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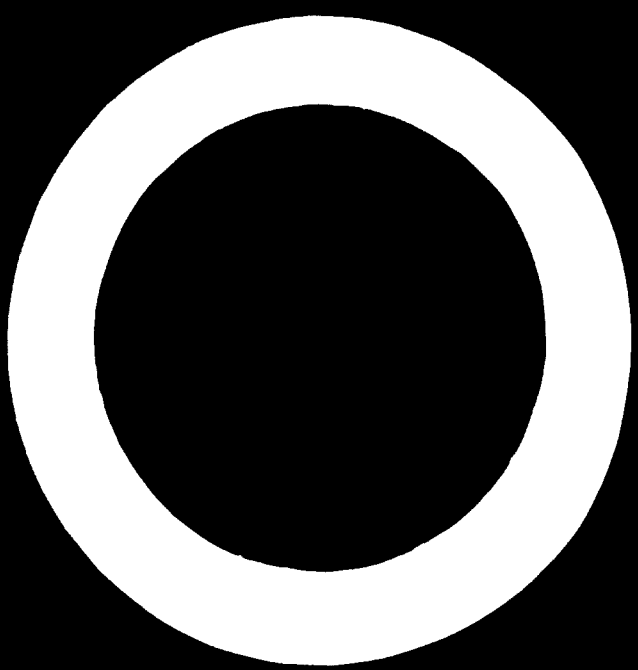

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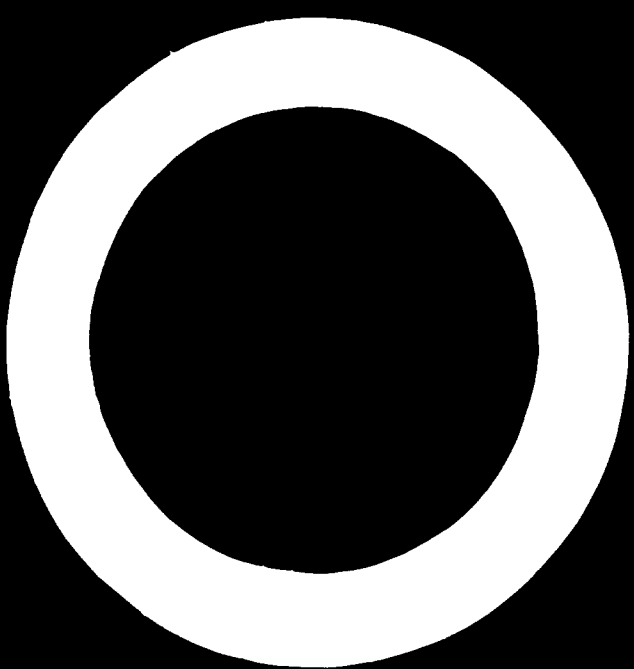

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
VIENNA

UNIDO MONOGRAPHS ON INDUSTRIAL DEVELOPMENT

Industrialization of Developing Countries:
Problems and Prospects

MONOGRAPH NO. 18

INDUSTRIAL INFORMATION

Based on the Proceedings of the International
Symposium on Industrial Development
(Athens, November–December 1967)

UNITED NATIONS
New York, 1968

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Foreword

The International Symposium on Industrial Development, convened by UNIDO in Athens in 1967, was the first major international meeting devoted exclusively to the problems of industrialization of the developing countries. It followed a series of regional symposia on problems of industrialization held in Cairo, Manila and Santiago in 1965—1966 under the sponsorship of UNIDO and the United Nations regional economic commissions, and a similar symposium held in Kuwait in 1966 under the sponsorship of UNIDO and the Government of Kuwait.

The Athens Symposium was attended by some 600 delegates from 78 countries and by representatives of various United Nations bodies, international organizations and other interested institutions in the public and private sectors. It provided a forum for discussion and exchange of views on the problems and prospects of the developing countries which are engaged in promoting accelerated industrial development.

The Symposium devoted special attention to possibilities for international action and for co-operative efforts among the developing countries themselves, and explored the scope, means and channels for such efforts.

Studies and papers on a wide range of problems relating to industrialization were presented to the Symposium—by the UNIDO secretariat and by participating Governments, international organizations and observers. An official report, adopted at the Symposium, has been published by UNIDO.[1] Based on this documentation and the discussions in the meeting, the present series of monographs is devoted to the 21 main issues which comprised the agenda of the Symposium. Each monograph includes a chapter on the issues presented, the discussion of the issues,

[1] *Report of the International Symposium on Industrial Development, Athens 1967* (ID/11) (United Nations publication, Sales No.: 69.II.B.7).

and the recommendations approved by the Symposium. Some of the monographs deal with specific industrial sectors; some with matters of general industrial policy; and others with various aspects of international economic co-operation. An effort has been made to make the monographs comprehensive and self-contained, while the various economic, technological and institutional aspects of the subject matter are treated within the context of the conditions generally prevailing in the developing countries.

Since economic, technological and institutional aspects are described with particular reference to the needs of the developing countries, it is felt that the monographs will make a distinct contribution in their respective areas. They are intended as a source of general information and reference for persons and institutions in developing countries concerned with problems of industrialization, and particularly with problems and issues of international co-operation in the field of industrialization. With this in view it was considered that an unduly detailed technical presentation should be avoided while at the same time enough substantive material should be offered to be of value to the prospective reader. For a more elaborate treatment of the subject, the reader is referred to the selected list of documents and publications annexed to each monograph.

The annexes also contain information on the areas in which UNIDO can provide technical assistance to the developing countries on request; a selected list of major UNIDO projects in the respective fields; and a list of meetings recently organized by the United Nations.

It is hoped that the monographs will be particularly useful to Governments in connexion with the technical assistance activities of UNIDO and other United Nations bodies in the field of industrial development.

This monograph has been prepared by the secretariat of UNIDO.

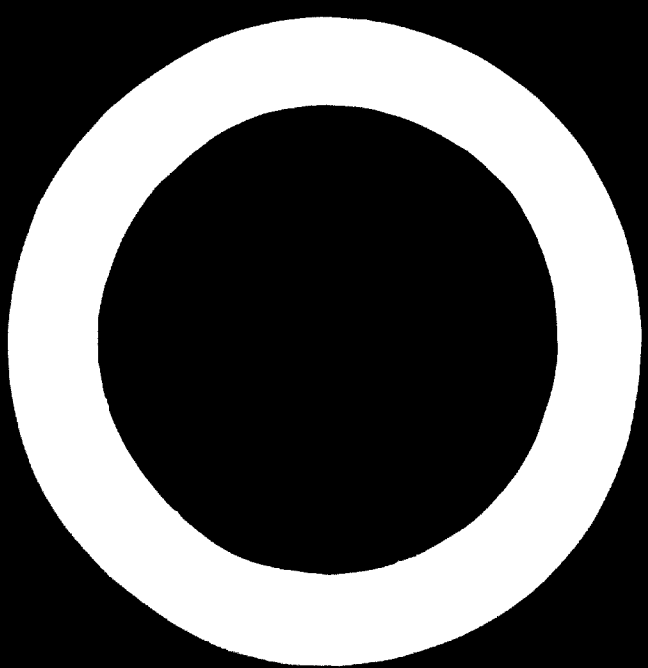
CONTENTS

Explanatory Notes

Billion refers to thousand million.

