information, and also (as in subsection IIA) the data must be gathered from the draft contract, from the Egyptian firm and from other sources (for example, it might be possible to discover from another firm in a developing country whether it is feasible to use the patent without also obtaining the licensor's know-how). Many cases of calculating royalty payments have been given in the works mentioned above so the illustrations of how to assess clauses look at less familiar items.

106. Suppose first that the draft license agreement does require tied purchases of raw materials (question 6). What costs does that impose and what are the implications? The first thing to discover is whether those raw materials are available from alternative suppliers (i.e. other than the patent licensor) - if so, are the licensor's prices for them comparable to the charges made by other suppliers? If there are no alternative suppliers (including suppliers of substitute raw materials), has the licensor sold the materials to other firms elsewhere and if so, at what prices? The search for prices can be made through several routes e.g. trade journals, contacts with other firms, use of commercial attaches in Egyptian embassies abroad, the International Trade Centre in Geneva, and so on. Above all, the licensor himself should be asked to provide details - if he is not ready to offer information on alternative prices, then he could be asked to show his costs of production for those raw materials. Direct requests like this, even if they do not extract the figures, can certainly serve to help TTD in judging better whether the sale of raw materials is a key profit generating item for the licensor. Once some figures are available then TTD can compute the excess cost incurred by the licensee through the obligation to buy raw materials from the licensor instead of from other, cheaper suppliers, or from the licensor at the prices he charges in other countries, or at prices which better reflect the licensor's true costs of production for them. That excess cost is obviously part of the real cost of the licensing agreement, and when calculated over the whole duration of the license might easily turn out to be far more significant than the royalty payments. Hence those costs must be a critical element in the negotiation of the contract; any draft which did not reflect that factor would be gravely deficient. It is for this reason that several countries have outlawed such 'tie in' clauses; while that is not done in Egypt, TTD can serve a valuable role in showing enterprises how they can save through avoiding such penalties.

107. The illustration just given shows how the royalty may turn out to be only a small proportion of what the licensor expects to gain from the agreement while similarly it may be only a minor fraction of what the Egyptian will really have to pay. Consider now export restrictions i.e. where the licensing arrangement forbids the Egyptian firm to sell products made under patent in foreign markets. Again many developing countries have outlawed these clauses but Egypt has yet to do so. Moreover, it is worth

bearing in mind that since some foreign licensors want to use Egypt as a platform for penetration into markets of neighbouring countries, it is likely that several agreements here contain partial restrictions, i.e. where the Egyptian licensee is allowed to export to the neighbouring lands but not elsewhere. What is the cost of such a restriction? It is essential to remember that there will only be a cost if a foreign demand exists in a country where export is forbidden by the agreement, if the Egyptian licensee would be likely (during the life of the agreement) to achieve the production levels, costs and qualities to fulfill that demand under competitive conditions with other exporters, and of course if it would be profitable for the Egyptian licensee to do so. From the firms point of view, and provided these conditions were satisfied, the cost of the restriction would be the profit foregone through not being able to export. That profit foregone is made up of the direct profit through the foreign sales plus any indirect gains that the firm could make (e.g. it might realise economies of scale on its whole output and thus reduce unit costs, or the exports could strengthen its competitive position, and so on). If the foreign exchange which could be earned through exports has a particularly high value to the economy of Egypt (in technical terms, if the shadow price of foreign exchange exceeds the prevailing official rate - a situation which exists in Egypt now, as can be seen from the spread between black market and official prices of foreign currency), then those export restriction clauses should also be removed in the light of the country's interests.

108. Both examples given imply that TTD must do detailed work with the firm. Registries in other developing countries often do not have to make such efforts since the laws under which they function forbid such practices; in Egypt the task will be harder until such a policy is established. The examples further demonstrate that the real cost of an agreement may go much beyond the apparent cost, which is another way of emphasising that the agreement can only be evaluated in its totality. Furthermore, as question 3 shows, the agreement also has to be looked at in relation to other agreements which it may imply or which may be required in order for it to function. As stated in the beginning of this section: while decomposition of an agreement is needed to permit careful economic assessment of the component elements, TTD's evaluation of the agreement must be made in its totality i.e. bearing in mind how the various pieces fit together and how the particular

agreement might mesh in with a pattern of agreements into which the licensee has entered or could be persuaded to enter. This statement of course applies not only to license agreements but to all agreements concerning technology. It is, of course, for this fundamental reason that we stressed how TTD's longer term objective must be to work backwards from the contract until it is influencing the whole process of preparation and negotiation.

109. Know-How Agreements

These are the toughest in terms of straight economic evaluation, and that for two simple reasons. First, the familiar adage that you do not know what to pay for such intangible items until you have received them - but if you have them there is no need to pay. Second, by its nature any useful know-how tends to be supplier specific and in that sense is a unique item over which the supplier has a monopoly power. The difference between what it really costs the supplier to provide you with this know-how and what it may be worth to you is potentially enormous. There is, in short, no such thing as a 'fair price' for know-how. The practical problems are thus those of devising some kind of 'fail safe' procedures to minimise risks and make some assessment of the cash values at stake. The brief discussion which follows is only to highlight some of the issues. Again there is an extensive discussion in the UNIDO "Guidelines" (Chapter III and Annex III and Annex IIB) and ICPE has now a draft study of know-how from the legal angle which does, nevertheless, serve to throw into relief some of the economic conundrums.

