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UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org

UNIDO/ICIS.29
IDCAS-UNIDO-WIPO-IRAQ/5
20 January 1977
ORIGINAL: ENGLISH

07350

INDUSTRIAL DEVELOPMENT CENTRE FOR ARAB STATES (IDCAS)

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)

WORLD INTELLECTUAL PROPERTY ORGANIZATION (WIPO)

REPUBLIC OF IRAQ

CONFERENCE ON INDUSTRIAL PROPERTY AND TRANSFER OF TECHNOLOGY FOR ARAB STATES

organised jointly by IDCAS, UNIDO, WIPO and the Government of Iraq

(Baghdad, March 5-10, 1977)

INFORMATION AND TRANSFER OF TECHNOLOGY*

prepared by
the secretariat of UNIDO

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Introduction and Basic Terms

For the purpose of clarity the following explanations are given for the term "transfer of technology" :

" A particular technology can be considered successfully transferred when the technology is practiced at its new location by local manpower as efficiently as or better than at its point of origin" .

Furthermore, the following practical point of view may be added:

" The transfer of technology can be considered successful if it is achieved on a scale broad enough to have economic impact or if it justifies the demands of the country (enterprise) or if at least it reaches the stage of self-acceleration without the need for further outside help."

In this context therefore the term "information" or even better "industrial and technical information" should be considered as a selection of suitable means assisting in the achievement of required successful transfer of technology".

Potential Users of Information and their Needs

In principle, there will be the following categories of existing information users in any developing country :

a) private companies
b) public companies
c) R&D institutions
d) various government agencies
e) others (including individuals)

It should be also noted that the information needs by the above-mentioned "would-be-users" may be classified as "industrial information" and as "technical information". Such a distinction is extremely important

particularly because the term "industrial information" is far broader in scope than "technical information".

In principle the "industrial information" may include the following more important areas :

(a) Information on raw materials and semi-products utilized in the industrial production : global, national and regional market situation, quality specification, prices, international and national trade trends, substitute products;

(b) Information on economic infrastructure : public services, availability of water and energy and their prices, transportation, technical training, labour unions etc.;

(c) Information on technology : techniques and processes, technologies adapted to local conditions, capital goods and machinery, innovations, prices, maintenance and repair programmes, availability of spare parts, availability of services, productivity etc.;

(d) Information on products : forecasts, fashions, handling of materials, packaging, quality control, markets, national and foreign competition, prices , sales organisation, export opportunities, demand and supply situation etc..;

(e) Information on industrial legislation : corporation law, patent system, tariffs, licences, labour law, unions, industrialisation policies, government incentives, export promotion options, foreign capital treatment, monetary and currency regulation, exchange regulations;

(f) Information on Industrial Organisations : cooperatives, chambers of industry, research institutes, opportunities for subcontracting, industrial estates, etc..;

(g) Information on financial problems : capital, bank loans, suppliers of credit, foreign investment, technical and financial foreign assistance, liquidity problems;

(h) Information on administrative and management problems : management accounting, organisation systems, use of mechanisation etc..;

(i) Information on public relations : publicity, advertisements, announcements, etc..

The above-mentioned areas will mostly respond to needs of major information users, which are in overwhelming majority the private and public companies though some of above-enumerated areas of information may as well be required both by government agencies as well as by R&D institutions

The preceding list is of course only of indicative and illustrative nature and as such shows how much information needs exist in modern society. It shows also that industrial development as such requires a continuous stream of information of all types during all stages of its implementation. Another point worth considering is that information needs will change according to the stage (planning and investment, construction and production, expansion) in which the enterprise finds itself.

In order to have a more in-depth look into information in relation to the transfer of technology, the following areas should specifically be covered :

(1) Information on sources of available and alternative technologies;

(2) Information on available indigenous technologies;

(3) Information on research and development activities in industrialized countries;

(4) Comparable information on financial, legal and technical conditions of technology transfer agreements;

(5) Information on legal framework in which foreign companies are operating;

(6) Information on recent developments of international licensing, patent and trademark law, compulsory licences etc..;

(7) Information on foreign companies, specially multinationals.