The following abbreviations are used in this monograph:

CNIIPI	Central Research Institute of Patent Information and Technical Economic Studies (of the Committee on Inventions and Discoveries of the USSR Council of Ministers)
DCSIR	Danish Council for Scientific and Industrial Research
DTO	Danish Technical Information Service
FAO	Food and Agriculture Organization of the United Nations
FID	International Federation of Documentation
IACOD	International Advisory Committee of UNESCO on Bibliography, Documentation and Terminology
ICAITI	Central American Research Institute for Industry
ICSU	International Council of Scientific Unions
IDCAS	Industrial Development Centre for the Arab States
IFLA	International Federation of Library Associations
INSDOC	Indian National Scientific Documentation Centre
OCAM	Common Afro-Malagasy Organization
OECD	Organisation for Economic Co-operation and Development
RND	Netherlands Government Advisory Service
TNO	Central Organization for Applied Scientific Research (the Netherlands)
UNACAST	United Nations Advisory Committee on the Application of Science and Technology to Development
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNIDO	United Nations Industrial Development Organization
VINITI	All-Union Institute of Scientific and Technical Information (of the State Committee for Science and Technology of the USSR Council of Ministers and of the USSR Academy of Sciences)
VNIIKI	All-Union Research Institute of Technical Information, Classification and Coding (of the USSR State Committee of Standards, Measures and Measuring Instruments)



INTRODUCTION

The industrialization of developing countries, and thence the improvement of living standards, depends on the extent and type as well as on the effective utilization, of their resources. Industrial information is one of the most important of these resources, since the exploitation of other resources depends upon it. For the purpose of this monograph, the term "industrial information" is used in an industry-oriented context to mean specific items of scientific, technical and economic knowledge that can be communicated and applied in order to facilitate and accelerate the process of economic growth.

All over the world, people are pressing for higher standards of living, but the effect of these demands in a highly industrialized economy differs from the effect in an economy at an earlier stage of industrial development. Further increases in economic growth in an industrialized economy depend on pushing forward the frontiers of knowledge. To this end, industrialized countries allocate larger and larger sums of money for scientific and technical research in order to generate new ideas, processes and products. As an illustration of the magnitude of the investment involved, the total expenditure on scientific and technical research in the United States in 1969 was estimated at $25.9 billion. In developing economies, on the other hand, increased economic and industrial activity depends only to a relatively limited extent on new knowledge; progress is made mainly by adapting the expertise and information accumulated in the industrialized countries.

But it is not enough for knowledge to exist; it must be communicated to those who can apply it. In the past, the communication of existing and new scientific and technical knowledge was left to chance. Thus, information that was available on a specific subject might remain unused for years, or even centuries. At present, published information is proliferating at an ever-gathering speed. As an example, 50,000 scientific journals containing some 2,000,000 articles appear annually, and it is estimated that the volume of technical literature published more than doubles every ten years. To this must be added the still larger volume

of unpublished reports and data on industrial know-how. This phenomenon explains why, in the past twenty years, the industrialized countries have devoted increasing attention to devising ways and means of collecting and evaluating scientific and technical knowledge and organizing its communication to industry.

Studies on the use made in industrialized countries of the wealth of available information have revealed that only a handful of firms make use of information on innovations: the average industrial undertaking is content with conventional processes and techniques and seeks out the minimum of information by haphazard methods.

In the developing countries, it is particularly important to combat this indifference in industry, as the impetus of strong competition is frequently lacking; information officers can play an important role as stimulators in this connexion. It is the task of the information officer to persuade public authorities and industrialists to systematize the intake of industrial information. At the same time, the information officer should promote the concept of reciprocity in the flow of information. He should also spread awareness of the fact that information on the present state of the national economy and industry is a prerequisite for stimulating the input of new resources from abroad.

UNIDO is conscious of the urgent need to organize an international system for the transfer of industrial information to and from the developing countries. In a series of regional conferences beginning in 1964 and culminating in the UNIDO International Symposium on Industrial Development held in Athens, it was pointed out that an important part of the work of UNIDO was to promote the systematization and co-ordination of the present national and international methods of collecting, collating and distributing industrial information in order to facilitate and expedite the flow from industrialized to developing countries as well as among developing countries themselves.

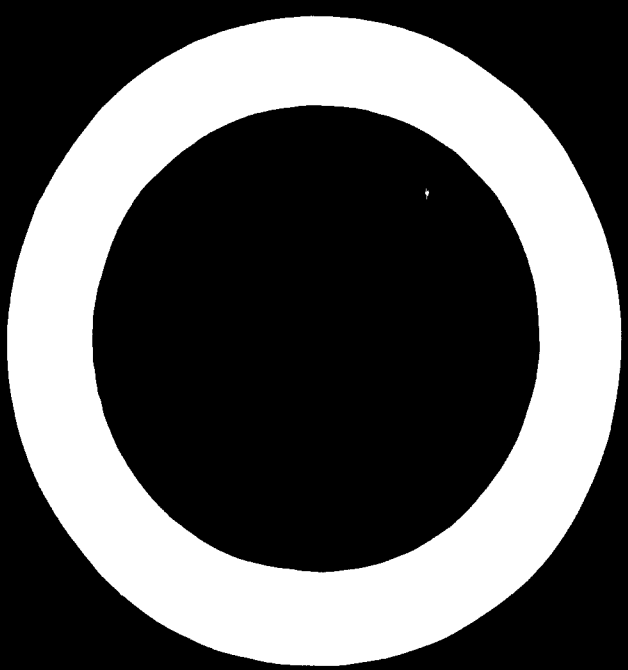
In accordance with the recommendations of the Athens Symposium, the present monograph contains, in *Chapter 1*, a short description of some of the systems that have been initiated for the transfer of industrial, scientific and technical knowledge for application in industry. It was not considered useful to include "prototype systems" that might be adopted by developing countries. The diversity and complexity of the various approaches adopted by industrialized countries proves the need for each country to build up a system tailored to its particular situation and requirements.

Chapter 2 emphasizes the need for developing countries to establish information systems of their own, suited to local needs. Questions of policy are considered as well as methods for assessing and meeting the requirements for industrial information in developing countries.

Chapter 3 summarizes the issues, the discussions and the recommendations of the International Symposium on Industrial Development, where the framework within which UNIDO could operate most effectively in the field of industrial information was examined. The main conclusions and recommendations of the four preceding regional symposia are also briefly covered.

The scope of the action taken by the United Nations system to promote the flow of industrial information to developing countries is discussed in *Chapter 4*. The activities of UNIDO in this domain are described more comprehensively. The field activities of UNIDO include assistance to developing countries in setting up their local systems. At its headquarters in Vienna, UNIDO provides a clearing-house for industrial information and a referral centre.

