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POLICY CONSIDERATIONS IN THE FIELD
OF TECHNOLOGY TRANSFER,

EGYPT.
(VC/EGY/75/069)

Project findings and recommendations ^{1/}

Terminal report prepared for the
Government of Egypt

by
Enrique M. Aguilar and Thomaz Thedim Lobo

for the
United Nations Industrial Development Organization

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FOREWORD

The Government of Egypt requested the United Nations Industrial Development Organization (UNIDO) to assist the General Organization for Industrialization (GOFI) in examining the existing institutional machinery dealing with technology transfer and reviewing with Egyptian authorities the experience of Mexico and Brazil in this area (project No. VC/EGY/75/069).

For the implementation of the project, work was conducted in close collaboration with a team assigned by GOFI and selected staff of the Institute for National Planning (INP).

In accordance with the Government's request, a short-term mission was sent to Egypt by UNIDO under the Voluntary Contribution Programme.

The mission was composed of the following members:

Enrique M. Aguilar, Industrial Institutions Section,
Industrial Services and Institutions Division, UNIDO

Thomaz Thedim Lobo, Consultant to the Industrial Technology Division, UNIDO.

During its stay in Egypt, the mission held discussions with representatives of GOFI, the INP and the Engineering and Industrial Design and Development Centre (EIDDC). Various issues were discussed in great detail, taking into account relevant legal, economic and other policy considerations prevailing in Egypt.

This report, together with various Annexes, reflects the main discussions drawn from joint consultations with counterparts and takes into account the views and suggestions of Egyptian officials.

An attempt was made to provide a comprehensive approach at the policy and institutional levels for the establishment of a co-ordinated system to promote and regulate technological and investment transactions into Egypt.

The mission wishes to express its sincere gratitude to GOFI, INP and EIDDC for the most useful information and orientation given by them. It is on the basis of these discussions that the mission was able to formulate various recommendations contained in the report.

The mission is specially grateful to His Excellencies Mr. Issa Chahine, Minister of Industry; Mr. Ibrahim Abdel Rahman, Minister of Planning; Mr. Hassan Abdel Fattah, Deputy Chairman, General Organization for Industrialization; Mr. Ismail Sabri Abdallah, Director General, Institute for National Planning; Mr. Kamel Maksoud, Director of the Central Department of Planning; Mr. Fawzi R. Fahmy, Director of Industrial Planning Centre; Mr. Abdel Salam Mansour, Director, Legal Department for Contractors and International Agreements; Mr. Yusef K. Mazhar, Director, Engineering and Industrial Design and Development Centre, as well as other staff of GOFI and INP that made it possible to accomplish the task of the mission.

The mission would also like to express its gratitude for the overall orientation given in Cairo by the UNDP office.

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INTRODUCTION

Under the country's new Economic and Development Plan for 1976 - 1980 (under preparation) great emphasis is given to a new "open door policy" for foreign investment and technology into Egypt.

This important policy decision entails many responsibilities, and a commitment from the part of the Government to design and strengthen the appropriate institutional infrastructure to meet the overall objectives of this policy.

It is to be noted that the complex problems related to technology transfer, adaptation and development would largely need to be resolved through a national consciousness of the nature of these problems, a political support to solve them and the introduction of concrete measures for implementing a plan of action in this field.

It should be recognized that for the successful implementation of policies in the field of technology, joint efforts are required from the part of government institutions and local enterprises. Several considerations discussed in this report are oriented to highlight the desirability of introducing explicit policies for the regulation and promotion of foreign technology into Egypt.

It was felt that the experience of Brazil and Mexico in the implementation of a technology transfer policy would be a useful reference to Egypt. Although the Brazilian and Mexican economies and their political framework differ from that of Egypt; the discussions held, served to confirm that similar problems and possible solutions in this area would be applicable to all three countries.

The report is divided into three chapters:

Chapter I: Covers certain features of the technology transfer process and reviews the areas of concern in the definition of an adequate government strategy in this area.

Chapter II: Touches upon the functions that should be covered in a national regulatory system for technology transfer and reviews a methodology that may be applied to deal with international licensing transactions.

Chapter III: Provides recommendations for consideration of the Egyptian Government for possible action in this field.

Furthermore, the mission was requested to provide additional documentation related to these problems and for this purpose several annexes are incorporated.

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CHAPTER I

AREAS OF CONCERN IN THE DEFINITION OF AN ADEQUATE GOVERNMENT STRATEGY
IN THE FIELD OF TECHNOLOGY TRANSFER

On the basis of the knowledge and experience accumulated to-date, it is possible to identify several principles upon which the formulation and implementation of government policies in this area should be based.

- First of all, the need to introduce explicit policy measures in the field of technology transfer, that must be differentiated from other policies in fields such as (i) science, (ii) economics, (iii) employment, (iv) education and (v) industry; yet a technology transfer policy that would have to be closely related to them.

- A technological policy must be subordinated to economic and social development objectives.

- The growing complexity of the industrial development process of Egypt would call for the interaction or interlinkage among different kinds of policies to reinforce and support each other and form a coherent whole.

- Market forces are not sufficient to promote by themselves technological development and to guarantee the fulfilment of socio-economic objectives; therefore government action is needed for the regulation of imported technology in order to (i) strengthen the bargaining position of recipient enterprises; (ii) the promotion of interlinkages between indigenous technological efforts and industrial activities; and (iii) to stimulate local technological research and the improvement of technical capabilities at the national level.

The formulation and implementation of technological policies have to be guided by a strategy of selectivity and should contribute to the improvement of conditions for the acquisition of foreign technologies without creating obstacles for the continuous flow of technology into priority sectors of the economy.

In this context, the mission wishes to recommend for consideration of the Egyptian Government, the introduction of explicit regulatory and promotional measures in the field of technology transfer.

In the absence of an explicit regulatory policy in this field it would be advisable to consider the introduction of norms and procedures to regulate and orient technological transactions with foreign enterprises. As a first step certain efforts should be initiated to define a criteria for acceptance or refusal of licensing and technological proposals.

In this area it would be essential to develop a different set of policies for the various productive sectors and branches, as it would not be appropriate to establish a policy common to all sectors. What could be needed will be to design a set of flexible policies that would take into account, among others, the improvement of technological capabilities in the country; the conditions under which technology can be acquired in the international market; the characteristics of the domestic and export market and the different conditions introduced by foreign ownership.

In summary the formulation and implementation of technology transfer policies should be oriented toward these objectives:

1. A more efficient process for the selection of foreign technology;
2. The development of negotiating skills conducive to obtain better contractual terms;
3. A more efficient process for the adaptation and absorption of imported technology;
4. The gradual development and creation of local technologies and capabilities.

In order to meet these objectives, it will be important to consider certain basic principles that should be observed in promoting the transfer of technology into the country.

The flow of technology should be adequate to meet the basic needs of industrialization, involving processes and technical information as to cover the major technological and production gaps already identified within the Economic and Development Plan.

- Foreign technology would have to be effectively absorbed within the shortest period of time and adapted to local conditions, and should be acquired on acceptable terms.