On top of these, a detailed check list of information for selection of technology should be established which in principle will consist of the following eight categories : product demand, availability of material including utilities, process characteristics, equipment costs (investments), licence conditions, environmental factors, safety and economic feasibility.

Finally, there will be always a need to establish a list of information about processes and information about the project.

The information for each process should include :

(a) Name and address of licensors/designers;

(b) Services provided;

(c) Licensing agreement arrangements;

(d) Flow sheets: qualitative and quantitative;

(e) Capital investment: fixed, operating;

(f) Feed materials (list of data to be obtained for each principal feed material);

(g) Utilities;

(h) Products;

(i) By-products;

(j) Know-how requirements;

(k) Specific process conditions;

(l) Adaptability potential.

As regards the information on the project, the list should include the following :

(1) Capital resources
(2) Local conditions
(3) Regulations
(4) Economics

How once a broad and broadest area of informations which potentially may be required in technology transfer, in its widest sense, has been identified, it will be required to identify and classify the users of information more closely. Departing point for this consideration will be the five main categories identified earlier with the purpose to clarify more closely their needs and means to cover them.

Careful analysis of the experience of a UNIDO Industrial Inquiry Service indicates that out from 11,245 inquiries received (in reported and analyzed period) nearly one fourth (25%) came from information centres and industrial institutions - all of them may be qualified as intermediate information processing institutions.

Such large proportion of inquiries indicates also possibly that existing information systems in developing countries tend to pass more "difficult" inquiries to outside sources.

27.5 % of all inquiries come however from primary information users that is from firms, associations and corporations. The other big group of information users are the government organisations representing some 15.1%. The remaining three major groups of users - each representing some 7 to 10% of inquiries - are : international organisations, consulting organisations, banks and chambers of commerce and finally individuals.

As may be seen from the very short review, major groups of users are similar to those identified earlier with the exception of R&D institutions, which are usually major users of information and were not represented in the UNIDO survey because of the specific nature of its inquiry service.

It seems therefore right to assume that information users - also in the field of technology transfer - will primarily be : private and public companies, various government agencies and last but not least R&D institutions

Specific Information Needs

As already indicated earlier, different groups of information users will require specific information inputs according to their specific needs.

For example planners and policy makers in the industrial sectors will need a broad range of types of current and forecast statistical, economic and technical information and the results of surveys of existing industrial facilities and of production and commercialisation, as well as technology projections.

R&D institutions undertaking major research projects will require apart from technology projections, current state of art surveys and analyses combined with detailed patent recherche in a given field etc..

Industrial enterprise management considering the purchase of a new technology, will seek detailed and updated information on possibly all proven competitive and alternative technologies, with comparable cost and benefit analyses and as broad as possible information on costs and conditions of application of a given and comparable technique or technology. For information purposes an example is presented as to what kind of information is usually required when considering the acquisition of a specific process technology :

A. On the process :

Specific characteristics or criteria for selection :

1. Economics :

1.1 Investment per ton of annual capacity
1.2 Raw materials
1.3 Utilities
1.4 Maintenance, frequency and ease
1.5 By-products
1.6 Effluents
1.7 Personnel
1.8 Lifetime of equipment

2. Scale of production :

2.1 Profitability versus scale of production
2.2 Elasticity of the investment with scale of production
2.3 Lower and upper limits of plant size

3. Flexibility

3.1 Alternative use of raw materials
3.2 Alternative final products

4. Process control

4.1 Critical points of control
4.2 Systems of control

5. Safety and reliability

6. Start-up

6.1 Estimation of time necessary from signing of a contract until plant start-up

6.2 Breakdown of : project, procurement and equipment, construction, plant erection and start-up

B. On the technology :

1. Technology owner and patent situation of the total process or a part of the process

2. Equipment from a pre-defined supplier; percentage of total investment

3. Special materials; need for utilisation of special materials for plant construction; percentage of investment

4. Training of personnel: what opportunities of training in production plants would the owner of technology offer

5. Up-dating of technology within the approach to the applicable improvements of the process concerning licencee

6. Technical exchange programmes : what type of periodical technical exchange programme could be offered

7. Engineering : what part of engineering may be free contracted

8. Guarantees : what guarantees will the technology suppliers offer regarding : yields - quality - investment

It is clearly seen that information on above is rather oriented towards preselection of technology and its suppliers and of course does not exhaust the possibility of information required for implementation.

