



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

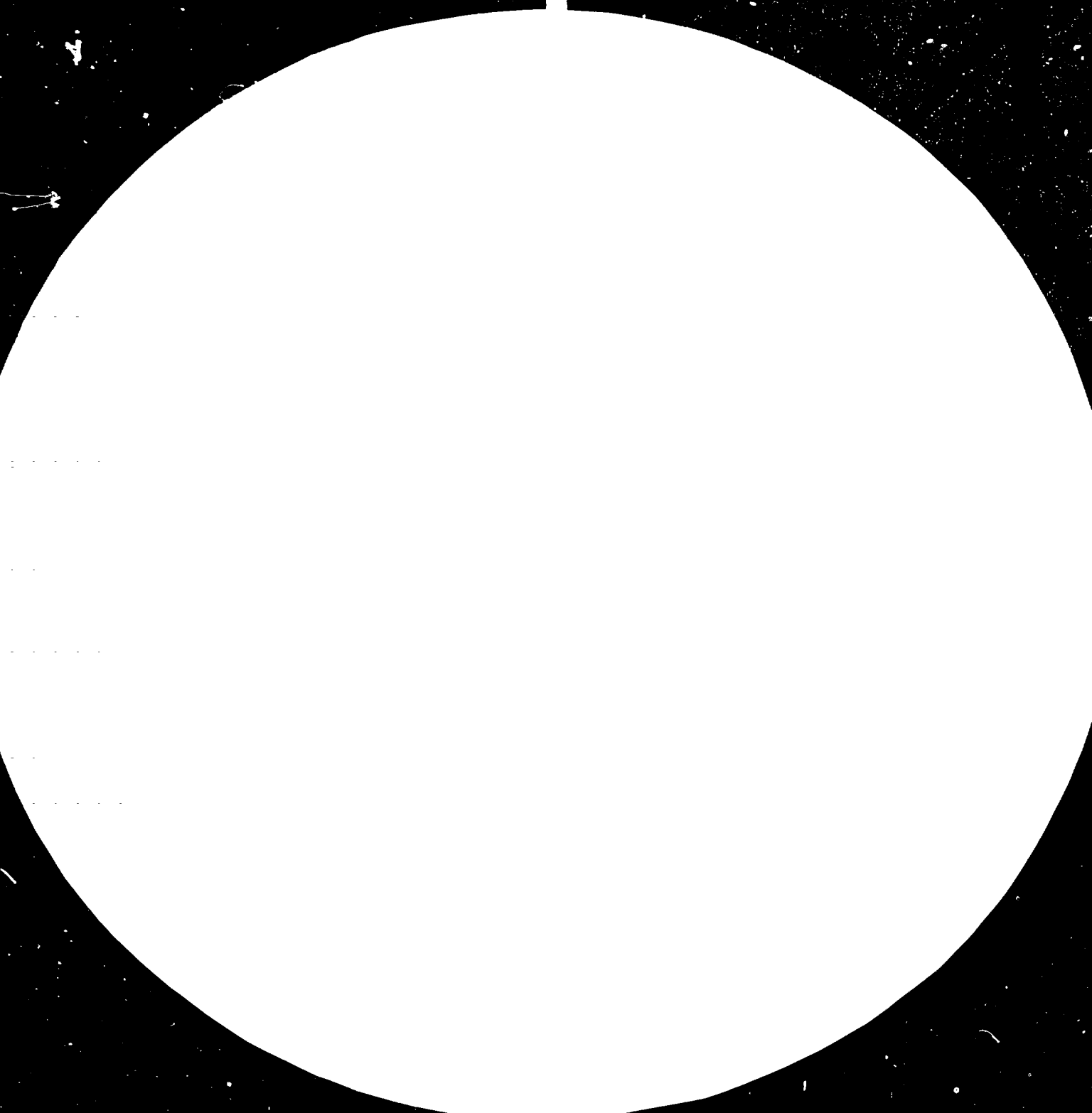
FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

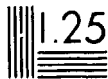
Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org





4.5



M. P. O'NEILL, JR., UNIVERSITY MICROFILMS, 300 N. ZEEB RD., ANN ARBOR, MI 48106

U. S. GOVERNMENT PRINTING OFFICE: 1980 O - 288-329



11276



Distr.
LIMITED

ID/WG.362/15
26 March 1982

United Nations Industrial Development Organization

ENGLISH

Preparatory Meeting of Directors of
Industrial Development Finance Institutions (IDFI)
on the Creation of a Technological Information
Exchange Network (TIEN)

Bridgetown, Barbados, 26 - 28 January 1982

COUNTRY BRIEF: MEXICO *

prepared by

Ramon Carlos Torres **

00000

* The views expressed in this paper are those of the author and do not necessarily reflect the views of the secretariat of UNIDO. This document has been reproduced without formal editing.