110. The central questions to ask are:

- (1) What are the components of the know-how and is the supplier the entity which is really in the position to provide them?
- (2) What guarantees are there in the contract that the performance of the know-how will match up to expectations?
- (3) What liabilities are accepted by the supplier for any failures to perform his obligations?
- (4) In what ways will the know-how be transferred (e.g. training of personnel in Egypt and/or abroad, provision of manuals)?
- (5) What payments systems are envisaged in the contract and how do they relate to fulfillment by the supplier of his obligations? Do those payment systems also provide any fallback, insurance clauses in case the Egyptian firm can clearly be shown not to have absorbed the know-how?

111. This short list shows that from the economic perspective, the best procedure is to devise a remuneration method which fits closely with the gains expected and which offers insurances against non-fulfillment. Now the definition of the gains expected is a technical issue and the chances of realising them depend not only on the suppliers performance but also on the degree of preparation undertaken by the Egyptian firm e.g. the care with which counterparts are selected. Moreover, those gains will be realised according to a schedule such that it is possible to identify whether performance is or is not up to expectations. In this stage it is essential for the contract to stipulate what should be accomplished on the Egyptian side such that responsibilities for non-compliance can be clearly seen. The practical method of building insurance into the payments arrangements might be to keep some of the payment in reserve until after the agreement is completed such that the supplier only receives full payment when a certain time has lapsed after completion of the transfer. This arrangement, similar to that in turnkey plant construction deals where the purchaser has some time in hand after the plant has come onstream in which to work out faults, could give some protection. It is, however, open to two objections. The first is that the supplier will try to negotiate for a price sufficiently high so that the percentage he would receive post implementation would just be an addition to already substantial profits. The second is that the cost to the Egyptian firm if things went wrong (e.g. if the deal had concerned process know-how and the domestic enterprise was finding it too difficult to manage the process) might be much greater than is covered by the percentage kept in hand. It seems difficult to devise any general procedures which would resolve these questions: to put the point another way, TTD will make its best contribution through helping the local firms to specify carefully and prepare well for any know-how transfers. If that is done then the financial arrangements can be approached with more confidence; at all times the payments must be linked to performance as closely as possible.

112. Know-how agreements will again be of varying importance to different categories of firm. On the assumption that full transfers of know-how are what is really sought in technology transfer, and that only when know-how is mastered such that it can be diffused elsewhere in Egypt, will there be success, it is clear that PE have a special interest in these arrangements. Given that they operate in the critical sectors where know-how is needed,

their spearhead function is evident. For them, the negotiation of these agreements must be done to specify timetables of absorption and costs. With JV the situation regarding diffusion is quite different, since presumably their market position is affected by their ability to keep the knowledge secret rather than diffuse it; the extent to which more favourable clauses can be negotiated is thus limited. For LP the significance of these arrangements is likely to be less, because of sectors and size, than for PE.

113. The ideas here can be applied to management service contracts, which relate to a particular kind of know-how, namely the organizational type. In other words, the need for the agreements in the first place has to be seen in relation to some notion of industrial priorities; how useful are managerial improvements in different areas? Within that, the attempt must be made by TTD, in consultation with the Egyptian firm, to devise quantifiable criteria to determine whether performance is up to standard, and then link payment to a performance schedule. Thus if it could be seen that Egyptian staff had so increased their management skills that say inventory costs had fallen appreciably, important savings were being registered through better cash flow management, better forecasting of demand was taking place, then it would be possible to indicate numerically how the management service was helping.

114. The onus in this kind of evaluation as in the earlier ones is on acquiring good information and then relating it to schedules which link performance, guarantees, costs and benefits. The operational procedures discussed in the next section try to indicate what kinds of data should be gathered on a standard basis by TTD if it is to carry through economic evaluation.

#### 115. Operational Procedures

##### The Gathering of Information

Analysis and improvement of the technology transfer process depends on the kind of information which TTD can gather and how it uses that information. Three kinds of information can be distinguished: (i) the contract itself; (ii) data from the Egyptian firm concerning its identity, activities, technological situation and reasons for obtaining new technology;