It is stressed in this monograph that the transfer of technology through industrial information is one of the prerequisites for faster economic and industrial growth in developing countries. It is the responsibility of Governments of developing countries to foster the establishment or expansion of information services. The industrialized countries, together with UNIDO and other international bodies, have an important contribution to make in selecting the information appropriate to the particular stages of development of developing countries and in ensuring that it is transferred to the ultimate users.



Chapter 1

ESTABLISHED INFORMATION SYSTEMS FOR INDUSTRY

The phenomenal rate of expansion of the fund of scientific, technological, economic, and production knowledge, and the increasing overlapping of these disciplines, are leading more and more countries to realize that "the health of the technical communication system must be a concern of the Government"[1]. This is particularly true of information in certain spheres, as for example, the supply of nuclear energy and the installation of a communications network, which are regarded as a public responsibility in nearly all countries. Countries with a traditional structure of autonomous and dispersed information and research centres tend therefore to increase the Government's share of responsibility and initiative in the co-ordination of the work of existing centres and in the improvement of the flow of information.

Industrial information systems[2] are basically organized along the following lines:

The *general system* cuts across the entire field of industry, for example: national documentation and information services; patent offices; national bureaux of statistics or standards.

At the other end of the spectrum is the *specialized system*, which evolves from documentation services set up in response to specific needs, each service serving a particular industry, as for example, the iron and steel or the textile industry.

The *centralized system* is an integrated information, library and documentation service as distinct from a decentralized system consisting of specialized documentation services in different locations co-ordinated by a central clearing-house.

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[1] *Science, Government, and Information;* for full reference see annex 3 under "Other sources".

[2] The term "information system" is defined as a complex of methods of processing information (Mikhailov, Tsherny and Gilyarevsky; for full reference see annex 3 under "Other sources").

The strictly *government-planned system* is in contrast to the *mixed system*, in which independent non-profit and profit-making producers and disseminators of information play a major role.

The *discipline-oriented system* is based on the conventional science documentation service in contrast to the *application-oriented system*, which includes technological information, statistical data and business management information specifically designed for industry.

Finally, there is the system based on the *industrial information liaison service*, which initiates contacts by using field officers, conferences and audio-visual presentations to stimulate potential consumers of information to make use of existing sources, as distinct from the *conventional library service*.

In practice, the system adopted is generally not so clear cut, but may be a combination and blend of several types.

Examples of various types of information systems are given below.

Planned centralized system catering for branches of industry and geographical regions

The Government of the Union of Soviet Socialist Republics assumes full responsibility for the planning and operation of the information system.

> "The organization of technological information work in USSR industry at present is characterized by a centralization of administration in regard to directives and procedures, but also by a decentralization of operations, with the exception of the abstracting service, which is provided fundamentally on a centralized basis." [8]

The State Committee for Science and Technology is responsible for the management of the national information service, which consists of a network of information institutes operating at four levels.

All-Union information institutes

Examples of All-Union information institutes are the All-Union Institute of Scientific and Technical Information of the State Committee for Science and Technology of the USSR Council of Ministers and of the

[8] A. S. Melik-Shakhnazarov; for full reference see annex 3 under "Other sources". See also *International Science and Technology*, June 1964, pp. 100—104.

USSR Academy of Sciences (VINITI); The Central Research Institute of Patent Information and Technical Economic Studies of the Committee on Inventions and Discoveries of the USSR Council of Ministers (CNIIPI); The All-Union Research Institute of Technical Information, Classification and Coding of the USSR State Committee of Standards, Measures and Measuring Instruments (VNIIKI).

The All-Union Institute for Scientific and Technical Information (VINITI) is typical of the All-Union information system. It abstracts literature systematically from all over the world in the fields of the natural sciences and technology. It compiles and publishes journals of abstracts, reviews, bibliographies and reference books and issues specialized information on particularly important or topical developments.

The scientific staff of VINITI scans more than 17,000 international journals and 100,000 patents each year. It abstracts about 1,000,000 articles yearly—from 105 countries in 70 languages. Some 260,000 organizations and individual subscribers receive these abstracts. VINITI gives special attention to the preparation of bibliographies and reference literature aimed at solving specific industrial problems.

VINITI is responsible for fostering scientific studies to improve existing methods of collecting and disseminating information. It trains graduate and undergraduate specialists in scientific and technical information; maintains contact with international bodies, such as UNESCO and UNIDO; co-operates in the international exchange of information; and promotes the standardization of internationally comparable definitions and methods.

Regional information organs

Regional information organs, called Institutes of Scientific and Technical Information, have been set up in each Republic. The task of these multi-sectoral bodies is to disseminate advanced technological information to the leading sectors of the national economy of a Republic or region. They control the use of information materials received from All-Union and branch centres; supply reference storage centres with information; and supervise the methodology and consultation procedures of industrial plants and institutions within the Republic or region.

Institutes of scientific and technical information and economic studies

Institutes of scientific and technical information and economic studies have been created for each branch of industry. The main function of these organs is to collect and systematize scientific and technological information received from industrial plants and institutions in a given branch. The branch institutes prepare bibliographies, abstracts and reviews, using data provided by the All-Union institutes, research results, unpublished material and information from other national and foreign services.

Local information services

Departments of Scientific and Technical Information (or Bureaux of Technical Information) are set up in industrial plants and in various scientific and engineering institutions. Their function is to supply local plants, research institutes and design bureaux with new information relevant to their activities and to answer their inquiries. These services also collect, systematize, study and analyse information originating locally and feed it back into the national system. The special value of the local information services is that their officers are familiar with local executives and works personnel and their problems so that they can direct inquiries to the appropriate source of information and feed new information to local plants which they know from experience will be of special interest to them.

The specialized system with general extension and clearing-house services

The combination of vertical and horizontal services has usually developed in the following way. Specialized (or vertical) centres were set up gradually as particular branches of industry developed and industrialists organized themselves into trade associations or other groups. A common need was subsequently felt for the co-ordinated distribution of information specific to the industrial branch. Since a great deal of information is not exclusive to one branch of industry, it was found that many specialized centres were duplicating each other's work. Hence, general (or horizontal) clearing-house services were set up to provide a general link to all industries. In the United Kingdom, India and in the Netherlands, this liaison function is performed by a general industrial extension service.

The United Kingdom

A handbook issued by the British Ministry of Technology[4] lists over 170 sources of technical information and other services available to industry from government departments and associated organizations. These services are mainly for branches of industry (e.g. The British Jute Trade Research Association, The British Scientific Instrument Research Association), but a few are of a general nature (e.g. The National Institute of Industrial Psychology, The British Productivity Council, The British Institute of Management).