** Projects Promotion Director, Nacional Financiera, Isabel la Catolica 51 piso 8, Mexico 1, D.F.

V.82-24042

1. Brief description of industrial development financing activities

Nacional Financiera, S.A. is the development bank of the country and the Mexican government's main financial agent. It manages resources through direct or endorsed operations and through trust funds totaling 15 billion dollars.

During the last fiscal exercise, the Institution registered a net increase in its resources of more than 3 billion dollars, of which national savings was responsible for 57.4%, foreign loans 35.8%, and the remaining 5.4% came from internal and external sources.

The total amount of funds directed to economic promotion reached 14 billion dollars, of which 72% has been directly channelled by the Institution to credit operations, investments in shares and the purchase of fixed-income securities. 16% corresponds to guaranteed financing of foreign loans, and the remaining 12% are resources agreed upon by the fostering trusts.

With respect to the destination of these resources, 48% was channelled to basic industry, 19% to physical infrastructure and services; 18% to industrial enterprises, and the remaining 15% to various activities.

Nacional Financiera participates in the fixed-income securities market, earning approximately 12% of the total, and its earnings represent 13.9% of the total obtained by the banking system.

With respect to the international financing received at the end of 1981, Nacional Financiera had a direct and endorsed debt of 9 452 million dollars. It is important to say that the Institution contracted (9.2% of the credits negotiated outside of the country.

A last aspect which is worthy of mention because of the importance which this activity represents in Nacional Financiera, is the characteristic of the financing given to industrial development, and we are referring to some aspects related to what is known as the Nafinsa Industrial Group.

This is made up of 87 enterprises, 81 of which are industrial, and 6 related to services. In 73 of them the Institution participates in the capital, and in the remaining 8 it manages all or part of the shares owned by the federal government.

The paid capital of this group was 3.3 billion pesos, and the Nacional Financiera's participation was 39%.

The total assets of this group are 1.2 billion dollars and gave employment to 154 000 people.

2. Current experiences and methodology of evaluation of the technological contents of the industrial projects

Since the 70's, Nacional Financiera became concerned about the country's development of capital goods. Thus, as a result of a diagnosis of the economy

and various study programs, a Strategy^{1/} for capital goods which considers aspects from economic policies to different investment possibilities in this field, was born in 1976. In this Strategy fundamental instruments of economic policy are outlined, such as the creation of a finance fund especially defined according to the needs of this industry; the implementation of a capital goods acquisitions system for the public sector, as well as a series of general actions among which aspects relevant to protection and technology are contemplated.

Since 1976 a second stage including a series of actions to identify and generate a battery of profiles and projects in this industrial sector was developed and for this reason this speech will be directed specifically to the experiences and methodologies of evaluation of the technological content of the projects that have been promoted recently in this sector.

In the previously mentioned profiles all technological, economic and financial basic characteristics of the industrial enterprises to be constituted are established.

The identification of possible technology suppliers has been the result of these profiles. Once this main technologist have been identified, an invitation is extended to several to participate in co-investment project.

^{1/} Mexico: Outline of a strategy for the development of the capital goods industry. NAFINSA-UNIDO Joint Project on Capital Goods. Mexico 1977.

When those technologists who show themselves ready for an agreement and have proportioned all the necessary technological information for evaluation, according to that indicated in point 3 of this document, detailed evaluation of technological alternatives is made, using the following criteria:

- Royalties according to the area of industry, kind of technology, product or equipment.
- Criteria referring to evaluation indexes based on the main parameters of the project, for example: investment in machinery and equipment, plant capacity, sales volume and annual benefits, among others.
- Other criteria used for technologic evaluation are those based on the projects evaluation techniques to measure the income yield capacity of the investment.
- From a strictly technical view point some criteria are taken based on the range quality and increase of the technical supplies.