(iii) data which is explicitly sought from diverse sources by TTD in order that it can carry out its evaluation work - examples might be the availability of alternative technologies and suppliers, market structures within Egypt, trends in technological change outside Egypt and so on. Item (i), the draft contract, is information which TTD will receive automatically as the starting point for its appraisal work i.e. the draft contract is the object of appraisal. Items (ii) and (iii), however, will only be collected in response to the efforts of TTD. Item (ii), in particular, requires the preparation of standard questionnaires which firms should complete and submit with the contracts at the time they request appraisal. For the firms under GOFI jurisdiction, whether PE or LP, TTD itself has autonomy in the preparation of forms. For JV the procedure will depend, at least to begin with, on TTD receiving pertinent material from GAFI. At present GAFI requests JV to submit material covering project information (including management structure and a brief reference to technology transfer), market survey, site location, structure of ownership and financing, capacity, investment costs (including machinery and equipment costs), earnings and returns, operating expenses, profits and internal rate of return, sources and use of funds, and balance of payments impact. It will clearly be necessary for TTD and GAFI to work out together a suitable questionnaire to cover JV cases; this could be done within the frame of GAFI's current requests for information by rearranging the items under a separate major heading 'Transfer of Technology'. The reply on that heading would then be forwarded to TTD with either the separate contracts for technology or the full contract within which technology is subsumed. It is understood that TTD and GAFI have already begun conversations on the content of the Transfer of Technology questionnaire. TTD staff have prepared a first draft of the questionnaire which could be used for item (ii); what follows is an elaboration of some points found from experience in other countries and which may help in finalising the questionnaire.

116. UNIDO has surveyed the registry application forms used in Argentina, Colombia, Mexico, Philippines, Portugal, Spain and Venezuela and found that the following elements are included in all of them:

- Name and address of supplier and recipient of technology
- Identification codes within national industrial system
- Structure of ownership and financing of the domestic firm
- Structure of production in the recipient firm
- Structure of inputs, distinguishing by type and origin
- Employment by type, amount and whether national or foreign
- Information on the technology i.e. the purpose in seeking it
- Equipment, patents and trademarks included in the contract
- Expected payments for technology over the next 3 - 5 years
- Expected production, sales and exports over the next 3 - 5 years

117. These 10 basic components are found in all contracts. In addition, the survey found that some of the countries included one or more of the following elements:

- Alternative technologies considered
- Description of problem which led the recipient to seek the technology
- Adaptation of the technology for local use
- Research carried out by recipient firm during past five years
- Prices of substitute or similar products
- Quality control system employed

118. Since the registries do not normally reveal the detailed calculations which they may undertake for review and evaluation of contracts, it is hard to estimate how frequently and in what ways the data are used. It must be remembered, however, that in Egypt the intention is to engage in careful technical, economic and legal evaluation, which implies that more rather than less data may be needed. TTD has two options: it can design questionnaires which are complete in the hope that all relevant data can be obtained at a single step; or it can use reduced forms, asking further questions only in those cases where it wants to enter into greater depth. The choice is affected by the range of firms which TTD is dealing with, through GOFI it can always supplement information on PE, but this may be harder to do for LP, and much harder still for JV, by the reticence which many firms may have in present circumstances for providing TTD with lots of data, and by the fact that TTD needs to build an information base regarding technologies currently in use in Egypt, who is using them, where they are from, and so on.



119. With these factors in mind, the following questionnaire (registry application form) is suggested:

I. Identification of Firms

A. Egyptian

Company Registration Numbers (IRO, CRO, GAFI and TTD)

Company Name, Official Address

Names of Chief Operating Officers

B. Foreign Supplier

Company Name, Official Address, and Address of any Offices in Egypt

Names of Chief Operating Officers, and of Senior Staff permanently located in Egypt

II. Structure and Activities of Egyptian Firm

A. Financial Data

Equity Capital: Size, Ownership (Domestic and Foreign Holders)

Loan Capital: Size, Sources

Profit Performance over past three years

B. Production Data

Number of plants and location (governorates)

Outputs by Product, Value and Destination (for past three years)

Inputs by Type, Cost and Origin (for past three years)

Size and Composition of Staff (Management, Engineers, Technicians, Skilled Labour, Administration and Services)

III. Technological Situation of the Egyptian Firm

A. Production Process Currently Employed

Description

B. Imported Technology

Number of Contracts, Subject, Source, Estimated Cost

Firm's assessment of the use of this technology

C. Technology Purchase in Egypt

(as for B)

D. Sales of Technology by the Firm

Number, Subject, Destination, Estimated Value

Firm's assessment of the level of this technology (was it adapted from imports, etc)

E. Technological Development Work Currently Undertaken by the Firm

Purpose, Kind of Work; Trouble-shooting, Modification of Output or Input

Mixes, Internal Workshop for Producing Pieces of Equipment, Laboratory (Testing), Stage reached, Staff involved, Cost, Estimated Results

IV. The New Technology

A. Nature of the Technology

Embodied in Machinery and Equipment; Know-How; Technical Assistance; Engineering Services; Training of Technical Staff; Patent Licensing

Age of the technology, proven experience of the supplier in using and transferring the technology

B. Reasons for Acquiring the Technology

C. Estimated Impacts of the Technology

Production, Sales

Inputs of Machinery, Raw Materials and Human Resources

Market Situation of the Firm

D. Estimated Cost of the Technology Contract

Direct payments (e.g. royalties - give for next three years)

Indirect charges (for next three years)

E. The Alternatives Considered

Indicate briefly why this technology and supplier were chosen, whether any alternatives were seriously examined, and the time taken to plan and choose the technology