It should be underlined also that such information is very much needed at the company level as well as at the government level particularly in cases when specialized office for transfer of technology is being operating and executing government policies in the field of inflow of foreign technology.

Partioularly in the field of evaluation of technology acquisition specific information needs will arise and therefore specialised information

service to this effect is usually required.

The most basic information in this respect will require :

1. Information on licensor's financial situation, rang and number of products manufactured directly by the licensor and additional information to determine the licensor's general strength.
2. Information on product technology and process : present and potential utilization of the product/process including the implementation and utilization experience by the licensor and other licencees, name and location of other licencees.
3. Information about the type of know-how, the patent situation, analysis of other licensors' patent rights compared to other company(ies) in the same or other countries and conditions of exclusivity of the licence to be granted, right for sublicensing held by other licencees.
4. Information on the list of materials, intermediate products and all components, or capital equipment required in the process that has to be supplied by the potential licensor or other parties related to the licensor.

It is clear that this information about the position of the licensor and of the technology will of course not include disclosure of know-how, that is precisely the subject of the contract, but should , if obtained from a variety of sources, help the competitive shopping and clarify many of issues related to ultimate agreements.

This type of information will be required - along with the draft contract - to reach the positive and objective decision as to suitable licensor and appropriate technology both at the level of licencee company as well as by government agency which might be involved in negotiations or approval procedures.

A short mention should also be made on information required for unpackiging(unwrapping or disaggregation) of technology, which may be described as identification of the key technologies and peripheral technologies within the package.

Information Sources in Transfer of Technology

Once the information needs have been clearly established in transfer of technology and once major groups of information users have been identified, a survey of potential information sources required in transfer of technology is to be carried out with the purpose to supply as broad and detailed informations as possible.

In principle, many primary users of information in industrialized countries regard their own knowledge and commercial intelligence as a prime resource of information. The acquisition of proprietary information is therefore one of their basic priorities, and whatever resources they have, they will be devoted to the acquisition of internal, proprietary information through process and/or product development. Furthermore suppliers of companies and particularly suppliers of machinery are regarded in many instances as alley source of technical information (food processing industry) as they supply not only hardware involved but also market intelligence information and process and product technological information.

Of secondary importance (at least in the food processing sector)as much as information source is regarded,were rated research institutes as well as information contained in patent information. One may draw therefore certain conclusions that as regards private companies in Western Europe in some sectors (as textiles, food, etc.), their primary source of information is proprietary information and only of secondary rate generally accessible like coming from research institutes or from patent literature.

At this point of time, it is also necessary to clarify certain issues related to institutional organizations for obtaining information which may be of interest particularly to users in developing countries.

Documentation and Libraries

These are not always considered as information infrastructure though may be an important element of information activities providing basic literature and information on a certain subject. In most instances, documentation and libraries offer subscription and current awareness services of different scope also for industry, universities and government institutions.

Information Centres

Information centres are one of the most efficient elements in the actual transfer of information to users in developing countries.

It should be made clear that information centres search and obtain information both from formal and informal sources, published and non-published and do not accumulate information a priori, mostly handling reference material and referral services.

The key personnel has technical background in the field in which information is sought. Information centres also act sometimes as industrial extension services and have their own industrial officers that see entrepreneurs and businessmen to take about the technological and information needs of their companies.

In principle, functions of information centres may include :

- Introduction of the user to the informal network of information by means of referral and reference activity;
- Supply of actual information adapted to needs as expressed by inquiries;
- Different types of literature search and analyses when appropriate;
- Cooperation in the flow of background, continuous information

National Information Systems

In some developing countries - for example in Latin America - there exist efforts to constitute national information systems, particularly in the area of technology or for service to the industry. They usually consist of the mix of documentation and information centres as well as standards and research institutions offering both passive and active information services.