- As already mentioned, there will be a need to establish broad priorities and a degree of selectivity applied, in order to avoid the high cost of foreign technology.

- An important consideration for the definition of government strategy in this area that may constitute a major policy objective in Egypt, will be to promote and encourage the growth of local technological services and facilities. This effort would have to be coupled by promotional measures, to ensure at the same time, that the Egyptian economy keeps pace with international technological developments through the acquisition of foreign know-how in key industrial sectors.

- On the basis of a government policy framework, individual technological agreements would have to be negotiated and the terms and conditions for its acceptance should conform with the overall interests of the economy.

- Finally, it is important to consider the role of local enterprises in the process of technology transfer. This subject will be treated in closer detail in the following chapter, but it should be mentioned that the role of local enterprises, either public or private, is of central importance for the successful implementation of policies in this field.

On the basis of the experience accumulated to-date by Brazil and Mexico, the following elements governing the role of enterprises were identified:

a) With very few exceptions, independent enterprises do not have a systematic approach for the acquisition of foreign technology and its adaptation.

b) The selection of foreign technology is made on the basis of a cost-benefit analysis at the enterprise level and frequently for the purpose of solving specific technical problems without prior investigation of locally available capabilities to fulfil all or some of these requirements.

c) Due to the weaker bargaining position of local enterprises versus the supplier of technology, it is frequently found that the remuneration agreed upon is not in conformity to the type of technical knowledge or services acquired. Additionally, for the purpose of covering a specific technical need, these enterprises often accept contractual provisions of a restrictive nature, in many instances operating against the fulfilment of national objectives, i.e. diversification of industry; export of products locally manufactured, etc.

d) Small and medium enterprises tend to conclude agreements relying heavily upon future technical assistance from the supplier, for excessive periods of time, and no efforts are made to gradually attain technological self-reliance in a particular field.

It should be said that an adequate strategy should call for institutional support and government guidance to enable local enterprises to become more efficient and to gradually attain a certain degree of self-reliance. Furthermore, there will be a need to identify the requirements of the local enterprises and to differentiate the various types of industries within the country, including:

- 1) state-owned enterprises;
- 2) large private-national enterprises;
- 3) small and medium private-national enterprises; and
- 4) foreign subsidiaries or joint ventures.

In order to achieve a more systematic and efficient handling of foreign proposals government attention is required to the various stages related to the planning and implementation of projects, such as:

- a) Pre-investment studies, including preparation of a feasibility study and a detailed project report (DPR);
- b) Basic and detailed engineering, including preparation of machinery specifications, plant design, factory lay-out;
- c) Selection of equipment, plant construction, erection and installation of machinery and start-up of plant;
- d) Acquisition of process or manufacturing technology;
- e) Technical assistance during the post-installation period, including training programmes and various forms of management assistance.

In line with the above, the mission wishes to suggest certain areas of concern for the definition of an adequate strategy in this field:

a) The selection and evaluation of foreign technology would have to include a more direct participation of engineers and technical personnel of local enterprises - through the identification of alternative sources of technology and technologies available at the international level;

b) The need to prepare adequate methodologies for separating the various elements included in a foreign proposal in selected sectors of industry and for identifying opportunities to replace imported by local technologies and services;

c) The preparation of feasibility studies and detailed project reports (DPR) to allow an increased participation of local enterprises and consulting firms in Egypt;

d) Preparation of equipment specifications, plant design, factory lay-out, including the selection, installation and ordering of equipment;

e) The need to develop closer association of local engineers and technicians in the planning and implementation of specific projects, particularly in the areas of basic and detailed engineering;

f) Training of government officials in negotiations of technology transfer agreements from the technical, economic and legal point of view;

g) Training of government officials in administrative matters concerning the classification, analysis and registration or acceptance of foreign proposals, drawing heavily upon the experience of other developing countries, where such an institutional framework exists; and to draw upon the assistance of international organizations, UNIDO in particular;

h) The need to define priorities for research and development work oriented to meet specific requirements at the industrial or enterprise level.

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CHAPTER II

FUNCTIONS TO BE COVERED IN A NATIONAL REGULATORY SYSTEM FOR TECHNOLOGY TRANSFER AND THE METHODOLOGY THAT MAY BE APPLIED TO DEAL WITH INTERNATIONAL LICENSING AGREEMENTS

Taking as a basis the objectives outlined above, the mission wishes to recommend the creation or strengthening of existing institutions, that would have responsibilities in the following areas:

1. Selection of foreign technology

The mission recognizes the existence of government skills in the negotiation of foreign proposals in the industrial field. This responsibility lies at present within the general organization for industrialization (GOFI).

On the other hand, it was possible to ascertain that the main experience, developed by this agency, is related to technological transactions for the purchase of machinery from the international market (supply contracts).

This experience and possibly the scope of responsibility of this agency would have to be enlarged so as to cover the evaluation and approval of international licensing agreements of various kinds; including those which presently do not call for a specific revision.

This may include licensing agreements where the main object relates to:

- (i) use or exploitation of trademarks;
- (ii) use or exploitation of patents;
- (iii) technical information in form of plans, diagrams, models, operating manuals, formulas, specifications and training of personnel;
- (iv) the supply of basic or detailed engineering; and
- (v) managerial and/or administrative assistance.

It is to be noted that an international licence agreement through which a foreign licensor assigns, sells or leases to a licensee the right to use certain industrial property rights and/or technical expertise (know-how) should also incorporate other elements for the fulfilment of

specific requirements of the recipient firm; thus, a technology licence agreement would generally include economic, technical and business considerations, as well as legal elements.

For the purpose of clarification certain definitions concerning the scope of international licensing agreements are presented in Annex I of this report.

In order to introduce a systematic and co-ordinated effort for the selection of technology, the work of government agencies - BOPI in particular - would have to be re-enforced and re-oriented toward the evaluation of alternative technologies. The identification of international sources of supply for technology requires a support of information facilities to maintain an up-to-date reservoir of technical data on available processes or products which are of particular interest to industry.

Government institutions should also have to assist the productive units in the country in improving their capabilities for evaluating and negotiating various contractual provisions. It should be emphasized, that adequate co-ordination among responsible institutions working in this area is essential in order that solutions which are both, technically and economically sound, can be achieved. In this context, the up-grading of technical skills through adequate training programmes at the planning and implementation stages of projects is of particular importance.

2. Improvement of negotiating skills

The mission was able to ascertain that at present there are no explicit policies for the regulation of technological transactions in an effective and co-ordinated manner.

From the experience of other developing countries, in particular Brazil and Mexico, it was found that the absence of specific policies and institutions to deal with the screening and approval of foreign licensing proposals; generally results in undesirable contractual arrangements, due to the weak bargaining position of recipient enterprises in these countries. Furthermore, without the proper government guidance, many

technological improvements and services are contracted for, without due consideration to the industrial priorities of the country.

Drawing further from the experience of these countries, it is recognized that local enterprises both, public and private, have a central role and responsibility not only for the implementation of specific projects, but also in the decision making process to formalize licensing arrangements.