V. Annex - to be completed by TTD

Staff member responsible for evaluation

Observations on the Contract

Results of renegotiation (if any)

120. It would be a mistake to use this form, or some variant of it, without some initial testing on a pilot basis. This should be undertaken with different kinds of firms, starting with PE under GOFI, and in consultation with government staff (especially in GOFI) who are well experienced in major sectors e.g. chemicals. In assessing the need for modification, TTD should bear in mind that such questionnaires have a didactic value i.e. it sometimes pays to keep them a bit more complex than the firms would like to see because the very act of posing the questions forces the firms to examine possibilities they might not otherwise have considered. Of course the form can be changed when TTD has had some experience in using it and notices that some aspects are more useful than others, or that certain things have been omitted. Mexico, for example, has progressively increased the complexity of its data gathering, and the forms used today are not those with which things began in 1973.

121. Item (iii) of paragraph 42 is that crucial element of data gathering which cannot easily be reduced to standard forms. This requires imaginative searching which will differ from sector to sector, firm to firm, and even from time to time. Table 2 above has illustrated some of the possibilities, but they should be seen as general signposts rather than detailed maps of the terrain. There tends to be (happily its not always so) a direct relationship between the specificity and value of information and its cost; the more up to date and detailed the item, the more you pay. What TTD should do, as far as possible, is obtain as much access as possible to those data sources which can at least define the parameters of problems. It should then retain the option of calling in short term, perhaps high cost, advice at critical moments in evaluations. One use of funds under the UNIDO/UNDP programme should be for that purpose (especially because the outlays will probably be in foreign exchange).

122. Effective evaluation by TTD means combining the three sources of information to assist the firms. This implies not only that TTD should go to the firms but that they should come to TTD to draw on its information, perhaps when they are at the very early stages of thinking about some technological purchases. For TTD to respond effectively, as well as for the efficiency of its own work, it requires a system of information classification and codification.

123. The principal files which should be kept would be:

- (1) An index of domestic importers of technology, cross classified by type of firm (PE, JV and LP), sector, and nature of technology agreement (patent licensing, management services, etc)
- (2) An index of foreign suppliers, cross classified by sector and nature of agreement
- (3) An index of technologies which can be supplied within Egypt, classified by their nature and the name of the supplier
- (4) An index of information suppliers (the item iii of paragraph 42)
- (5) A collection of case history information i.e. annotated files giving the contracts, action taken and results obtained.

Those files should be open to the firms to the extent possible (the need for confidentiality will obviously be a limiting factor).

124. Assistance to the Firms

It is recommended that, following the practice of some other offices, TTD build bridges to the firms by offering them active support through:

- (1) The organization of brief training courses which help the firms to absorb the technology of technology evaluation
- (2) The regular production of bulletins which summarize the material at TTD's disposal, especially in terms of technology offers
- (3) The preparation of brief analytic reports which serve to summarize TTD's view of the problems encountered and the steps which firms can take. There is an urgent need for this function in Egypt where much of what is known is oral rather than written history, in the field of technology imports
- (4) The dissemination of data about technology fairs and other gatherings where firms can obtain relevant ideas

125. The whole discussion of TTD's operations has been conducted on the assumption that the services would be provided free of charge. However, the activities do have costs, both of LE and foreign exchange. Other national offices do impose registration fees designed to cover part at least of the expenses and consideration should be given to the progressive introduction of some fees. This will be important as the service extends.

## APPENDIX IA

### CURRENT PERSPECTIVES ON TECHNOLOGICAL DEVELOPMENT IN DEVELOPING COUNTRIES: THEIR RELEVANCE TO EGYPT

#### I. Recent Experience in Developing Countries

##### A. The Technology Import Process

- Since end 1960s, concern that rapidly growing costs, many of which were disguised, were having an adverse impact on the balance of payments, the profitability of domestic firms, their freedom of decision making, and on the use of domestic resources including technological resources
- Spread of legislation, particularly in India and Latin America, of chiefly regulatory character aimed at strengthening the bargaining position of domestic firms, public and private
- Emphasis on the close links of foreign investment, sales or lease of technology, and the power of large corporations, and thus the use of concerted policy measures, especially relating the investment process to technology import process, to try and unpackage the arrangements
- Recognition that the success of such policies would depend on the support received from overall economic policy; if the outcome were positive, not only would costs of a financial kind be reduced but a much greater space would be created in which domestic firms and institutions could try to use the external inputs as a springboard for their technological development
- Shift of the regulatory approach to international debate, through UNCTAD Draft Code of Conduct on Technology Transfer, WIPO/UNCTAD Revision of Paris Convention for Protection of Industrial Property, Various Draft Codes concerning Transnational Corporations: in short, an ongoing effort to establish rules of the game