One of the main functions of the Ministry of Technology, created in 1964, is to assume "a considerable and growing information and publicity responsibility to ensure that at all levels in industry there is an awareness of the possibility of using more advanced technologies to improve quality and output" [5]

> "To improve the lines of communication between the Ministry of Technology and Industry, the Ministry established nine Regional Offices and, linked with these, nearly 70 college-based Industrial Liaison Centres... Much of the effort of Regional Offices is devoted to consultation with, and visits to, individual firms in their region and their aim is to help identify and define problems facing firms and to assist them in obtaining a satisfactory solution... Whilst the main concern of the Regional Offices is with the more technologically advanced firms in their area, the Industrial Liaison Centres focus their attention on small firms. Centres are based on Colleges of Technology, and their broad objective, again by personal contact, is to encourage firms to make greater use of scientific and technical knowledge and provide a free and confidential information service on technical production, or management matters... The end result is a substantial national network of problem definition and routing Centres in close and positive communication with industry and able effectively to contribute to the multiplicity of elements involved in industrial modernization."[6]

India

One of the functions of the Council of Scientific and Industrial Research (CSIR), set up by the Government of India in 1942, is "to collect and disseminate information not only on research but on industrial matters in general". Accordingly, special units have been attached to

[4] For full reference see annex 3 under "Other sources".
[5] *Ibid.*
[6] C. G. Giles; for full reference see annex 3 under "Other sources".

each of the present 29 industrial research laboratories or institutes for the purpose of maintaining contact with industry, communicating research results and assisting in the industrial application of research. Most of the laboratories publish brochures, bulletins or technical digests to supply information in their specialized industrial fields. Some of the laboratories also operate technical abstracting and documentation services.

In addition to publishing six scientific journals, CSIR issues *Research and Industry*, a journal designed to communicate research results that are ready for industrial application. The industrial Liaison and Extension Service Unit publishes a quarterly "Information Newsletter", which describes the results of research projects of direct interest to industry. A monthly journal designed for rural and cottage industries is published in Hindi.

The national institutes also serve as industrial consultants. Not only can an enterprise apply for the services of the scientific and technical personnel of a laboratory to advise on its industrial problems, but it can also indicate which scientist it would like to have as a consultant.

A number of CSIR laboratories have field extension centres situated in various parts of the country. The centres are manned by technical personnel who are in constant contact with industry. They disseminate research results, obtain specialized knowledge from their parent institutes for application in a specific industry and inform the laboratories of local industrial problems that require investigation.

The Indian National Scientific Documentation Centre (INSDOC), set up with the assistance of UNESCO in 1952, complements CSIR. The library holds 45,000 volumes and subscribes to 2,000 periodicals. Bibliographies, photo-reproductions (from any country) and translations (from seven languages) are provided on request. INSDOC publishes lists of titles (45,000 in 1963) and of current scientific literature (a classified list intended to give scientific workers in India and neighbouring countries a current review of the contents of the leading scientific and technical journals of the world).[7]

The Netherlands

For over fifty years the Netherlands has operated a decentralized state consulting service, whose purpose is to promote the industrial development of small and medium-sized firms that need information and advice but cannot afford to employ private consultants.

[7] UNESCO, *World Guide to Science Information and Documentation Services*; Paris, 1965.

The Central Organization for Applied Scientific Research (TNO) was created in 1932 "to ensure that research is put at the service of the community in the most efficient manner possible". In addition to the Central Organization, there are now four specialized organizations, "each functioning within the framework of the central body but each with autonomy in its own specific sphere of action". They are: the Organization for Industrial Research TNO; the National Defence Research Organization TNO; and the Organization for Health Research TNO. Since 1957, the institutes for agricultural research have not been tied organizationally to TNO but have been connected with it through their programmes and the co-ordination of their work.[8]

To link this branch-oriented research structure to industry, the Netherlands Government Advisory Service (RND) set up a corps of field engineers with wide practical experience. Each engineer is permanently assigned to a particular region and acts as an intermediary between individual users and the head office. Offices of field engineers are established in the twelve main industrial towns of the Netherlands; in addition there are a chemical engineering office, a management consulting office, an advisory service for handicrafts and a research laboratory. An Information and Documentation Section has been set up at the Netherlands Patents Office in order to take advantage of the facilities of the excellent technical library of that office; the section also makes use of other libraries and information centres. However, the location of the Information Section enables it to advise industrialists about applications for patents. It publishes bibliographies and patent abstracts.

In general, RND's services are offered free of charge, although fees may have to be paid for research work and for the services of management consultants.

Application-oriented information and promotion system

The Danish Technical Information Service (DTO), set up by the Danish Productivity Council in 1955, is an independent institute affiliated to the Danish Council for Scientific and Industrial Research (DSCIR), financed by government grants (allotted by DCSIR) and directed by a

[8] *European Research Index* and H. W. Julius; for full references see annex 3 under "Other sources".

committee of six elected representatives from DCSIR, the Technical University of Denmark, the Royal Veterinary and Agricultural College, the Academy for Technical Sciences, the Federation of Danish Industry and the Technological Institutes of Copenhagen and Jutland.

The tasks of DTO are: to act as a liaison office between research centres and industry; to collect and disseminate technical, economic and other published and unpublished information of use to industry; to sponsor lectures, conferences and training courses focused on the application of the results of research to industry; and to co-operate with foreign and international information services.

DTO considers that its role is to mobilize the resources of knowledge available within Denmark, in the belief that knowledge obtained by means of research is not of value to the community until it has been converted into measurable results in production. In its programme, emphasis has shifted from the dissemination of selected publications and cuttings from technical journals and from drawing attention to the numerous sources of experience and knowledge in the country to providing a liaison and promotion service between industry and research. This has proved an effective means of transmitting knowledge and research results. Great importance is attached to personal contacts, which prepare the ground for the subsequent reception of other forms of communicated information.

The following are the chief components of the service:

The Field Liaison Service. Field officers visit firms uninvited. Through interviews they stimulate the demand for knowledge and promote awareness of the available sources of specialized knowledge. In return, DTO receives as a feedback a profile of the fields of interest of the various industrial units and of their readiness to receive advice and help. DTO field officers pay approximately 600 visits yearly to firms and research laboratories.

The Active Information and Loan Service. DTO searches for information evaluated according to the profiles of individual firms and disseminates it uninvited. Each piece of information chosen, usually in the form of cuttings from periodicals, is addressed personally to a high-ranking member of a selected firm, with an offer to provide, for a fee, more comprehensive information in future.

The Conference and Training Service. DTO organizes courses and "information days" for managers and technical staff and arranges conferences where managers and technical sales directors of industrial

companies can discuss problems and make proposals for establishing or developing auxiliary institutions for industry.

The Question and Answer Service. DTO transmits requests for knowledge or documentation to the appropriate source of information, establishing a direct contact; acts as a confidential intelligence service upon request; and acts as an international referral service.

SUPRANATIONAL INFORMATION SYSTEMS

To make better use of the information resources and documentation holdings of a region or to pool the resources of specialized information services in different countries for better coverage of one branch of industry, supranational information systems have been established. Some examples are described below.

The OECD Development Centre

Based on a network of correspondents in member countries of the Organisation for Economic Co-operation and Development (OECD), the OECD Development Centre serves as a clearing-house of information on economic growth for developing countries. This centre has access to a body of experience readily available from the organizations forming part of the network of correspondents, for example: national economic development and planning agencies; technical assistance services; universities; research, training, and productivity centres; and consulting firms. With the help of these sources and the material available within OECD, the following types of information are supplied: details of studies or research material useful for specific development assistance projects; statistical data for the formulation of economic policy; names and addresses of institutions and experts specializing in particular areas of economic development; and information relating to conferences and seminars on development problems.