In this context, the mission wishes to recommend the need to develop guidelines for acceptance of technological transactions with foreign enterprises and the need for the government to provide guidance and institutional support to improve the negotiating skill of recipient companies.

These skills could be enhanced on the basis of:

- (i) a higher degree of knowledge (information) concerning alternative sources of supply;
- (ii) a better definition of the technical requirements to be satisfied; and
- (iii) the degree of direct government support in this area.

As already mentioned, the regulatory functions would have to be complemented by promotional efforts to adequately encourage the import of foreign technology in priority sectors of the economy. It should be noted that the introduction and the successful implementation of a regulatory policy in the field of technology transfer would require the highest governmental support at the political and institutional level.

3. Adaptation and absorption of imported technology

In order to improve local skills and capabilities in Egypt, certain initiatives from the part of the government should be taken to support this effort.

The gradual absorption of imported technology would require the introduction of changes in attitude by local enterprises, in order to prevent the repetitive purchase of foreign technologies and services and to encourage as well the introduction of technical modifications (adaptations) which would make the technology more suitable to fulfil specific local conditions.

It should be expected, that for the proper implementation of policies in this area it will be required to basically modify certain technical and administrative procedures and to provide institutional support to industry in various areas including:

- (i) industrial training;
- (ii) industrial information;
- (iii) fiscal considerations;
- (iv) local R+D and engineering activities.

The definition and use of methodologies for separating the various elements that form a technological package will be fundamental for the development and absorption capacities, since this effort will lead to a better identification of the components of technical knowledge and to better understand or ascertain the degree of complexity of these various components.

The orientation that should be given to the gradual development of local capabilities, should have to be closely associated with the requirements of the productive units in Egypt and should have as a main objective the development of technical knowledge to be used in productive processes and the capability for autonomous decision making in this field of activity.

These efforts should involve development work on existing technologies; reverse engineering and other activities which could generate or enhance the technical capabilities in priority sectors.

4. Criteria for evaluation of technological agreements

Appreciating the significance of the new open-door policy of Egypt, the mission wishes to submit for the consideration of the government, broad guidelines for the acceptance or denial of international licensing proposals, as well as some recommendations concerning the methodology that may be introduced for this purpose; and to highlight some of the aspects that require attention from the part of the government agency dealing with these matters.

Furthermore the mission recommends the need to undertake additional work in this field, preferably coupled by expert assistance from UNIDA to assist in the definition of methodologies and criteria for evaluation.

These are preliminary recommendations and by their own nature not exhaustive.

- The work of a responsible body within the government in the area of scrutiny and appraisal of technology agreements calls for a multidisciplinary approach and should be provided in an integrated manner.
- The degree of authority to be invested in the government agency will have to be properly defined, and foreign proposals would have to be submitted to a detailed legal, economic, financial and technical scrutiny.
- The purpose of this evaluation is not only to ascertain that contracts comply with all related legal provisions existing in the country, but also to critically evaluate, if the technology or services as well as the obligations and responsibilities to the parties, are acceptable both, to the recipient enterprise and to the Egyptian economy.

In this context, the mission had the opportunity of reviewing Law. No. 43 "concerning Arab and foreign capital investment and free zones"; and it was found to be an important instrument for the regulation and promotion of foreign investment into Egypt. Among the main features of this Law that would have an effect concerning the flow of technology into Egypt the following are mentioned:

- The Law provides for explicit protection to the foreign investor against non-commercial risks, as well as incentives.
- The Law insures the re-exportation of invested capital within a reasonable period of time; and allows for repatriation of profits and for the settlement of disputes through arbitration.
- The Law specifically calls for tax exemption for reasonable periods of time and provides flexibility for foreign currency transactions.
- The degree of foreign participation allowed for specific sectors is explicit and is to be considered an important element of this Law.

In addition to Law No. 43, a number of juridical and administrative provisions existing in the country require special attention, i.e. industrial property legislation, and fiscal and tariff policies, etc.

An important aspect that requires further consideration from the part of the government will be to explicitly define the conditions under which technology transfer arrangements into Egypt can be concluded.

Although certain considerations pertaining to technology transfer arrangements are incorporated in Law No. 43, it would be advisable to define the procedures to be followed for obtaining the acceptance of these agreements. This relates, to the manner in which licensing contracts should be presented, and the type of additional information required for its analysis and approval; screening procedures; recourse of administrative appeal; fees, etc., etc.

In line with the above, two important requirements were identified:

1. That all agreements involving the transfer of technical know-how; services and other kinds of intellectual property (involving foreign equity participation or not) would be reviewed by a competent body within the Ministry of Industry;
2. That specific guidelines for internal use ^{*/} should be developed.

^{*/} At a later date a summary of these guidelines could be made public.

Some of the basic elements to be incorporated in these guidelines are described below:

- Foreign licensing arrangements should include a provision whereby the recipient enterprise or the Government of Egypt could acquire explicit rights to the use and exploitation of the technology licensed, and the period of these rights should be clearly specified in the agreement.
- "Prior disclosure" of technology from potential licensor to licensee should be encouraged so that the government agency and the recipient enterprise could judge upon the suitability of the know-how and ascertain the type of improvements and services required for the implementation of a specific project.
- In order to properly evaluate foreign proposals, the agreement should clearly define the main features of the process or product to be licensed.
- In cases, where the licensee is mainly acquiring the right to practice a process, the term know-how should be clearly expressed and defined in the agreement. In this connection, the concept of "technical information" and/or "technical services" should only be treated as complement to the know-how. Similar considerations concerning a more explicit definition of the "field of use" will be important.
- The remuneration for the various elements of a contract is to be related to the most essential component of the licensing agreement in order to properly ascertain the value of licensor's contribution.
- Whenever various elements are involved in a technology agreement, each one should be evaluated separately and the corresponding remuneration determined, not only to ascertain the relative value of each, but also to provide the basis for determining the licensor's responsibility concerning performance in any of these elements.
- In projects of special importance, the concept of net present value should be introduced as a tool for evaluating the remuneration, together with other economic and technical considerations.

- Where the main element of an agreement relates to an industrial process, licensor should provide process performance guaranties and/or warranties, as applicable, in order to critically identify its adequacy.
- Process guaranties should be covered by licensor's financial responsibility and his liability would have to be in close relation to the value of know-how.
- Where process guaranties or warranties are negotiated, provisions should be made for licensor's discharge of liability by introducing certain provisions for process correction. If the option to pay liquidated damages is available, there should be a provision for licensee to exercise this right in an independent manner.
- On a selective basis a "most favoured licensee clause" should be incorporated in agreements relating to new technologies, to compensate licensee in the event that in future, licensor licenses his know-how to a third party in another country on a more favourable basis.
- To ensure a dynamic flow of information between licensor and licensee during the life of the agreement. This should provide for licensee's access to licensor's plants and related R+D facilities.
- Obtain that licensor informs licensee on "improvements of technology" and ensure that licensee has the option to use such improvements commercially, including those, that are not commercially practised by licensor.
- To define the know-how licensed; as the know-how in use or in position by licensor during the life of the agreement in order to prevent arbitrary separation of know-how from process improvements.