- Recognition that knowledge is power and thus Developing Countries have to develop information systems relating to the commercialisation of technology, the alternatives available both in techniques and suppliers, the legal procedures for handling technology (e.g. the definition of know-how), and case studies of the import process as a basis for elaborating Guidelines to assist in negotiations
- Efforts to respond to these requirements through UNIDO IIES scheme of technological information exchange, now comprising 15 Developing Countries as full members (including Egypt, through GAFI) with double that number actively working towards membership, through UNCTC information system on Transnational Corporations, and through ICPE bringing together Public Enterprises from more than 30 Developing Countries (including Egypt) to develop Guidelines concerning the import process through a combination of case studies and conceptual analysis
- Hence awareness has been created, many operational steps have been taken, and Egypt can draw on a rich well of experience

#### B. The Changing Context of National Policies

- Given the major reorganisation and structural change in the international economy, several Developing Countries have had to be flexible in their handling of technology issues (e.g. Mexico, with petroleum exports of recent years, and some modification of its relationships with major technology suppliers, has been less severe in treatment of various imports of technology)
- Industrial priorities have been reexamined in various countries and with that an attempt to bring together sectoral needs, the balance between domestic/foreign and public/private enterprise, and the kinds of technology suited to the aims at hand; prominent in the reexamination have been the necessity to utilise domestic resources and supply domestic requirements on the one hand, and the imperatives of rapid technological change in various sectors on the other
- So far the movement is towards a better understanding of the differentiating factors from one country to another, and to

to a search for the appropriate policy mix which can, in conditions of dynamic shifts in the international economy, make the best use of the four components of power potentially available to any country with respect to its dealings in technology i.e. political power, resource power, information power, and bargaining power

### C. The Development of Domestic Capabilities

- Growing concern with the impact of the import process on the use and expansion of domestic technological skills; is a real transfer taking place?
- Focus on the internal measures essential to the proper selection, acquisition, absorption, modification, reproduction and diffusion of imported technologies
- Appreciation of the institutional implications of such measures, including the use of Public Enterprises as the vanguard of unpackaging, the mobilisation of domestic producers and the diffusion of technology, the links between enterprises and research institutions, and the crucial role of learning through doing

## II. The Context in Egypt

### A. Industrial Restructuring

- Dramatic opening of the economy since 1974; the ratio of trade (imports plus exports) to GDP was 0.35 in 1972/73 yet almost 1.0 by 1979/80. Of all Developing Countries with population more than 20 million, Egypt is now the most trade dependent
- Composition of imports has altered sharply with the share of Machinery and Equipment purchases rising from 14% in 1974 to 31% in 1979
- Internal emphasis on expansion of investment, now averaging 30% of GDP, and thus modernisation through scrapping of obsolete equipment and the installation of new productive capacity
- Much of the new investment is undertaken by existing Public

- Enterprises (which accounted for nearly 2/3 of production in the national industrial sector at end 1970s) but an important and growing proportion comes from the Joint Venture firms (expected to take 37.5% of investment under the 5 year programme of the Ministry of Industry, 1980/81 - 84/85) and to a lesser degree Egyptian Large Private firms
- Shift towards a multi-dimensional industrial sector (combining public and private, domestic and foreign) accompanied by a shift in emphasis of Allocative Mechanisms; increasing reliance on the market and competition and less confidence in any kind of planning
  - These changes occurring amidst a strong attempt to reduce the flow of public funds to Public Enterprises, thus forcing them to modernise either by borrowing at rates of interest which, for most, clearly exceed their capacity to pay, or by transforming themselves into Joint Ventures. Since foreign capital is only prepared to take a part in firms which are already profitable or otherwise fit the business strategies of the foreign supplier, the risk is that the weaker firms will be those which remain in the Public Sector
  - The institutional corollary has been decentralisation of decision making powers within the administration, the explicit or implicit application of different criteria in assessing industrial project proposals, and a (to some extent inevitable) confusion about what priorities govern the choice of projects
  - The administrative structure, and in particular certain parts of it, is under additional pressure due to the pull exerted by the Joint Venture and Large Private firms in the competition for skilled manpower; the resource allocation process thus has a direct effect on the availability of staff for purposes of industrial policy



### B. The Technological Challenge

- Restructuring has been possible due to the inflow of resources from abroad and the exploitation of petroleum at home (which has thus been a major foreign exchange earner). Hence an opportunity exists to put the economy on a basis for the future which would rely far more on the mobilisation of domestic skills and thus sustain growth when the extremely favourable conditions of transition which have prevailed in the recent past no longer apply
- The combination of foreign with domestic resources will be best when the former are provided on a long term basis with clear identification of the financing and technological components, and when the projects embodying them are properly screened, evaluated, selected and monitored by Egyptian institutions
- To use the transition has external and internal implications
- Externally the bargaining position of Egyptian enterprises may be strongly conditioned by the politico-economic factors which have themselves contributed to the modernisation process; thus the freedom of choice for enterprises, particularly because of the links between supply of credit and supply of technology, may be quite limited
- Internally the emphasis in recent years on creating industrial capacity without worrying too much about the concomitant creation of technological capabilities may have already circumscribed opportunities in some sectors while the Joint Ventures now established are not likely to alter their patterns of behaviour in the near future
- Information about the import process remains very imperfect. It is evident that the large majority of technology inflows come in the traditional form of packages, either through turn-key projects or Joint Ventures and that the habit of bundling together equipment purchases with "disembodied" technology (e.g. licensing arrangements) renders it difficult to sort out the one from the other