Central American Research Institute for Industry (ICAITI)

The Central American Research Institute was founded in 1956 as a result of a request for United Nations Technical Assistance (UNTA) expressed in a resolution adopted by the Ministers of Economy of Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua. The duties and

functions of ICAITI were defined in the resolution as: conducting research on the natural resources of Central America; conducting studies for the improvement of production techniques in industry; advisory service to industry and the Government; adaptation of technology to the regional economic and social conditions.

On the recommendation of the UNTA mission, the provision of technical information, assistance and advice for developing industries and the local development organizations was, *inter alia*, added to the functions of ICAITI. Thus, one of the prime objectives of the institute as set forth in the Agreement is:

> "To undertake or participate in a practical form in the preparation, publication and dissemination of technical information useful to the producers of the region."

Since its establishment, ICAITI has provided valuable consulting services to the industry of the region and carried out a great many techno-economic studies on a wide range of topics (including conservation and refrigeration of agricultural products, installation of fertilizer and pesticide plants, textile mills and the steel industry).

The Industrial Service Division of the institute follows closely new technologies in other countries and suggests possible fields of research and development. It also provides an advisory service to manufacturers and maintains contact with suppliers of material and equipment on a world-wide basis.

The Documentation and Library Division supplies most of the technical information required by industrialists, ICAITI specialists and other organizations. The library contains 5,000 books, catalogues and directories of industrial machinery and subscribes to 300 scientific and technical journals.

The Scandinavian Council for Applied Research (Nordforsk)

Nordforsk, established by the central scientific and technical research organizations of Denmark, Finland, Iceland, Norway and Sweden, operates a joint scheme for the dissemination of research results.

Acta Polytechnica Scandinavica, published under the auspices of Nordforsk, is an amalgamation of five different series formerly published by the national engineering academies. Information on research policy, research organization and in answer to national inquiries is generally published only in the language of the respective countries. Nordforsk has also issued the *Scandinavian Research Guide*, a directory of research

institutions in technology and physical sciences. A bulletin, "Scandinavian Research Information Notes", is published twice a year and distributed free of charge to interested organizations abroad. Twice a year Nordforsk publishes and distributes gratis "Scandinavian Research Projects", a list of current research work carried out under grants from research councils and foundations. In addition, conference reports and inquiry reports are published every year, some of them in English and some in a Scandinavian language.

Since 1953, the Nordforsk Committee on Technical Information has been active in promoting co-operation in documentation and information services. Combined efforts are being made to develop a co-ordinated, computer-based information system for Denmark, Finland, Norway and Sweden. This project has high priority because none of the Scandinavian countries has enough users, for example, of the chemical abstracts system on tape. The committee recently concluded a comprehensive inquiry into the communication of information in Scandinavian industry. This inquiry analysed the needs of industrial users for information.

Nordforsk also maintains a Scandinavian Documentation Centre in Washington, D.C. This centre, Scandoc, assists research institutes and industry in the Scandinavian countries to acquire the so-called "literature of difficult access" from Canada and the United States.

Clearing-house for information in one branch of industry

The European Cement Association (Cembureau) is an example of a non-profit association established to foster co-operation among the cement industries in eighteen countries. The primary task of Cembureau is to provide a clearing-house of information for its members. It collects and processes statistics on cement production and consumption throughout the world; undertakes structural studies on matters of importance to the cement industry, such as fuel prices, bulk transport, transport costs, taxation and the growth of industries manufacturing concrete and concrete products.

In the technical field, the secretariat issues newletters dealing with developments of interest to the cement industry, special reports and proceedings of meetings; compiles research projects and standards; provides a news service showing recent constructions in concrete and lists of technical translations available.

Cembureau also serves as a clearing-house of information through personal contacts made in a number of committees. These committees

deal with economic information and related questions; concrete in building and structures, in roads and airfield runways, in agriculture; the testing of cement and concrete; and research. *Ad hoc* meetings are arranged from time to time in order to discuss special technical questions in greater detail.

It is claimed that these various forms of communication have resulted in quicker transfer of technical advances from one country to another. Many technical problems arise independently of the conditions existing in the market of a particular company or country.

Information that can be obtained from Cembureau includes:

World Cement Directory giving the addresses of the head offices and plants of all cement companies in the world, together with the number and type of active kilns, yearly kiln capacity, production of finished cement, types of cement produced, brand names and numbers of employees, supplemented by maps showing the location of plants. Details are also given of associations and institutes connected with research and information in the field of cement and concrete.

Review of the Portland Cement Standards of the World covering the testing of cement, definitions and terminology, strength testing and chemical analysis.

Films on cement and concrete, including films on cement production, concrete research and technology, concrete in building, construction and civil engineering and precast concrete.

Similar clearing-houses operate in other branches of industry with varying geographical coverage.

Chapter 2

INDUSTRIAL INFORMATION FOR DEVELOPING COUNTRIES: POLICY ISSUES AND NEEDS

Developing countries need information on all aspects of industry—technology, production, marketing methods, finance, business and personnel management—in order to set up new plants and to run existing plants more efficiently. Most of the information required to meet this need is available in industrialized or in other developing countries, but a system must be devised for its transfer to potential users. A primary requirement of a transfer system is a national body that can both marshal the information available in the country, complementing it with intake from other countries, and transmit it to the local user.

In some industrialized countries, responsibility for industrial information has been delegated by the Government to one or more bodies within the country; in others, a referral centre has been set up to indicate the domestic sources of industrial information. In most developing countries, on the other hand, such bodies have not yet been established.

To ensure that the information required can be made available to industry in developing countries, it is essential to establish local information transfer services whose structure and coverage will depend, in particular, on the stage of economic and industrial development of each country. These services should screen and process the information supplied to ensure that it is pertinent to local needs and can be easily transferred through the different communication media (i.e. the printed word, audio-visual media and personal contacts).

THE RESPONSIBILITIES OF GOVERNMENTS IN THE TRANSFER OF INDUSTRIAL INFORMATION

The role of Governments in industrialized countries

Governments of industrialized countries now generally recognize that the transmission of knowledge to developing countries to aid and hasten their industrial and economic growth is ultimately of universal

benefit. Facilitating the rapid and easy access to their own storehouse of expertise and documentation is one of the major contributions that industrialized countries can make to the economic and social development of the less advanced countries.

To this effect, the Governments of industrialized countries might, for example, consider measures to reduce copyright fees for printed matter and films. They should encourage their experts in public research and information agencies to make their knowledge available in response to requests for information from developing countries, thus creating a precedent for non-government bodies. Government agencies in industrialized countries could assist their counterparts in developing countries in selecting and assessing information, for instance, in the field of purchasing, quality control and testing, and could provide them with extremely valuable data.