Concerning paid-up licences, it would be in the interest of the recipient company in Egypt to extend the duration period of the agreement to the maximum possible, as licensor's new technical information could be acquired without further compensation.

The considerations outlined above, are only descriptive and are presented to highlight some areas of concern from the part of the government. These provisions could assist in attaining some of the following results:

- that there is a continuous and efficient transfer of know-how from a foreign licensor to a licensee in Egypt;
- that the recipient company acquires the technology with adequate knowledge of all the critical and competitive aspects, so that it can master its operation;
- that a clear definition of "know-how", "technical information", etc. is incorporated in contracts;
- that remuneration to the foreign licensor is determined in relation to the main elements that form the licensing transactions (i.e. know-how, patents, etc.);
- that the remuneration and other forms of compensation bear a close relationship to the technology or services acquired, and is kept in line with international norms in specific sectors;
- that the recipient company in Egypt is adequately oriented concerning the technical performance of processes through the introduction of explicit process guarantees and/or warranties;
- that the agreement clearly specifies the responsibilities of the foreign licensor and the recipient company, in achieving performance of the technology;
- that the recipient company in Egypt will be able to effectively operate in the market-place by negotiating all technology aspects related thereto;
- that a dynamic flow of information on technological improvements is secured;
- that the absorption of the technology occurs within a reasonable period of time;
- that the recipient company in Egypt will be in a position to efficiently operate the plant after the agreement ends.

Note: As an integral part of this report, it is incorporated the basic criteria for approval of technology transfer agreements in Brazil and Mexico, together with other pertinent information generated within UNIDO. However, in order to appreciate the relevance of some of the above outlined provisions, the following background information is also provided:

Although a contract is a legal document that governs the relation between the parties, and their rights and obligations, it is essential that the main elements are clearly defined. Some of these rights or grants are tangible elements, such as the technical information to be supplied, and some others are intangible, such as the right to sub-license the acquired know-how.

More often than not, compensation for the know-how is consolidated in a global sum of money. The government should be interested in a description of the main elements of the transfer, particularly in a contract, where the local enterprise is acquiring the right to practise a process.

The significance of separating the main elements of the contract is to explicitly define the responsibilities and liabilities of the foreign supplier.

For instance, if the licence covers know-how and consultancy services and compensation is only related to this service, and if the know-how appears to be inadequate, the licensor can claim no financial liability, since his income is only related to consultancy services, which he may be effectively rendering. In summary what is needed is to avoid a dilution of the foreign supplier's contractual responsibility.

In the experience of countries like Brazil and Mexico, it was found useful to focus attention on the concept of know-how instead of "technical information", mainly because the foreign supplier could disclaim responsibility by simply providing sufficient information, but not the knowledge for the use of said technical information. In this context, the term "technical information" should be considered as one of the supporting elements of the know-how.

In connection with "prior disclosure" of information what is necessary is not a statement from the part of the foreign firm on the nature of confidential data, but rather a definition of the main technical features and the process key elements (i.e. vacuum fractionation of reactor mixture to yield a 99.5% purity product). This detailed definition would help in determining the uniqueness of the foreign supplier's contribution and to identify as well the key areas of licensor's know-how.

Furthermore, a process description through a prior disclosure agreement will enable to assess the complex areas of the project and to determine as well the capabilities of the recipient company to comply with the various technical requirements.

For the implementation of projects involving high levels of investment it would be advisable to negotiate for a prior disclosure agreement. It should be noted that this type of an agreement normally calls for an initial fee to be credited against future royalties, in the event that the contract is accepted. On the other hand, if on the basis of technical and economic evaluation, derived from prior disclosure of information, the decision of the government or the local enterprise is not to go ahead with the project, then this initial fee would have to be write-off as a loss. Additionally, the analysis of sophisticated technological data calls for high skill and capabilities for evaluation, requiring specialized assistance from technical units in the country.

In this context, the mission wishes to recommend that the analysis of prior disclosure agreements should be selectively encouraged, and the participation of the Engineering, Design and Development Centre to assist in the analysis and evaluation stage should be considered.

This could apply to projects where there is a large investment in plant and equipment, or when the novelty of the process and its adaptation to local conditions requires further technological evaluation.

Furthermore, if the government regulatory agency wishes to associate itself with specialized units in the country, it should ensure that foreign proposals provide access of these units to the information and technological data involved. If this aspect is not incorporated in the agreement, these units will be contractually prevented from having access to the information.

5. Remuneration and payment for technology

An important element in the evaluation and negotiation of foreign technological proposals is the payment for technology. This question is primarily dependent on the technical know-how or services to be acquired; and the criteria for its analysis will have to be developed over a certain period of time.

Nevertheless, because this is an issue of particular importance for the future work, various considerations are presented, in order to highlight certain features and possible requirements at the government level.

It should be recognized that the evaluation of the cost of technology or services is a rather complex exercise; however, one of the central responsibilities of the government agency would be to develop the necessary skills to judge the direct cost of licensing transactions and its effect upon the national economy. Drawing upon the experience of Brazil and Mexico in this area, two basic considerations emerged:

(i) From the point of view of the recipient company, the adequacy of compensation is normally determined on the basis of a cost-benefit analysis at the enterprise level.

(ii) From the point of view of the economy, additional to the cost-benefit criteria at the level of the enterprise, it is important to judge upon the cost of the technology in relation to its value-adding potential, i.e. in up-grading local capabilities; employment of labour, foreign exchange and fiscal considerations, etc.

This question becomes more complicated in view of the fact, that in most of new ventures, the analyses of "cost" and "profit" are speculative and involve assessment of risk. Complicating this matter still further is that the remuneration can be covered through different modalities, such as running royalties; and initial know-how fee; a paid-up licence fee; or a combination of these, etc., etc.

If, for instance, we analyze the effect of continuing or running royalties during the life of an agreement, we would have to note that this will be affected by the type or base that is used for its computation (such as net sales value, volume of production, plant capacity, feestock volumes, profitability, etc., etc.).

Note: For further study of these problems, the report is accompanied by a specialized document - UNIDO/ISID. 23.

Needless to say, a great deal of experience can be accumulated by establishing a government agency, or a system for revision and negotiation of foreign proposals at the government level.

In this context, the mission wishes to recommend that international organizations, and UNIDO in particular, could assist the Government of Egypt in acquiring the necessary skills in this area and to make available to them the experience achieved by other developing countries in this field.

As a matter of illustration the following examples concerning the analysis of remuneration for technology as practised in Mexico are given:

See Annex ID/WG.178/7: page 13 - 24). Among the basic criteria for evaluating the adequacy of royalties in a licensing agreement is to consider the royalties as the licensor's share of the recipient company's profits.