With respect to the first point, given the variety of industrial areas in which Nacional Financiera promotes projects, which have distinct technological complexities in their productive processes, some criteria are taken for considering ranges of royalties that the Institution is ready to negotiate, for example: capital goods from 3 to 5% over net sales; food products from 1 to 2.5%; chemicals and other goods from 1 to 3%, depending on the process technology, product or operation.

With respect to the second kind of criteria (based on evaluation indexes), we have the following:

Total current cost value of technology including license and basic engineering can be equivalent to approximately 5% of the investment in machinery and equipment, without exceeding 10%.

For the process industry, various criteria are applicable to the total payments in present value according to installed capacity, resulting in an index in terms of pesos per unit regarding annual production (ton, barrel, ft.).

These values, which can be tabled or put in graphs for use as reference, depend on the kind of process, product or typical commercial size of the plant.

Another characteristic of this formula for evaluation and payment is that its value decreases as plant capacity increases, and follows the law scale economy.

Other indexes or economic relations are used simultaneously, for example, the percentage which the annual net amount for technology payments represent with respect to the annual net amount of profits. A rate of 20% is considered reasonable.

With respect to payments for technical assistance, Nacional Financiera uses as reference the current values accepted by the National Register for Technological Transfer, although some Governments establish minimal amounts that personnel can earn abroad for technical assistance.

Regarding the third criteria related to techniques to measure the income-yield capacity of investments it is understood that when 2 or 3 types of technology have been selected the computer is used to determine Internal Return Rate of the Investment or the Present Net Value of the Effective Flow, applying a sensibility analysis.

Results could allow us to observe what technology will give more yield to investment, independent of the amount, adaption to technology, range, ability to assimilate, technical assistance services and the derived social benefits such as job opportunities.

The fourth group of criteria embraces strictly technical aspects to be applied according the kind of technology, the project promotor's experience and that of the negotiation specialist. Basically, under this criteria, greater value will be given to that technology which, besides being more suited to basic project parameters, has a greater range in technical services and skill as seen in: extensive personnel training, basic engineering consultation, convenient execution of the detail engineering, obtainment of main equipment, plant construction, operational tests, start-up, quality control of raw materials, finished materials and products, solution to operational problems in production and, if necessary, for commercialization of products or equipment included in the contract.

A comparative analysis of each one of the documents and technical materials to be provided by each supplier is also done, pointing out the additional aspects, for example special recommendations, particular experiences, emergency shutdowns, etc.

A basic technical aspect of the processing industry is the one related to "guarantees". The more guarantees offered in capacity, raw materials and services consumption, in equipment and product quality, quality in effluents, quality in engineering works and in no infringement of third parties patent rights and, at the same time, the more the technology supplier accepts penalizations for nonfulfillment of the minimum guaranteed specifications, the greater the indication of high value technology.

Among other technical elements that are worth considering in this evaluation are: the licensor's experience in technology transfer to other countries and the number of industrial plants built in the world with such technology; maintenance costs and obligations, including the cost of the principal replacement parts, their number and availability. The facilities granted by the licensor for the technological assimilation must be taken into account since it is an important strategical factor that can substantially reduce the technological dependence.

A comparative tabulation system can be applied to the technologies, giving a studied value to each technical element evaluated depending on its impact and importance within the project and then, classifying each alternative, so that the one that offers the best results may be identified.

The following can be said in reference to the experiences of Nacional Financiera in the field of technological acquisition.

Nacional Financiera is convinced that the objective of technological negotiations is much more than the simple obtainment of a lower technology price or the elimination of restrictive commercial techniques and practices.

It is necessary to define clearly the technology to be acquired, the level of work needed and under what conditions, all this to satisfy the technical and commercial basis or parameters of the particular project. It is prudent, before definitely accepting any proposed offer of the potential supplier, to visit different operating plants, products and equipment exhibition, consult with national or foreign enterprises that have been in contact with or licensed the same or a similar technology, to visit customers or users of the products or equipment to be produced in order to, beside knowing better the market characteristics, get more familiar with them. Therefore we must pay attention to the productive capacity data, the specifications and versatility of products or equipment, the characteristics of materials and raw materials, the commercialization plans, etc.

Another experience of Nacional Financiera is that one of the final aspects to be negotiated should be the one related to price or counter-rendering to be covered by the technology acquired since the most advisable way, not only to determine the mentioned counter-rendering but also to evaluate it, is to know before hand the nature of the technology and to define the reach and profoundness of the transfer and its mechanisms.