In this context worth is mentioning the National Technical Information Service (NTIS) of the US Department of Commerce which is the central source for the public sale of Government sponsored research, development and engineering reports and other analyses prepared by Federal agencies, their contractors or grantees, or by special technology groups 1/. To give just an idea of the kind of services offered by NTIS

1/ NTIS Information Services, General Catalogue No 4 , Jan. 1975

it should be mentioned its weekly publication of Government Abstracts Newsletter on business and economics/it offers a Technical Help to Exporters (THE) of the British Standards Institutions, issues monthly data compiled by the Census Bureau on import and export shipments for every commodity, publishes Foreign Market Reports etc..

In major industrialized countries there is a full range of government as well as private information sources and for information purposes only some of them are enumerated below. To these belong the American Institute of Aeronautics and Astronautics (AIAA), which is a professional society of aerospace engineers and scientists providing so-called Technical Information Service which acquires, evaluates, selects, abstracts, indexes and processes information in this field. Another source is Volunteers in Technical Assistance (VITA) - a referral information service with emphasis on appropriate technology solutions. A Systems Development Corporation (SDC) is a private sector access service firm which assesses up to 25 different data bases through its software retrieval system ORBIT. FIND/SVP is another private sector firm who provides "answer services" information on demand. As such, they subscribe to information access services and also assess on their own in order to obtain quick documented answers to a wide variety of business and general questions. FIND is a part of SVP network of information centres with member organisations in CANADA, UK, France, Belgium, Italy, Switzerland, Australia, Japan and USA. FIND does not acoumulate information of its own; it uses terminals, telephones and telex to find answers from different information sources.

In response to specific information needs of would-be licensees worth is mentioning specialised private organisations providing on request information on available for licensing technologies in certain fields of production. In this context, for example is the Republic of Korea, where /the Ministry of Science and Technology has issued a survey of advanced technology resources which includes over 4,000 itemized processes with short technical description, operational data and full name and address of the owner of technology.

Worth mentioning are also information services for transfer of technology supplied by CONACYT of Mexico as well as the activities of IDCAS, which, no doubt, are described in detail by IDCAS in its paper delivered for this conference.

Finally attention should be paid to Regional Centres for Technology Transfer (in particular in the ESCAP and ECA regions) with strong information activities.

One of the most acute problems of developing countries in technology transfer is an information gap or lack of information on sources of alternative technology, cost and conditions of available technology, etc.

This situation lead developing countries to the adoption of a resolution at UNIDO's Second General Conference in early 1975 calling for the establishment of an Industrial and Technological Information Bank.

Based on the Executive Director's report on the thirty first session of the General Assembly (Docume . A/31/147 of 18 August 1976) it might be said that as a significant contributory resource, UNIDO's Industrial and Technological Information Bank would add new inputs and provide improved information access in both quantitative and qualitative terms, thereby strengthening existing information systems and services. Where possible, the Bank would also draw upon such systems and services and facilitate a more intensive use of the information available with them. The UNIDO Industrial and Technological Information Bank would evolve its functions in the light of needs and experience, and the following are among the range of possible information and advisory services it might provide, it being noted that the listing is neither comprehensive nor does it represent any specific order of priority:

(a) Technology information: information for use in the techno-economic evaluation of projects and their implementation;

(b) Natural resources: information on their more effective utilization;

(c) Wastes: information on their economic exploitation and profitable utilization;

(d) Technology licensing: information on the experience of various countries on the acquisition and purchase of licences or patent rights, including the terms and conditions of licensing agreements;

(e) Investment data: information on sectoral investment plans throughout the world as a means of promoting understanding and furthering the process of international co-operation in this field;

(f) Energy: the provision of an access point of existing knowledge on the industrial application of energy;

(g) Who's who: information on equipment suppliers, research institutes and consulting organizations throughout the world, in response to inquiries about the competence of all those registered in the manner of a "better business bureau";

(h) Industrial legislation: information on various countries' legislations and procedures governing industrialization.