Basic elements to be considered:

R	-	Royalty	(%)
S	-	Net Sales Value	(%)
Y	-	Licensee's Profit on Sales	(%)
P	-	Licensee's Profit	(%)
X	-	Licensor's Profit	(%)
Z	-	Licensor's Share of Licensee's Profit	(%)

$$1. \quad Y = \frac{P}{S} \times 100;$$

$$P = \frac{Y \times S}{100}$$

$$2. \quad X = \frac{R \times S}{100};$$

$$R = \frac{X}{S} \times 100$$

$$3. \quad Z = \frac{R}{Y} \times 100;$$

$$R = \frac{Y \times Z}{100}$$

On the basis of the above the following example is given:

Basic data: a foreign proposal is given as follows:

1. The licence under consideration will enable licensee to reach yearly sales of US\$ 750,000.-.
2. Licensor estimates that in the manufacture of this product licensee can generate a 15% profit on sales.
3. Licensor requests a royalty fee of 5% on the net sales value.

Calculation

$$S = \$ 750,000.-$$

$$Y = 15 \%$$

$$R = 5 \%$$

The first important consideration is to determine what is the amount of the recipient company's profits in US\$.

$$P = \frac{Y \times S}{100} = \frac{15 \times 750,000.-}{100} = 112,500.-$$

$$P = \underline{\underline{\text{US\$ } 112,500.-}}$$

Secondly to determine the amount of licensor's profit.

$$X = \frac{R \times S}{100} = \frac{5 \times 750,000.-}{100} = 37,500.-$$

$$X = \underline{\underline{\text{US\$ } 37,500.-}}$$

Thirdly to determine what is licensor's share of licensee's profits

$$Z = \frac{R}{Y} \times 100 = \frac{5}{15} \times 100 = 33,3\%$$

$$Z = \underline{\underline{33,3\%}}$$

Evaluation

Assuming that the manufacture of the products in question do not derive from a highly sophisticated technology and considering that the know-how involved can be practically assimilated within a relatively short period of time - one to two years - the government agency could decide that the licensor's share of the licensee's profit should not exceed 20 %.

Accordingly, the correspondent royalty should be determined:

$$R = \frac{Y \times Z}{100} = \frac{15 \times 20}{100}$$

$$R = \underline{\underline{3\%}}$$

The effect of reducing the royalty rate from 5 - 3 % will be the following:

Licensor's profit is:

$$X = \frac{R \times S}{100} = \frac{3 \times 750,000.-}{100}$$

$$X = \underline{\underline{US\$ 22,500.-}} \text{ (a direct reduction of US\$ 15,000.- per year).}$$

Accordingly the licensee's profit on sales is:

$$P = 112,500.- + 15,000.- = 127,500.-; \text{ thus}$$

$$Y = \frac{P}{S} \times 100 = \frac{127,500.-}{750,000.-} \times 100$$

$$Y = \underline{\underline{17\%}}$$

As a result of this, we find that licensor's approximate share of licensee's profits will be:

$$Z = \frac{X}{Y} \times 100 = \frac{5}{17} \times 100$$

$$Z = \underline{29.41\%}$$

The final outcome of the government's intervention is as follows:

	Foreign Proposal	Conditions Approved by the Government	Changes by Year (+ or -)
S	US\$ 750,000.-	US\$ 750,000.-	NOIN
P	US\$ 112,500.-	US\$ 127,500.-	+ US\$ 15,000.-
Y	15.0 %	17.0 %	+ 2.0 %
X	US\$ 37,500.-	US\$ 22,500.-	- US\$ 15,000.-
Z	33.3 %	17.6 %	- 15.7 %
R	5.0 %	3.0 %	- 2.0 %

An important element from the part of the government and the recipient company is to consider that the "total amount of royalty involved" will be affected by the duration period of the agreement. Therefore, it is of special importance to establish approximate guidelines for evaluation in which, the permissible duration period is defined for various sectors of industry. The most common period in which royalty payments are called for is between 5 - 10 years. The latter referring to processes of a more sophisticated nature.

Other considerations pertaining to royalties are given below:

Frequently foreign proposals establish royalties on the basis of product-units, thus:

$$\text{Royalty on product} = \frac{\text{licensor's profit}}{\text{licensee's profit}} \times \frac{\text{licensee's profit}}{\text{product-unit}}$$

It is expected that the foreign licensor would determine what would be the royalty fee on sales and on this basis the corresponding amount is allocated to product-unit royalty.

The evaluation of these cases should follow the same criteria and methodology outlined above. Although a very detailed description of the various methodologies to deal with various payment modalities could not practically be incorporated in this report, the mission wishes to recommend that in large projects it would be required to incorporate the criteria of evaluation on the basis of net present value (NPV) for conversion of continuing royalty payments into paid-up royalties and vice-versa.

In this context the following example is given:

NPV is essentially from the compound interest formula:

$$R = R_0 \left(1 + \frac{r}{100}\right)^n$$

where,

- R = royalty payment made in n-th year
- R₀ = NPV of future royalty payment
- r = discount rate
- n = year from "zero-year" on which payment is received

For example, if the following is the sales forecast and royalty payment liability in a 6-year contract at 3% royalty on sales:

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
Sales value ('000 \$)	100	150	200	250	250	250
Royalty payments (R) ('000 \$)	3.0	4.5	6.0	7.5	7.5	7.5

The 1975 NPV for each payment at a 10% (r = 10) discount factor is:

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>
NPV ('000\$)	3.0	3.72	4.5	5.1	4.15	4.35

The "paid-up" assessment of royalty, in terms of 1975 value, is thus \$ 25,320.- against the undiscounted payment of \$ 36,000.-.

The NPV assessment method can be used to reverse the process, thus obtaining the term-royalty equivalent of a fixed-fee.

The applicable formula would be:

$$R = R_0 \left(1 + \frac{K}{100}\right)^n$$

where R = undiscounted total royalty payment over duration of contract = S.t.

R_0 = paid-up fee, fixed fee, etc.

K = discounting rate, (10 if rate is 10%)

n = term of agreement, years

R = S.t. where,

s = aggregate sales value over contract period of s years

t = average royalty rate (to be determined)

Thus, if \$ 25,320.- were the fixed fee on a 6-year contract where aggregate sales value is \$ 1,200,000.- and $K = 10\%$ (discount factor), the formula would be re-expressed by:

$$(1,200,000.-) (t) = 25,320 \cdot \left(1 + \frac{10}{100}\right)^6, \text{ in which case}$$

$$t = 3.73\% = \text{average royalty rate}$$

It is important to note that in the reversing process "t" does not equal 3% (of the first example) because "t" here is an average royalty rate and assumes that royalty income will be (or is) the same in every year of the contract, i.e. a plant operated to capacity, common in the process industries.

The NPV value of a license fee can then be gauged against licensee investment, licensee's sales over duration of agreement, etc. as is currently being done with undiscounted royalties.

In this chapter an attempt was made to describe in certain detail the criteria or methodologies as applied in Mexico concerning the evaluation of technology agreements in priority areas. It should be emphasized however, that there are many other considerations that a government agency should be concerned with, such as the elimination of restrictive business practices which could have negative implications in the country's economy and the improvements of national technological capabilities which constitute a pre-condition for gradually attaining a stronger technological basis.