- Hence there appear to be no reliable data on the costs of technology imports disaggregated by type; no comprehensive analysis of contracts containing technological components appears to have been made; while "oral history" suggests that several cases of technology bargaining have occurred in the recent period, there is a serious lack of documented case studies from which lessons could be drawn and adequate guidelines prepared; studies of important subjects, such as the extent of indirect pricing for technology (e.g. through tied purchases of raw materials) or behavioural patterns in key sectors, seem to be few and far between; though there may be some inventory type information on the availability of domestic technological skills, it seems unlikely that they have been integrated with ant technology bargaining within the context of a strategy for unpackaging
- The current stress on rapid increases in productive capacity along with extensive management training to handle that (these management and industrial service arrangements thus being a significant element of technology transfer at the present time), implies that time will be needed before there is sufficient appreciation of what is at stake. A major task for enterprises and government institutions involved in questions of technological development is therefore to build an audience and generate a dialogue, that dialogue should be in the spirit of harnessing the transition towards laying the foundations for sound long term growth in capabilities as well as capacities and in this way breaking one of the severest constraints on development.
- There must be mutual support between enterprises and government bodies in this endeavour. The latter should be seen as helping and assisting the former rather than trying to direct or control them; given the pressures firms are under, the only reason why

they should cooperate with official agencies working in the technology field is that they can gain something from that cooperation. If that can be obtained, then the agencies themselves will be far better placed to improve their work and assist the elaboration of policy

- These chances of cooperation and indeed its purposes may vary depending on whether Public Enterprises, Joint Ventures or Large Private firms are considered. The scope is liable to be greatest for the Public Enterprises; but if they are expected to be greatest in terms of contributions to domestic technological development, they will surely require strong back-up assistance. Any technological development has its risks and they often militate against short-term profit criteria; without financial guarantees, firms are not going to trade the latter for the former
- The management of technology is itself a technology and should be diffused as fully as possible within the economy

### III. The State of the Art

- The preceding comments indicate some areas in which dialogue should concentrate:
  - (a) Egypt is now redefining its development strategy; what does that imply for industrial policy, technology policy and approaches towards the transfer of technology?
  - (b) Can enterprises relate broad directions of policy e.g. to increase employment, to their technological choices?
  - (c) What are the principal problems facing enterprises in the preparation, negotiation, and implementation of projects involving foreign technology?
  - (d) What methodologies have been formulated by government bodies and/or firms to handle the technology import process?
  - (e) In which areas and in what ways could the government agencies assist the firms?
  - (f) What is known about the development of in-house technological capabilities by firms and what have been the pluses and minuses of that development?
  - (g) Are there many prospects for using internally developed

technologies within Egypt and, if not, do the difficulties spring only from lack of supply or is there a limited demand?

(h) How can the links with domestic R and D institutions be strengthened?

- Dialogues cannot be single-shot affairs, with a relapse afterwards into familiar patterns; what mechanisms could the forum propose for follow-up? Could UNIDO or other UN bodies play a continuing role in such support activities?

Peter O'Brien

Cairo

May 1981

## APPENDIX IB

### NOTE ON THE ROUND TABLE DISCUSSION ON "CURRENT PERSPECTIVES ON TECHNOLOGICAL DEVELOPMENT IN DEVELOPING COUNTRIES AND THEIR RELEVANCE TO EGYPT" CAIRO 20 MAY 1981

1. The meeting was attended by some 45 persons, including about 20 from Public Enterprises (8 Chairmen among them), from GAFI, Patent Office, ESRT, UNDP, BIDDC, Industrial Consulting Offices and a consultant from USAID.

2. The theme of discussion was the impact of current economic policies on the prospects for technological development in Egypt. The country seemed to be going backwards; whereas in the 1950s and 60s turnkey industrial projects were comparatively rare, a fair amount of licensing did take place, and it could be said that the country was following a pattern of unpackaging of technology imports, the situation these days was the reverse. Joint Venture projects were frequently turnkeys, Public and Private firms were demonstrating a "chameleon effect" as they switched from an emphasis on production to one on commercialisation, and professional staff were having their confidence destroyed by a process which focussed on the superiority of foreign technology and the chronic problems in doing anything locally. There was, in short, a serious danger if not already the reality of damage to the country's technological base which would be of an irreversible character, at least in the medium term.

3. The marked changes in industrial structure had powerful institutional effects. Public Enterprises were being used as balancing mechanisms, in the sense that while they were starved of the funds with which to carry through modernisation, and thus driven to consider transforming themselves into Joint Ventures (when there were takers), they were simultaneously subject to various controls on their prices and outputs in order that they could continue to support the social welfare aims of the government. To encourage the inflow of investment GAFI had been established and yet it had no capability to undertake technological assessment of projects and in fact even approved projects before technology agreements had been signed. It was argued by some that there had to be some division of competence among institutions, with GAFI having clear control over financial and economic issues for Joint Ventures, but others felt this split to be artificial - there was little sense in separating economic and technological aspects of projects when they obviously formed inseparable parts of a whole. The present set up had led to a fragmentation of information in the system; GAFI, for instance, had data on licensing agreements (which it submitted to UNIDO TIES system) while GOFI had mainly material relating to contracts which stressed machinery and equipment purchases.