Publishers might investigate the feasibility of offering preferential subscription rates for industrial periodicals and abstract journals and reducing the prices of technical books for customers in developing countries. Publishers might add the developing countries to their complimentary distribution list. If one copy were provided for each developing country, this would require only approximately 90 additional free copies.

Non-profit organizations sponsoring research, documentation and information services, as well as trade and professional associations, should consider extending the services and facilities offered to their members on equal and preferential terms to interested parties in the developing areas.

The role of Governments in developing countries

Since the exploitation of the wealth of available knowledge and know-how is of fundamental importance to the process of industrialization, Governments must accept responsibility for the transfer of information to industry in developing areas to the same degree and in the same spirit that they accept responsibility for economic development itself.[9]

Accordingly, Governments in developing countries should assume responsibility for the establishment and operation of effective local information transfer services. When setting up or reinforcing these services, the authorities should ensure that information activities are

[9] Science Council of Canada; for full reference see annex 3 under "Other sources".

organized or co-ordinated centrally in order to make the maximum use of all local information resources, while catering for the needs of every type of industrial consumer in the country. The information service may be attached to an existing institution, such as a ministry of economic planning and development, or a national centre for industrial research, or even a chamber of commerce, provided that this link does not restrict the service in its nation-wide application.

When establishing these services and defining their objectives, national policy-makers should bear in mind that their function is not only to acquire technical information but also to disseminate information about local industry. This is important, first, in order to permit other developing countries to share experience, and, second, to inform and thus stimulate potential investors and suppliers of other resources.

Industrial information services require government support. At present, all such services are partly or wholly subsidized by the Government. One issue that arises in this connexion is whether services should be supplied free or paid for by users, and, if so, whether payment should be a set fee or represent the total cost. In general, payment has the advantage of making the service more appreciated by the users; it also makes the consumer more critical, and consumer criticism may bring about more effective services. However, payment for services has, especially initially, the effect of reducing demand and, consequently, of defeating the main purpose of the service.

Government responsibilities for regional co-operation

Once an industrial information service has been established in a developing country and an efficient system organized for collecting and processing the information available locally or from industrialized countries, the pooling of information on a regional basis may be desirable. For example, instead of setting up its own documentation centre, a neighbouring country could contribute financial and information resources for improving the existing centre and widening its range of activity: this would lead to common advantages for both countries. Regional centres can be of service when one country is planning to undertake research on a new industry, product or technological process and studies in this field have already been carried out in a neighbouring country prepared to share the results with others in the region.

The shipbuilding industry provides an example of the pooling of specialized information in industrialized countries. At a conference in 1963, representatives of the French shipbuilding industry proposed that the British Ship Research Association assume responsibility for collecting from all over the world non-proprietary technical information of specific interest to the shipbuilding industry and for distributing it to other countries. This proposal was approved. It was realized at the time that the "operation of such a unit on an international service basis is not a matter of national prestige, it has little bearing on commercial secrecy or competition, but is simply a question of common sense and efficiency."[10]

Financial savings could also result from regional co-operation in the acquisition or production of information. For example, a co-ordinated plan could be drawn up for buying books and visual aids and subscribing to periodicals. If it were decided that manuals on specific industrial processes would be useful, they could be produced co-operatively. Industrial and technical films could also be produced by a regional group. Foreign films could be dubbed or subtitled for distribution throughout the area using joint funds. In certain regions (for example, Central and South America, the Arab countries, a group of French- or English-speaking African countries) where a common language is used, resources could be pooled to pay for translating publications of general interest to the region and exchange systems organized to avoid duplication of translation in the various countries.

Co-operation in the exchange of industrial information could strengthen regional consciousness and help to promote economic and political ties among neighbouring countries.

THE INDUSTRIAL INFORMATION SERVICE: FUNCTIONS AND STAFF

The basic objective of an industrial information service is to promote industrial growth. Its functions will be determined by the particular geographic, economic and social conditions of the region and by the technical requirements of the industries to be served.

The primary tasks of an industrial information service are to identify the type of information needed (the demand) and to promote an intensive utilization of the knowledge existing within the country or abroad (the

[10] OECD; for full reference see annex 3 under "Other sources".

supply). If knowledge is regarded as a commodity that should be sold to industry, just as goods are sold to consumers, then

> "using the marketing technique for the dissemination of physical goods as a model, a national information service must first of all examine the structure of the prospective market, then study the diversification of demand, further develop and stimulate the demand. It has to be active in its presentation of assortments of commodities, and it has to train the consumers in searching for evaluation and utilization of commodities and resources available: it must regard itself as a liaison service between consumers and manufacturers, all the while reporting on accessibility of commodities and appropriateness of services."[11]

Individual demands for information from industrialists usually have to be analysed and defined in terms of local conditions. The industrialist who requests information or states his problem is frequently unaware that there are several facets to his inquiry and a number of possible answers. The information service must, therefore, analyse specific demands and sometimes split up complex problems into manageable components.

The second function of an information service is to be able to locate immediately the source of all the information requested.

> "Switching (inquiries) to appropriate channels is a process requiring imagination, especially if a number of tentative approaches have to be made before a satisfactory answer is found. Users are usually unaware of the wide range of information sources available, or unacquainted with many of the appropriate directories and other guides to sources of information. This all points to the need for experienced mediators, not only to negotiate and elucidate the original inquiry but also to organize and control the course of the search."[12]

An industrial information service centrally placed in the administrative structure will be able to tap many sources of information, know-how and expert advice, of which the ultimate consumer, who may have few contacts outside his own specialized field, may be ignorant.

The basic tool of all information services is the network of sources of information. First, local resources must be pooled. After a national network has been set up, it can be linked to regional and international networks as a demander and supplier of information. The rapidity of

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[11] K. Klintoe; for full reference see annex 3 under "Other sources".

[12] J. S. Rippon; for full reference see annex 3 under "Other sources".

transfer and the quality of the information supplied will depend on these networks. Thus, the selection of the organizations, institutes or individuals that will constitute them is of fundamental importance.

The next function of an information service is to analyse the information that has been assembled before it is passed on to the inquirer or consumer. If several sources have to be consulted, a large file of material will probably be built up; many users have neither the time nor the inclination to sort through a big batch of material, some of which may well be irrelevant, in order to select the ideas and facts useful to them. The material must, therefore, be screened, collated or summarized, and translated if necessary.[13] Sometimes a national industrial information service may, through its knowledge of local conditions, be able to supply material an inquirer has not requested but which is, nevertheless, relevant to his problem or to his work in general.

The industrial information service must not limit itself to the passive role of helping firms to solve their problems. Most small and medium-sized firms in developing countries are unaware that they have problems; almost all firms lack the knowledgeable staff required for the introduction of new production processes. Here the industrial information service can perform an important service for the community by playing the active role of creating demand. The receptiveness of industry is usually "so small and so fragmentary that a systematic search for and handling of knowledge can only be expected from a minority of enterprises".[14] It is fundamental to the success of any communication process that the intended recipient of the message must be attentive and ready to receive it. "Where the recipient is not sufficiently motivated, communication suffers. This problem of motivating those who can exploit new knowledge... is a key one".[15]

The best way to stimulate the demand for information is through personal contact. If field officers visit industrialists and explain the benefits to be derived from modernizing their production processes and management techniques, and the industrial information service follows up these visits with factual information, the desire for information will be permanently instilled. Once industry is assured that the national industrial information service is aware of its needs and will supply information tailored to specific requirements, the demand for information will swiftly increase.