Also the formal aspects have been evaluated in respect to the substantial technological contracting and the effort to be dedicated to each aspect during the negotiations and evaluation. If the negotiator is a lawyer, he often gives more importance to the formal aspects than to the economical and technical ones; and if he is an economist, accountant or engineer, he often does the opposite.

Nacional Financiera agrees with the UNIDO's publications in the sense that it is not necessary to deepen and persist in the legal implications and reach for the formal terms included in the technology transfer contracts during the negotiation, but it is necessary that the negotiators have a multidisciplinary vision about the technological negotiation, without losing sight of the nature, reach and adequacy of the technology for the project in promotion, independently of the professional discipline of the negotiator.

As in the capital goods sector, where the licensee often has to buy parts and components from the technology supplier, it is convenient to handle this aspect separately and cautiously since the authorities that regulate the technology transfer can interpret it as a tying clause, with an obligatory or restrictive character. Therefore, it is convenient to make separate contracts with equilibrated conditions for both parties in countries where there are regulations for this item and when there is a decision to buy parts and componentes from the technologist, establishing the way of fixing prices for parts and components, as well as the conditions for its supplying. Even though sometimes it is easy to fix the basis for the said prices, there are some cases in which the problem becomes intricate, principally when the parts are different from the design that varies in each equipment.

With respect to the payments problem, it is advisable to ask the technology supplier for the necessary clarifications related to the extent of technological supply and its corresponding payment since it often results that some services such as personnel training, basic engineering consultation, technological adaptation services, operating tests, start-up, etc. are not included within

the quoted amount. It is necessary to detach the services with its corresponding payments or on the contrary, to indicate payment of X percent of the net annual sales or a specified amount during the enforcement of the contract as a result of the technical assistance supply, technical know-how, etc.

The licensor's personnel direct technical assistance payments must be evaluated according to the work they will perform, their qualification and their experience, duration of their services, as well as the level or the daily payments in the international market (per-diem fee).

Nacional Financiera recommends that the technicians of the acquiring enterprise participate with the licensor in the preparation, adaptation and development of the basic engineering plans and specifications, in order to reach efficiency and a quick assimilation of technology. This is particularly important in the processing industry, for manufacture of intermediate goods, since the personnel can learn quickly in the industrial process to be transferred, which will give better possibilities for innovation, modification or total or partial adaptation of the technology. The permanent access to plants using the technology to be transferred and to the laboratories and pilot plants will also help substantially the assimilation and technological innovation.

In relation to the brands use, Nacional Financiera has established a policy of not accepting the obligatory use of foreign brands, but using only the legend that says that the product has been developed under license of a designated technologist.

The institution has as an objective within its strategy of negotiation, to obtain the license for the new enterprise with the exclusive right within the national territory in order to get a healthy growth without having to face the competition with products manufactured in the country with the same technology.

The aspect of secrecy has been managed according with the criteria of the National Register for Technological Transfer, meaning that this obligation must not surpass the expiry date of the contract; however, obligations can be accepted after that date when it is feasible that during the last two or three years of the enforcement of the contract the licensor is able to transmit changes, improvements, modifications and innovations of transferred technology to the licensee.

It is important to stress that Nacional Financiera systematically rejects all technology transfer offers under "turn-key" contracts because of its negative effects on the national technology system, consisting mainly in limiting, restricting or delaying technological assimilation; the unnecessary importation of detail engineering, obtainment and imports of equipment, materials and complementary technical services. With these imports, the project personnel would not have access to substantial aspects of the technological processes and of the equipment design, with the consequent adverse effects mentioned for the technological assimilation.

The technical personnel training has a great importance, without skimping on economical and human efforts to reach a quick and adequate labor and

supervisory force in accordance with the specialization requirements demanded by the technology to be used.

It is important to remark that for Nacional Financiera, a good negotiation is only the first step towards the assimilation, efficient and competitive use of the technology and to propitiate innovation, with which the enterprise, the industrial sector and finally the country will be taken into technological self-management or self-determinative capacity.

3. Information required for technological evaluation of the projects submitted for financing, and the existing gaps for obtaining such information.

The first problem is the identification of potential suppliers of the required technology to implement the investment project. In order to identify those suppliers, Nacional Financiera has basically used two methods. The first one is associated with the various technical, economic and industrial cooperation agreements that the Mexican government contracted with different countries. The second method has been the direct identification through the technical staff of the Projects Promotion Direction, and this identification has been done through several mechanisms. Amongst these we can mention specialized publications, knowledge acquired on the sector during the formulation of the investment projects and the visits to the facilities of the main international producers.