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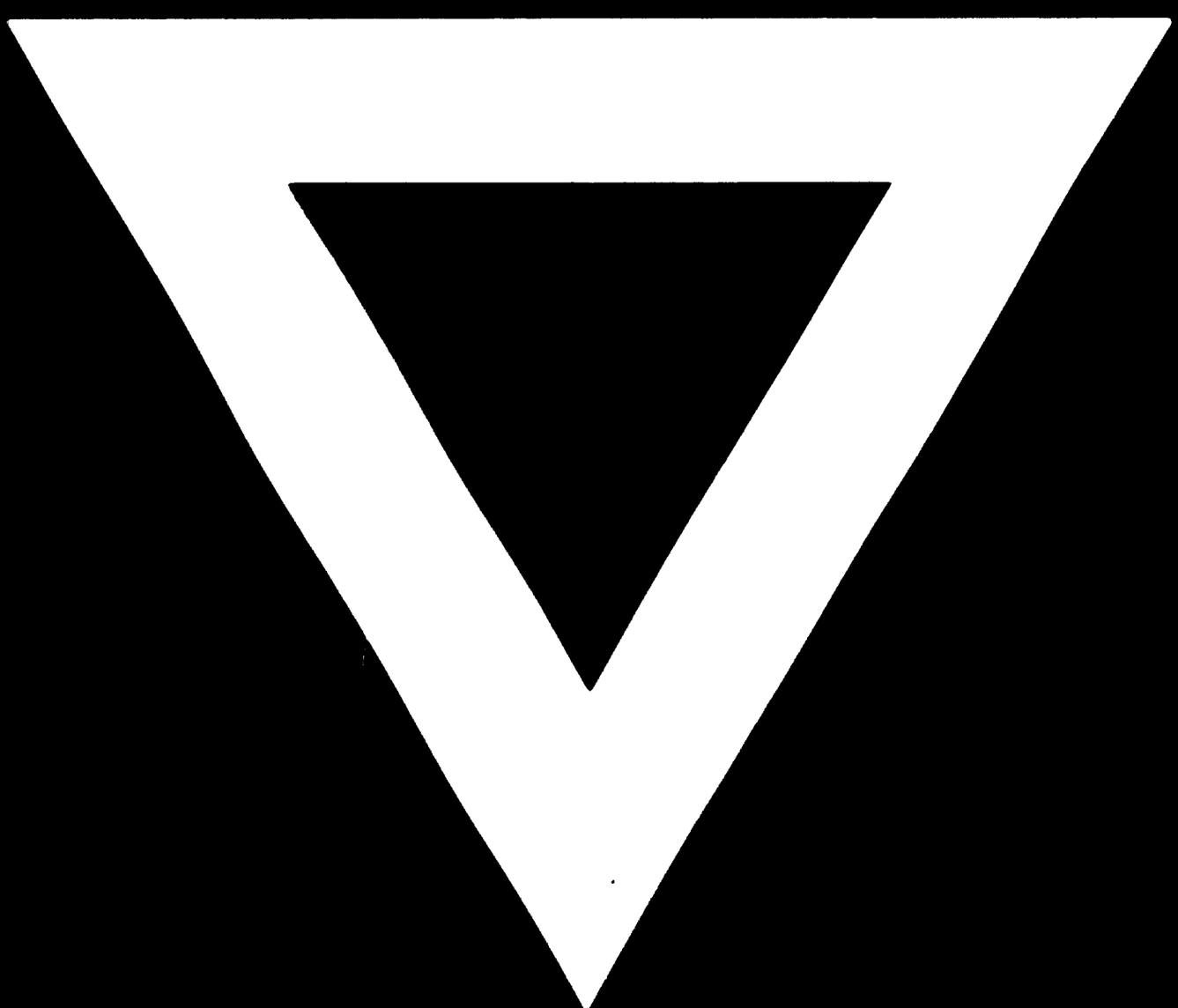

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