4. In the present context the links between production enterprises and domestic R and D institutions were also extremely feeble. Few were interested in the creation of technical skills and this was sapping the belief of both institutions and individuals in the utility of their work; little was gained if the results of development work were never seen in practice. The import process, due to its lack of concern with unpacking, accentuated the absence of ties between the production and research systems and the problem was compounded still further by the rapid advances in several areas which were beginning to affect (or had already affected) production processes, the creation of new products and indeed the growth of whole new sectors. The situation was thus still worse than the familiar one of research being divorced from domestic production and problems while locked into technological advance abroad - even the latter does not hold for Egypt today.

5. The dilemma was thus whether it was possible to consider the elaboration of an explicit technology policy with its concomitant institutions when overall economic and geopolitical directions were so clearly determining the actions of firms, government departments and R and D institutions. It was suggested that the only feasible strategy at the moment was to develop and deepen the dialogue of which the meeting itself was part through the preparation of studies which would focus on critical aspects of the import process (e.g. costs), through the documentation and analysis of detailed case studies designed to pinpoint the difficulties now confronting enterprises, and through the use of these studies and case histories as inputs for the preparation of appraisal methods for handling technology deals, and through the organisation of workshops (perhaps with the support of UNIDO) to diffuse the approach. Nobody could be under any illusion that the strategy would represent anything other than a long and complex task of persuasion. For this reason GOPI must treat the meeting as only a first step in a continuous dialogue. The next meetings could be devoted to a first sketch of some of the case studies and to a detailed listing of the types of problems now facing the firms. That dialogue should be more open, as it tried to draw in Joint Venture firms and Egyptian private ones as well as the public sector enterprises.

## APPENDIX 2

### THE DEVELOPMENT OF TECHNOLOGICAL AWARENESS: THE FRAMEWORK FOR A PROGRAMME EGYPT

1. The main body of the report has argued that the present conditions in Egypt are distinctly unfavourable for the organisation of a National Technology Transfer Office. Furthermore, the text has indicated that the current programme within GOFI is under severe pressures. In these circumstances it seems unlikely that the extent of implementation of the present programme will improve substantially in the near future.

2. In a medium to long term perspective, however, there can be little doubt that the needs of the economy will urge a rapid growth in the number of persons familiar with procedures for handling technological decision making. These persons will certainly not be concentrated in a single public institution but rather they are likely to be located in various organisations, both public and private. What seems to be required, therefore, is a programme which will, over a period of some two to three years, train a significant number (maybe around 200 persons) who will ensure that similar approaches are adopted in different organisations. The core staff for a future National Technology Transfer Office could be recruited from this group of trained persons.

3. The methodology of the programme would follow the Technology Workshops procedure already elaborated and implemented elsewhere. Tentatively, two or three workshops per year, each of a duration of six to eight weeks and with twenty to twenty-five persons attending, could be envisaged. The workshops would focus on the practical application in Egypt of the technical, legal and economic ideas which have been elaborated in recent years. At the workshops the stress would be on case study analysis i.e. in depth examination of the problems encountered in preparing, negotiating and implementing technology import operations in both public and private sector organisations in Egypt. The case study method would simultaneously allow participants to utilise their own job experience, could provide immediate assistance to domestic firms needing help, and would yield the vital information base without which a future National Office could not hope to function adequately.

4. The case study analysis should, taking the workshop series as a whole, provide detailed study of the technical, legal and economic aspects of decision making. An important outcome of the workshops would be the creation of a decision making environment in which people became accustomed to working in multidisciplinary teams. By the same token the practical cases dealt with would demonstrate the roles which different government organisations can or cannot play in the decision making process.

5. While the essence of the programme would derive from the case study character, the preparatory studies should cover some basic information collection and analysis which at the moment is hard to obtain in Egypt. Among such studies would be analysis of contractual costs and their incidence in different sectors, the impact of transfer pricing and other invoicing practices on the cost of technology imports, studies of disaggregation methodologies and so on. Thus the idea would be to create not only the people but also the in depth picture of what is happening in Egypt.

6. Inputs to the programme would come from organisations and individuals within Egypt as well as from outside groups and persons recruited through UNDP/UNIDO funding. Small coordinating groups should be appointed both in Egypt and in UNIDO and they should be responsible for launching the programme and carrying it through. An initial preparatory period of at least six to nine months would be necessary in order to determine the main outlines of the programme, publicise it, organise the content of the initial workshops, select both the workshop animators and participants, and arrange for work to begin on case studies. In that initial period the coordinators should have discussions with groups in other countries who have undertaken similar tasks, build up the documentary base essential to proper running of the workshops, and even explore the prospects for any supplementary financing (perhaps from bilateral sources) which may be felt necessary.