The various annexes incorporated in the report will provide additional guidance as to how other issues are dealt with by other developing countries.

CHAPTER III

RECOMMENDATIONS FOR POSSIBLE ACTION IN THE FIELD OF TECHNOLOGY TRANSFER

As already discussed in the preceding chapters, the problems that characterize the formulation and implementation of policies in the field of technology are of an interdisciplinary nature and would have to be analyzed and resolved in a comprehensive manner.

In essence, the activities covered by the concept of "technology policy" have as their main objective the acquisition of technology to be used in productive areas, as well as the development of a national capacity for autonomous decision making in matters of technology.

Within this framework, the mission wishes to recommend for consideration of the Government of Egypt, the following:

I. - The need to establish a technology policy in the country

This policy would require a solid national base and would have to be subordinated to economic and social objectives. Furthermore, this policy would have to be consistent with other policies for development and it should be designed in such a manner that they support each other.

More specifically, there is a need to incorporate the "dynamics of technology" within the country's existing industrial policy and to define and implement this policy on the basis of the following premises:

1. To ascertain the level of development at the sector by sector level; its dimension and perspectives in relation to:
 - (i) available production factors - inputs, outputs;
 - (ii) scale of production;
 - (iii) market and technological possibilities;
 - (iv) economic and financial resources;
 - (v) price structure and costs.

2. To analyse existing technological alternatives and the enlargement of these alternatives through:
 - (i) the improvement of information facilities;
 - (ii) the establishment of programmes for the selective importation and adaptation of foreign technology;
 - (iii) the creation of possibilities to gradually improve local research and development efforts;
 - (iv) the improvement of local engineering and consultancy capabilities;
 - (v) the definition of adequate training programmes in the areas of selection, negotiation and adaptation of foreign technologies.

3. The establishment of a co-ordinated system for the regulation and promotion of foreign technological and licensing transactions through:
 - (i) the proper co-ordination of legislative and administrative procedures in the fields of industry; technology transfer; foreign investment; industrial property and fiscal policy;
 - (ii) the definition of government criteria and guidelines for the selection, evaluation and approval of foreign technological proposals;
 - (iii) the identification of government policies and procedures in this field at the international level, through active participation of Egyptian officials in international forums, including those organized by non-governmental organizations, the International Licensing Executive Society; and selected business enterprises in the industrialized countries;
 - (iv) the establishment of direct communication and co-operation among other developing countries, where such an institutional framework exists;
 - (v) closer association with the productive units in the country; specialized technical centres; universities and government agencies having responsibilities in these matters.

II. - International assistance

In order to properly fulfil the outlined objectives in the fields of technology transfer, adaptation and development; the mission wishes to propose for consideration of the Egyptian authorities, the need to draw upon technical assistance support from international organizations and UNIDO in particular.

As a matter of reference, two technical assistance projects are suggested:

- (a) - A project oriented to meet the short-term and most immediate requirements of Egypt, for the regulation and promotion of foreign technology into Egypt.
- (b) - A large scale project oriented to improve and strengthen the institutional infrastructure and the government's decision making machinery for planning and co-ordinating the overall national effort for the creation and transfer of know-how and technology.

Note: A technical assistance project similar to (A), was successfully implemented by UNIDO in Mexico, and this assistance was proven to be very beneficial for implementing the policies of Mexico in this field.

A.

Technical Assistance for the Regulation of Technology Transfer

1. Background and justification

Foreign technology will continue to be an essential element in the industrial development of the country.

Foreign technology, however, very often involves an unreasonable high price, not only in terms of direct payment of royalties, but also as a result of contractual provisions that recipient companies are forced to accept in order to fulfil specific technical requirements.

Many suppliers of technological knowledge - including patents, trademarks, managerial skills and trade secrets, etc. - have managed to unduly use their knowledge as a lever to impose obligations, restrictions and controls over production in the recipient country.

In absence of a specific policy in the field of technology transfer it is considered important to introduce norms that could regulate and orient technological transactions with foreign enterprises.

2. Objectives of the project

A central objective of this project is to improve the conditions under which technology is imported into the country through the creation or strengthening of specialized government agencies, i.e. National Registry for Technology Transfer.

To meet this objective there is a need to establish a co-ordinated system for the registration, evaluation and approval of foreign technological proposals. In this context the project aims at assisting government institutions in the above mentioned matters; through adequate training programmes and expert advice in the following areas:

Description of UNDP input

1. Expert on organization and strengthening of national registry of technology transfer (24 m/a)

The expert will assist in the implementation of a regulatory policy on technology transfer, through definition of guidelines for internal use concerning the evaluation and approval of technological proposals. Furthermore, he will assist in co-ordinating the various functions of the national registry, particularly concerning the classification and evaluation of contracts. The expert would have to have broad experience in the work of a government agency concerning these matters in a developing country.

2. Expert on economic and financial evaluation of contracts (12 m/m)

This expert will assist in defining appropriate methodologies for the economic and financial evaluation of technology contracts. The expert would have to be qualified in the field of technology contracts and in the evaluation of markets and international sources of supply.

3. Expert on legal evaluation of licensing agreements (6m/m)

The expert will assist in providing guidelines for the evaluation of contracts from the legal point of view with particular attention to international law, commerce law, anti-trust considerations and arbitration procedures. This expert should have broad experience in the field of international licensing and would be closely associated with legal personnel in the national registry office.

4. Experts on evaluation of foreign proposals (24 m/m)

These experts will assist in the technical evaluation of foreign proposals and should develop guidelines for the evaluation of contracts in specific sectors of industry. They should provide recommendations on the type of technical support needed from other government institutions and research centres on industry for the proper evaluation of technology contracts. They should assist government officials in establishing methodologies for screening technical contracts in various sectors. They should provide recommendations concerning contractual provisions to enable local enterprises to better exploit the technology and to enable them to initiate development work, if appropriate.

These experts should provide general guidelines in improving the technological infrastructure in selected sectors through the use of local consultancy and engineering services in specific projects.

They should assist the local enterprise in securing "prior disclosure" of technology for a more adequate selection among alternative sources at the international level.

Consultants (18 m/m)

Consultancy advice will be provided to meet specific requirements of the government office, such as assistance in specialized fields of industry, i.e. pharmaceuticals, petrochemicals, etc. These experts will also assist in developing strategies for the regulatory office of technology transfer, to become more active in the promotion of local adaptation and creation of technologies.

Fellowships (36 m/m)

The fellowship programme in this project will rely on the experience of other developing countries and will be directed to strengthening the capabilities of the government office in specific areas of technical and economic nature.

b.

Large Scale Project for Technology Transfer, Adaptation and Development

1. Objectives

1. Long range objectives

The project is directed for establishing a national system for technology transfer, adaptation and development in Egypt, by strengthening the institutional infrastructure and the decision making machinery for planning and co-ordinating the overall national effort in these areas.