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[13] *Ibid.*

[14] K. Klintoe, *op. cit.*

[15] C. G. Giles; for full reference see annex 3 under "Other sources".

The impact of the industrial information service depends on the competence and dynamism of its staff. To make the service an instrument of real use to industry, it is essential that the staff understand the problems and aims of industry. Consequently, the background and experience of the personnel should be of an industrial rather than of a scientific or administrative nature.

When staff are appointed to organizations supplying information to industry, a distinction should be made between:

The field personnel, whose task is to initiate and maintain direct contacts with the consumers of information in industry;

The staff working at the head office, whose task is to screen and process information material, evaluate incoming inquiries, make literature searches and prepare answer files.

The field staff should preferably be engineers with extensive industrial experience and with a good understanding of business administration. Ideally, the headquarters staff should consist of a mixture of engineers and librarians: in short, they should be experts in documentation able to handle technical problems.[16]

In particular, the industrial information officer in the field acts as an intermediary between the head office, other sources and the ultimate user of information. The information officer is the key to the process of communicating knowledge for productive application in industry. His viewpoint should be broader, closer to industry and engineering and to the scientific aspects of industrial growth than that of the traditional librarian. He should be aware of the psychological, economic, sociological and technological aspects of a given problem. His qualifications and status should be such that he can discuss with authorities, managing and technical directors the issues at stake and help them to make decisions. Otherwise, the information, no matter how good, cannot be assimilated and put to productive effect.[17]

To function as a successful intermediary, the information officer must be in close touch with the current thinking and problems of those he serves. He must be able to promote meaningful exchanges between the sources of information and the users. He should be regarded by his information customers as a partner participating in the preoccupations and in the decisions of industrial management.[18]

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[16] R. van Houten; for full reference see annex 3 under "Other sources".
[17] OECD; for full reference see annex 3 under "Other sources".
[18] J. S. Rippon, *op. cit.*

To provide a link with foreign sources, the industrial information officer should be acquainted with at least one of the principal world languages and be familiar to some extent with information-handling procedure. His training should be designed to enable him to meet these requirements. In general, it is easier to complement the education of a graduate engineer with the required knowledge of documentation than to train a professional librarian in engineering.

No formal curriculum can be laid down for the education of an industrial information officer. The background required is that of an industrial and technological "generalist" rather than of a specialist in one subject. Most of his qualifications are acquired on the job and built up through the exchange of experience. The advancement of industrial information officers depends, therefore, on seminars or workshops, which make possible an exchange of experience acquired by information personnel working in diversified geographical and subject areas.

To sum up, the staff of industrial information services should consist of engineers with industrial experience at various levels. Inexperienced engineers would be at a considerable disadvantage in working with the management of industrial enterprises. This seems to be the reason why the countries with the most successful publicly operated industrial information field services appear to be those where the public authorities "can offer experienced engineers a remuneration that is equal or not much less than that offered by industry."[19]

Needs, and their relation to information material

Industry in developing countries needs information that is immediately applicable to current problems and presented in a form that permits rapid assimilation. Both large and small enterprises require technical information in order to decide whether to introduce new or improved production processes or products. They need economic information, such as data on manpower and the potential market, as well.

A manufacturing firm requires data and know-how in fields such as production, marketing, finance, industrial legislation, standards, administration and personnel management. To be pertinent, the information supplied has to be adapted to the specific situation of the

[19] R. van Houten, *op. cit.*

information user. For instance, in many developing countries, the consumers, who need a variety of products, are thinly spread over a large area. Long distances and high transport costs often militate against specialization by individual factories; hence, many plants make a complete range of products, each in short production runs. This is in marked contrast to highly industrialized countries, where individual plants can specialize in a few products. Accordingly, a different type of technical information is required.[20]

The aim of centralized documentation services is usually to meet the needs of a large group of users with differing backgrounds, activities and interests by providing abstracting services and bibliographies; industrial information services, however, should be designed to cater to the individual needs of a specific industrial customer by supplying precise information for the solution of problems.

They should identify the information needs of their users and help to meet these needs by:

Drawing attention to significant current developments and information within the relevant sphere of interest;

Undertaking information searches and presenting the results in a suitable form;

Putting the users in touch with useful local and external sources of expert knowledge and advice and seeking help from information centres abroad when required;

Procuring and producing bulletins, bibliographies, abstracts, indexes, alerting services, information reports, literature surveys, or state-of-the-art reviews and other tools;

Processing requests for translations, loans, photocopying and other library services;

Maintaining detailed records of all inquiries and requests for information and ensuring that these records are indexed and incorporated in the main information system.[21]

Scrutiny of the industrial information needs of developing countries shows that, in general, information covering the whole range of industrial know-how is needed, particularly with regard to the planning of new industrial projects for independent local enterprises that have no links with companies abroad. It is a characteristic of developing countries

[20] *Ibid.*

[21] P. E. Colinese; for full reference see annex 3 under "Other sources".

that their demands in no way correspond to their needs. The first step in an industrial information programme is to create an awareness of the need for information and the advantages inherent in its efficient application.

Next to the stimulation of demand for information, the most urgent requirement is assistance in the establishment of national information services and in the organization of the flow and exchange of knowledge, data and documents within a country. The resulting improvement in communication among the different branches of industry and with and among the main financial, educational and scientific institutions should reveal a substantial amount of locally available industrial expertise that is at present unexploited.

Providing the required data and recorded evidence for more effective co-ordination of national efforts in the field of industrial development may well be the most important function of a national clearing-house for industrial information. Such a clearing-house must also concern itself with the acquisition and distribution of scarce industrial books, periodicals and unpublished reports. Most industrialized countries have a central locating index for foreign periodicals (union list), study reports, translations and specialized engineering handbooks and reference books, a practice that should be followed by developing countries. Such an index assures more intensive use of the available material, the existence of which is often ignored by the people most in need of it. It also allows better use to be made of the funds available, since funds will be spent for specialized publications hitherto unobtainable within the country rather than for material that is accessible from another national body.

A distinction must be made between the information flow that should be continuously provided to industrialists on general subjects (e.g. industrial legislation, management techniques, new industrial processes and equipment or applied research results) and items of specific information that are tailored to meet the needs of a particular consumer.

General information for industrialists

The continuous provision of information on the various aspects of industrial know-how is an activity that is complementary and closely related to the more formal adult education schemes in the field of industry. There seems to be a need to extend the range of information media used to include films and other visual aids like posters, and to create more

opportunities for personal contacts through factory visits and organized discussions with experts.

Journals, handbooks and manuals, written in plain language with a minimum of scientific jargon so that they are understandable to the non-specialist, remain the most important medium. Clarity of expression is also important if material is to be translated; some of the foreign journals and handbooks should serve as prototypes for editions in local languages.