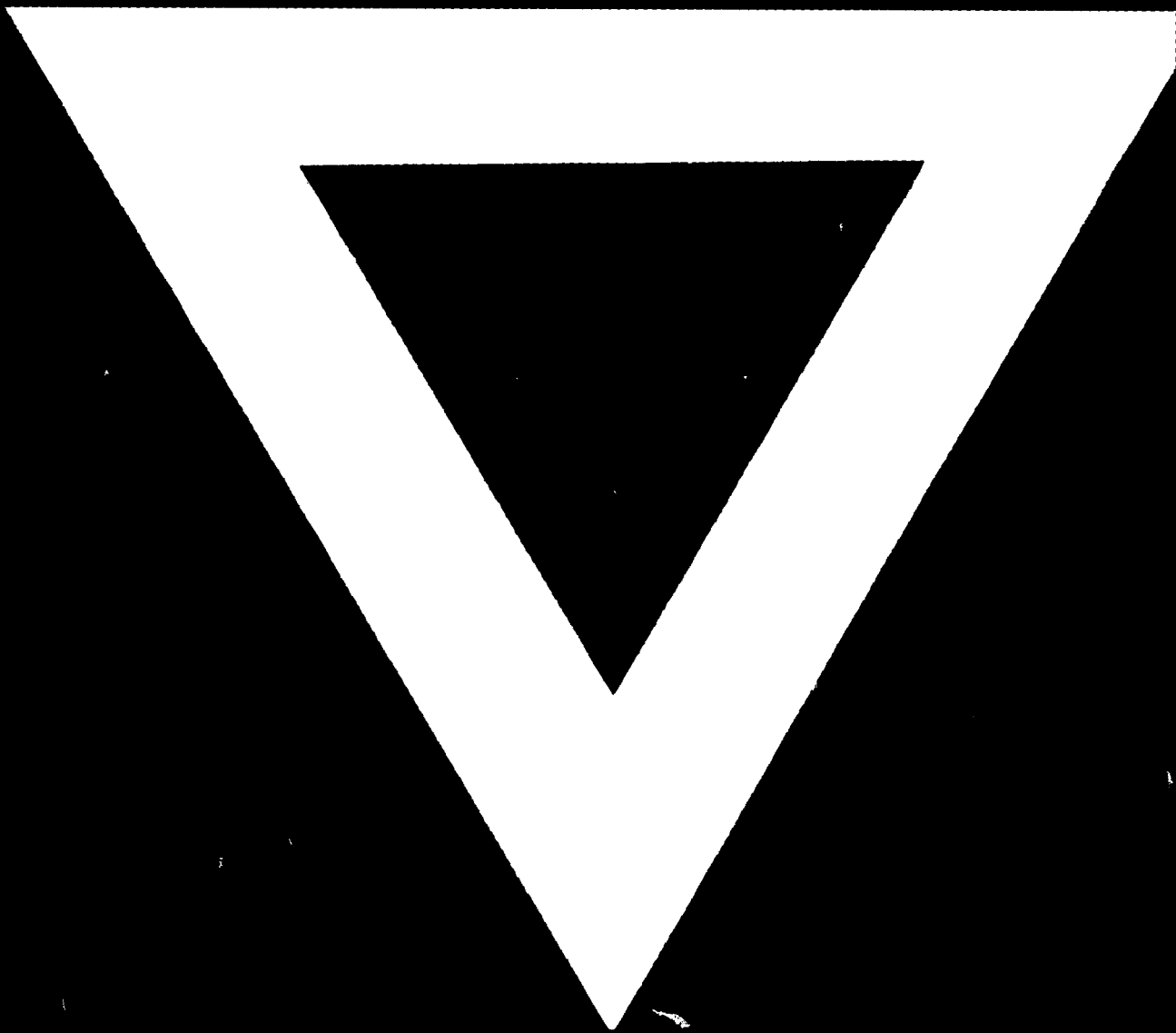
7. Evidently the procedure sketched here would require significant organisational procedures from those under which the current programme has been run. In particular, the idea of a coordinating team in Egypt shifts away from the focus on a single governmental institution which has hitherto provided the reference frame. Discussions would be required at an early stage to ascertain the composition of that group and its relationship to the public and private organisations.



By the same token UNIDO/UNDP would have to make provision for the permanent support to the programme required by the formation of a corresponding coordinating group outside Egypt.

8. Instead of expending substantial resources on visits abroad by Egyptian participants, the programme would be oriented towards undertaking work within Egypt itself and directly on Egyptian problems. This change of emphasis as compared to the broad structure of the present programme seems warranted by, among other things, the fact that many participants would be drawn from business concerns in Egypt. Present trends suggest that such persons are very interested in the possibilities of developing their technological expertise and the workshop programme would help to cement their involvement in this area.

9. The financial implications of the programme of course require detailed elaboration. On the assumption, however, that local costs for participants would be met within Egypt itself, it seems unlikely that the rate of expenditures by UNDP would need to be much in excess of that originally provided for in the present programme.



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