2. Immediate objectives

The immediate objectives are as follows:

- (a) To prepare a comprehensive industrial technology policy with a view to improve the regulation and acquisition of foreign technology; with due consideration to available local resources, including technical talents; capital equipment; design and construction skills; balance of payment constraints and the socio-economic objectives.
- (b) To assist in strengthening project evaluation capabilities from the technical and economic point of view.
- (c) To assist in improving the negotiating skills in the technology transfer process, both at institutional as well as the enterprise level.
- (d) To create or strengthen the institutional framework to identify short and long term technological requirements and to encourage local applied research and development activities in these areas.
- (e) To create or strengthening the institutional framework for the proper regulation and acquisition of foreign technology.
- (f) To provide policy guidance and implementation mechanisms for greater use of local research and development.
- (g) To develop a plan for use of local engineering and consultant capabilities in the process of technology transfer.

2. Description of UNDP inputs

1. Project manager (team leader)

The project manager will be responsible over a period of four years of co-ordinating the work of the industrial technology team and assisting the government in the formulation and implementation of the overall industrial technology policy. This would include, co-ordinating the work of the advisers in relation to the institutional requirements; project evaluation; mechanisms to improve local research and development and its effective use; and to provide as well such guidance as necessary, at the enterprise level.

2. Expert in applied R+D activities

This expert over a period of one year would assist the government in the formulation and implementation of policies to promote and stimulate applied research and development and its effective utilization; including legislative procedures to adequately encourage and orient these activities.

3. Expert in transfer of technology

For over a period of one year, this expert will assist in evolving procedures either legal or administrative for promoting and regulating the acquisition of foreign technology as well as the definition of guidelines and criteria for the implementation of these procedures.

4. Expert in training

Over a period of two years, this expert would be responsible for organizing the training programme incorporated within the project. These activities would include selecting the participants both at a government and enterprise level and the counterpart training organisation overseas (factory, government agencies, international organisations). The objective will be to organize and co-ordinate appropriate training programmes related to selection, evaluation and adaptation of foreign technology.

5. Expert in consulting engineering

For over a period of two years this expert will assist in the development of local consulting engineering capabilities and in their effective utilization in the technology transfer process. This activity will be closely related to priority sectors of industry.

6. Specialized expert assistance

Two experts will be responsible for over a period of one year for the identification of fields in which technological activities and local R+D efforts should be oriented and to provide recommendations for strengthening existing research facilities in key industrial sectors. At the same time the experts would be responsible for acquiring through the equipment component within the project research facilities from overseas to establish and maintain new research facilities which may be required.

7. Expert in governmental industrial technological institutions

This expert over a period of one year would be responsible for recommendation on government infrastructure to implement the industrial technology policy. This would require the establishment within the government of an industrial technology office charged with regulating the inflow of foreign technology and promoting local technological efforts.

In addition eight industrial specialists in key industrial sectors would offer advice at an enterprise level. The experts would be divided into four teams, each team allocated to a specific industrial sector. The teams would be made up of two experts:

(a) an industrial technology expert

This expert over a period of one year would offer advice to industries on the availability and appropriateness of overseas technologies bearing in mind the conditions prevailing within the country and the cost factor related to specific technologies. In the main the expert would operate through visiting local industrial concerns and offering on-the-spot advice on upgrading (through local research or imported technology) the productive capacity of these concerns;

(b) Industrial specialist (negotiations and contracts)

The expert over a period of one year will offer advice to individual entrepreneurs on the contractual arrangements prevailing within the specific industrial sector under consideration. His work will be aimed at upgrading the skills of the entrepreneur in selecting and negotiating overseas technology.

3. Training component

An allocation of US\$ 100,000 will be made within the programme for fellowships. These fellowships will be divided into two areas:

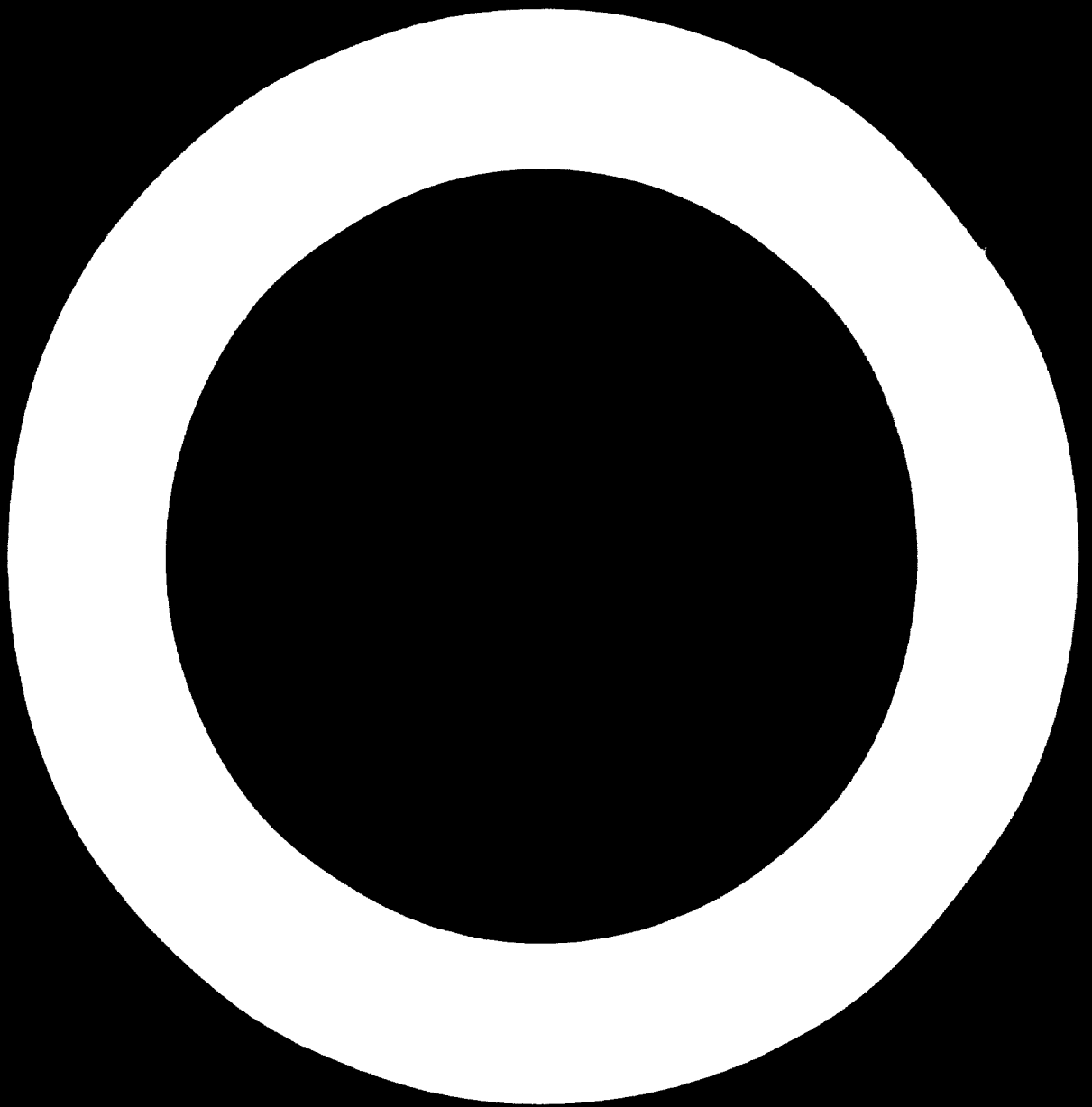
(a) Training technicians and engineers from Egypt in industrial concerns overseas. The aim of this element of the programme will not only be to upgrade their technological knowledge but to offer an insight into the effectiveness of the various available technologies.