After identifying the main technologists, Nacional Financiera invites them to participate in a joint venture. This is done by means of a document

named "Terms of Reference for Potential Investors", and its main purpose is to guide the interested technologist to present a proposal for association and for technology transfer. The terms of reference include indications in relation to the products to be manufactured, the plant size and also outline the main aspects to be included in the proposal that the technologist and potential partner should formulate.

Amongst the information to be supplied by the technologist, as an example, we can mention the description of the products to be manufactured, the production processes, the main machinery and machine-tools to be installed in the new facilities, information about the auxiliary equipment and installations, characteristics and number of people to be employed.

In relation to the technological content of the project, disaggregated information on the costs of technology to be transferred is requested.

The document also states the information needed on the scope and nature of the technological supply in relation to the design, construction, start-up, operation and maintenance of industrial facilities, as well as information on the technical assistance services to be provided in each of these stages.

The potential technologist is also obliged, if he intends to participate in the project, to provide information related to additional important aspects that allow NAFINSA to evaluate the degree of cooperation that is possible to expect from the technologist, and also the extent to which he is willing to grant access to his technological resources. Among these aspects it may

be mentioned those related to warranties, the treatment of improvements and innovations, the support to the R & D activities of the new enterprise.

Once this information is obtained, it is possible to proceed in order to develop a preliminary evaluation in which the criteria mentioned in the second point of this document are employed.

Another aspect to consider is related to the evaluation of the potential supplier; in this case it is most important to know its general characteristics, mainly its activities or experience in technology licencing activities.

Among the general aspects that should be identified, are the complete line of products that he produces, including information about quality and market acceptance, the markets covered, the patents that have been developed, those that are still in force and those that are no longer valid. It is necessary to know what patents are involved in the possible transfer of technology and the possible degree of obsolescence.

It is also convenient to know the number of licensees that have acquired access to the same technology and the number of plants that are operating in the world with this technology. All this information should be used to ascertain that we are dealing with a dynamic and up-dated enterprise that is leader in the international markets of the products or equipment to be produced.

As to the possible sources of technological information that will assist a better evaluation of the real alternatives for the different projects and that allow better analysis of the problems to be faced, the sources may be classified in two ways.

The first class includes the technological information sources that are independent of the technologist, and as an example we can mention the data and information banks, the various registries for the transfer of technology established in different countries and specialized publications. The second source is obviously the technologist himself.

In relation to the information sources mentioned, the main problems encountered are:

In the case of data and information banks, generally speaking the technological information provided by these entities is incomplete, not updated and requires a long period of time to be processed and besides, in many instances the cost for access to the information is rather high.

As to the various registries for the transfer of technology, their information is not usually organized for evaluation purposes. Further more access to the information possessed by the registries is very restricted and only seldom available to persons or entities belonging to the public sector.

The technological information that could be obtained in the specialized publications, except in the case of certain specific industries, does not provide the knowledge on specific aspects of the technology and doesn't give enough elements for its evaluation.

Regarding the second source of technological information, the technologist, usually will be reluctant to provide information on the essential elements of its technology that will enable its evaluation as long as he does not have the certainty that the project will be implemented and that his technology will not be disclosed by the potential licensee, for this reason he usually demands the formalization of a secrecy agreement as a previous condition to supply that minimum technological information necessary for its evaluation.

4. Brief outline proposal for a technological information exchange network including suggestions operation.

For the implementation of a technological information exchange network it is advisable:

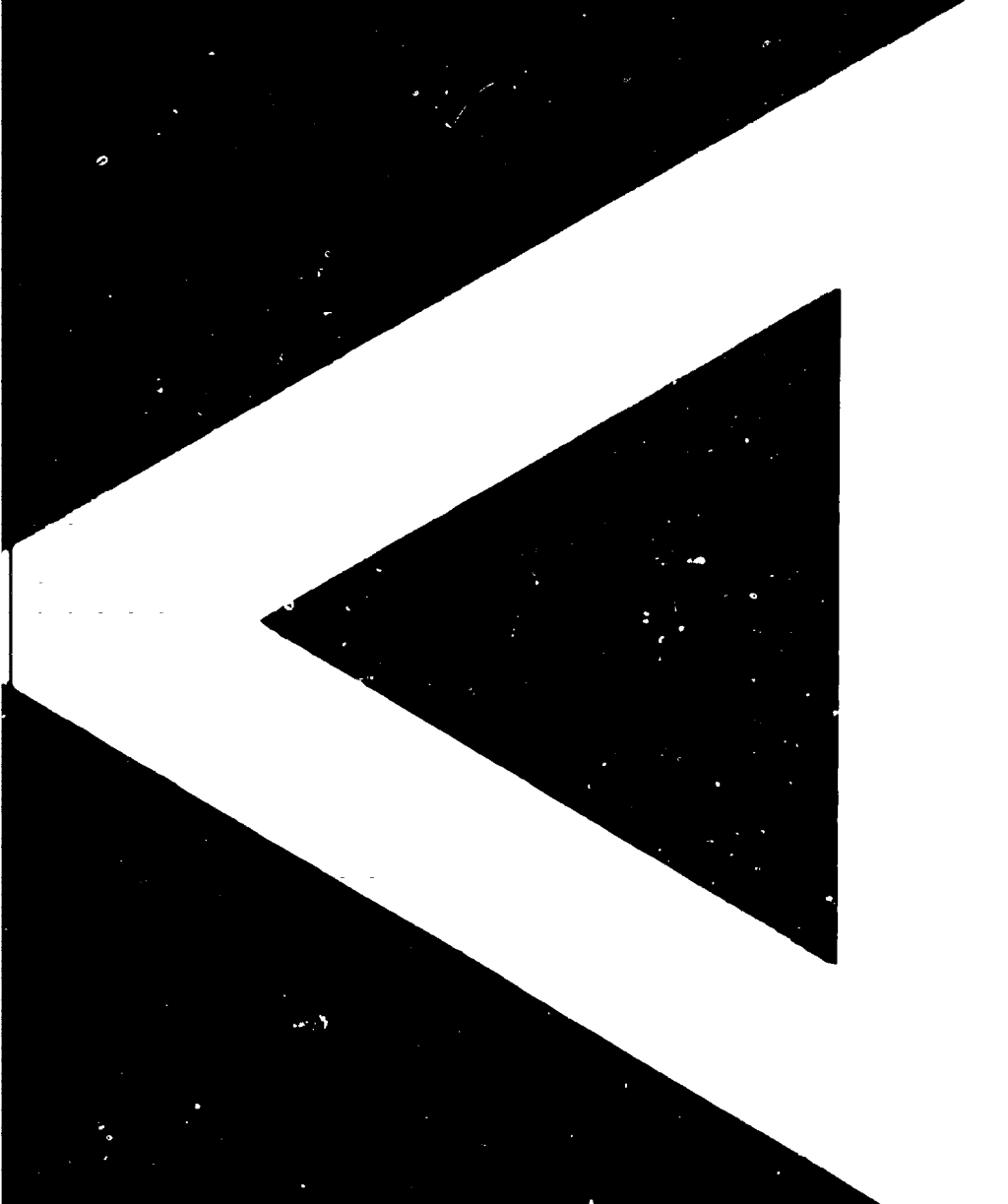
- a) To define the scope and objectives of the system.
- b) To define the required elements of information for:
 - Search, evaluation and technological selection
 - Negotiation and contracting of technology
 - It should be differentiated according to the type of technology and the industrial sector
 - Product technology

- Process technology
- Equipment technology
- c) To design mechanisms for the search, evaluation and selection of technologies.
- d) To design data and experience exchange mechanisms in the technology contracting activities.
- e) To design the operative and the follow up and evaluation mechanisms.
- f) To establish support networks.
(negotiation with private and public organization).

5. Other suggestions or proposals to comply with and support the needs or project evaluation and technology choice, and how Industrial Development Finance Institutions (IDFI)'s could most effectively contribute to strengthening the technological capabilities and capacities in the country.

- a) Creation of a regional committee for the operation and follow up the technological information exchange network.
- b) Implementation of international courses to prepare or train specialized personnel in:
 - analysis, negotiation and formulation of transfer of technology contracts.
 - search, identification, selection and evaluation of technology.
 - the design and operation of technological policy instruments.
(regulation, promotion and infrastructure).
- c) Integration of technology exchanges to promote the commercialization of locally developed technology.





.. .. .

..

.. .. .