(b) Training fellowships will also be offered to governmental officials through which they can examine technological policies in operation overseas together with the appropriate infrastructure. It is also anticipated that in this component fellows will be enabled to study the technological policies introduced by other developing countries, notably India, Mexico and Brazil including their regulatory and promotional policy legislation.

4. Equipment component

If the project is to offer comprehensive assistance in technological development a sizable equipment component is to be envisaged. Bearing in mind that the project is concentrated on technological development in key industrial sectors, certain indications should be gained as to the extent of this component.

In formulating this project proposal a phased work plan has not been included as this would depend, to a large extent, on the conditions of specific requirements of the country.



A N N E X I

DEFINITIONS

A. Patent licence

1. For a specific process equipment or for the manufacture of products. This could include a specific type of equipment whose essential element is patented; or it could also be the refinement of a process which makes an existing product more salable.

2. For a specific process or method of manufacture such as a metal finishing process to achieve a more functional surface quality; or it could also include a method of a more economical way to obtain a certain synthetic material.

3. For the combination of (1) and (2) which usually results in obtaining a more complete and marketable product.

B. Know-how agreements

1. These agreements would usually cover a specific information on formulas, processes and industrial techniques. This type of proprietary know-how could range from a secretly held chemical formula to a special manufacturing technique that has been developed by the licensor.

2. It could also be used in connection with licences covering patent rights. This type of agreement is sometimes referred to as "licence" contracts, which can also cover a licence and/or engineering fee (know-how fee), a process royalty (normally payable on continuing bases) and the terms and conditions related to these items.

C. Technical assistance agreements

1. These agreements could include the continuing supply (during the life of the agreement) of scientific assistance to the licensee; technical services as well as training and management assistance.

2. These agreements are usually embodied in licences which involve the transfer of know-how .

D. Trademark licences

These cover certain registered and well known proprietary identification and can be entered into with or without patent licences and know-how agreements. This type of licences can also be handled in documents separate from those covering patents and know-how.

E. Exclusive licence

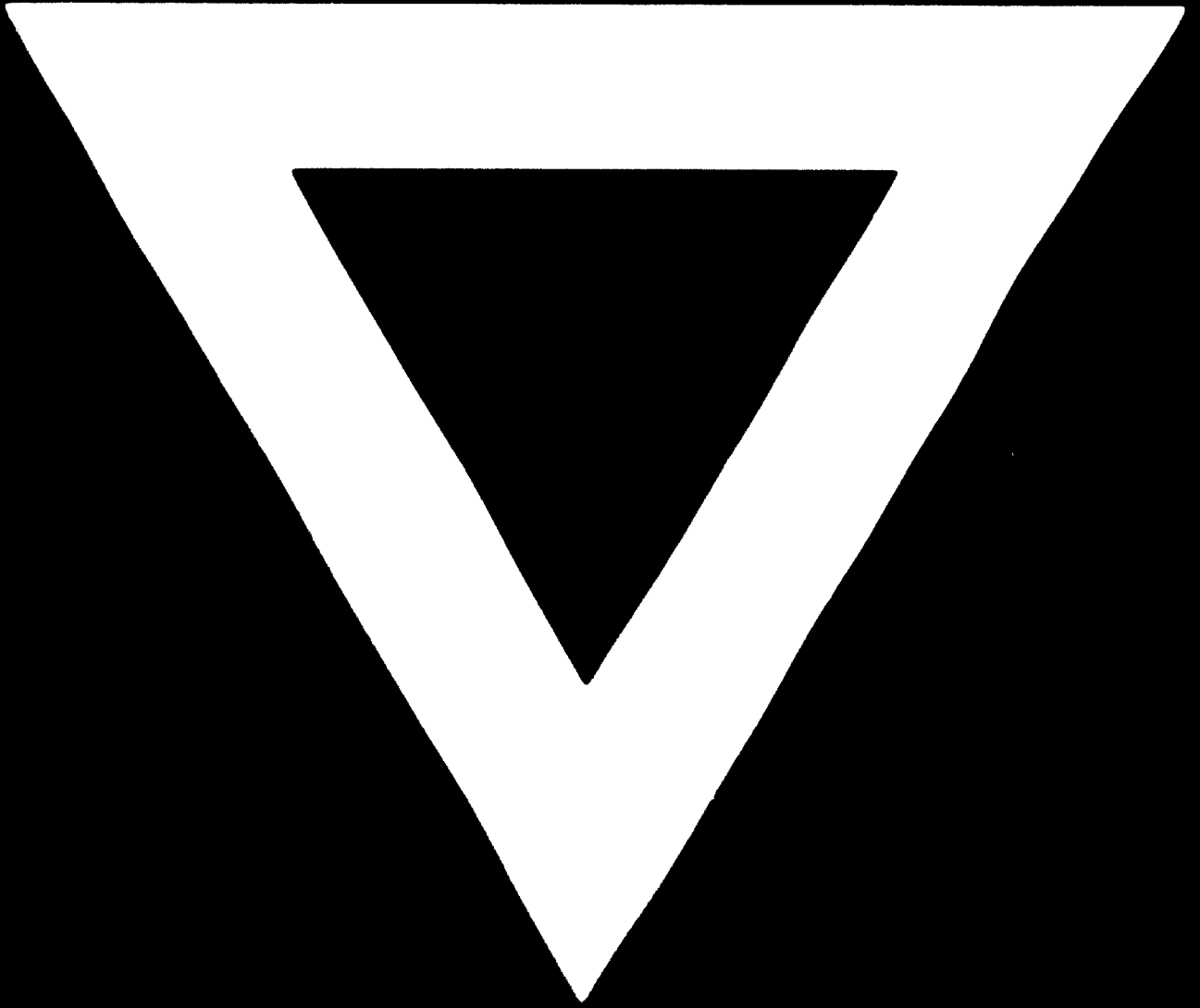
This is an agreement under which all rights (except legal title) are transferred to one licensee for a given territory to manufacture, use and/or sell a product.

F. Sub-licences

Is the right acquired by a licensee to grant such a licence to a third party.

The right to sub-license a given technology acquired from abroad could be beneficial to the present and future activities of enterprises in Egypt, because it would enable them to establish similar industrial activities in the country, once this technology has been successfully implemented and proven to be a successful business venture.





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