It appears, however, that in spite of the wealth of printed matter published today, little of it meets the real needs of developing countries. The categories of publications for which there seems to be the greatest demand are as follows:

Critical reviews, providing an introduction to the literature and documentation on various industrial topics;

Liaison bulletins encouraging contacts with industrial bodies abroad;

Idea journals issuing information on successful industrial achievements (processes, equipment) that are of particular interest to developing areas;

Regular information on industrial development projects under consideration or in progress all over the world.

The need for publications can be broadly broken down by subject as follows:

Manufacturing manuals with comparative evaluation and description of the processes and the equipment to be considered for production planning in industries, including textiles (spinning, weaving, dyeing and finishing, cotton, wool, artificial fibres); clothing (shirts, men's wear); plastics (tubes and consumer goods); leather; furniture; paper; cement; bricks; fertilizers; basic chemicals; petrochemicals; iron and steel; machine tools; bicycles; handling equipment (simple conveyors and lift trucks); agricultural machinery; cars; trucks; food processing (freezing and canning of fruits, vegetables, fish);

Manuals in the field of industrial organization and "horizontal technologies" (accounting, quality control, stock-keeping, packaging, personnel management and marketing);

Comparative tables of industrial programming data (co-efficients) used in the main industrial countries;

Reports on inter-firm productivity and comparisons of factory performance in different industries;

A world-wide directory of industrial research and study centres, multipurpose and specialized;

A comprehensive directory of sources of information on suppliers of equipment (addresses of national export councils or foreign trade information centres);

Selected, annotated checklists of any available publications of the types referred to above;

A compendium of industrial regulations in countries belonging to the United Nations;

Specimens of licence agreements and of contracts with industrial consulting firms, including conditions for delivery of plants.

Specialized information

Specific information is needed when a problem has to be overcome in the programming or execution of an industrial project. Industry in developing countries finds it difficult and time-consuming to obtain this type of information. This is mainly due to the lack of well-organized local sources of specialized information.

It must be recognized that it is not easy to select and provide the specific item of knowledge that may be the key to solving a particular technical problem in industry. This is a highly skilled job that can be done, for example, more effectively by a professional information officer in a central unit who has access to various handbooks or directories of supplier firms than a general or technical manager who may have only a few reference books at his disposal.

The amount of literature in the world and the interdependence of the different disciplines make it uneconomical to set up self-contained, specialized documentation centres in every country. However, the establishment of national industrial information and extension services (possibly with branch units corresponding to the main branches of industry in the country) is economically justified and would meet a very real need.

CHANNELS AND MEDIA FOR THE TRANSFER OF INFORMATION

When information is disseminated to industry in developing areas, the established channels of communication should be used—for example, those maintained by the ministries of industry and economic planning, governmental or semi-public agencies (productivity, development and

promotion centres), financial institutes, chambers of commerce and industry, professional associations and engineering societies. All these bodies have usually built up communication systems of their own for the distribution of information through publicity campaigns, radio programmes, announcement bulletins, newsletters, posters, circulars, conferences and meetings.

Personal contact still appears to be the most effective means of communication in transferring information to those who need to put it to practical use. It permits the matching of knowledge to a problem through discussion—hence the outstanding record of industrial extension services in stimulating the demand for industrial know-how and in promoting the use of local sources of expertise and advice, for example, industrial research institutes.

The audio-visual media of television, radio, and particularly the presentation of technical films, have tremendous potentialities for communicating information for industrial application in developing countries. Information services should, therefore, be equipped with films and mobile facilities for showing them to industry and at relevant meetings and exhibitions.

But the medium that can be most broadly applied in the transfer of information is the printed word. This medium comprises:[22]

Primary scientific and technical documents reporting directly on results of research, experimentation and design. Dissertations, articles in periodicals, journals and newspapers, in addition to patents, standards, trade catalogues, conference proceedings and unpublished reports belong to this category. It is estimated that nearly 50,000 scientific and technical journals with over 2 million articles are published annually. Patent registrations have reached 300,000 a year.

Secondary documentation prepared by processing primary documents. Annotions, abstracts, digests, specialized information, bibliographic references and indexes, surveys and state-of-the-art reviews belong to this category. The number of abstract journals in the world is at present estimated at 3,500.

Books. As a rule, books contain broader information and supply comprehensive coverage of scientific and production problems.

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[22] Technical Information Services for Industry; for full reference see annex 3 under "United Nations Industrial Development Organization".

Their publication, however, takes several years, and the information they contain is often out of date by the time it is read. The annual world output of books on science and technology is estimated at about 75,000.

Printed material has the advantage that it is lasting and can be widely distributed at low cost. Its impact on industry is, however, relatively low and depends largely on selectivity and presentation.

This selection and presentation can be improved by using computerized information-retrieval systems, since computers can replace the large body of specialized human labour that would be required to scan and select the vast amount of industrial information now available in almost any given field. However, the cost of introducing large-scale computerized systems in most developing countries would be prohibitive and probably not justified in terms of results. On the other hand, small-scale systems, at a rental of $5,000 to $10,000 per month, could be used. A small-scale system (i.e. one having no multi-programming and no multi-processing, but with core storage of up to 64 K, direct access storage with less than 25,000,000 bytes and an average access time of 50 milliseconds) would be powerful enough to provide the user with a reasonable information system, using about 20 per cent of the computer's time: the remaining 80 per cent of computer time could be used for the mechanization of tasks such as:

"government planning and administration
collection of statistics on production and resources
management of national industries
preparation of economic indices
education and research
demographic tabulation, analysis and projection."[22]

Computer technology is another domain in which regional co-operation would present many advantages: regional computing centres would spread the costs more thinly over several countries and would have the advantage of concentrating local expertise and training; moreover, smaller countries, which would not perhaps consider introducing a computer system for their own comparatively limited requirements, could have access to computers through a regional pooling arrangement.

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[22] Application of Computer Technology for Development; for full reference see annex 3 under "United Nations".

Chapter 3

INTERNATIONAL SYMPOSIUM ON INDUSTRIAL DEVELOPMENT: ISSUES, DISCUSSION AND RECOMMENDATIONS

The issues, discussion and recommendations of the Symposium are presented in this chapter.

The issues[24]

Introduction

Provision of industrial information is an essential part of the transfer of technology and a major prerequisite for industrial growth. Industrial growth in developing countries is particularly dependent on a vigorous intake of industrial data and experience from industrialized and from other developing countries because of the shortage of local resources in research and experienced industrial manpower.

Industrially advanced countries at present have highly effective institutions for processing and communicating industrial information; most of these institutions are of a public or semi-public character. There is a strong tendency—in industrialized countries with free markets as well as in those with state-controlled economies—towards increasing government responsibilities and initiatives in this field. This tendency is due to the recognition that industrial innovation has had repercussions on economic growth and that the rapid expansion of the scientific, technological and managerial fund of knowledge, the control of which is no longer within the capacity of individual corporations, calls for national or even international action.

The provision of industrial information is not limited to the preparation and distribution of printed matter to industry. It includes all other means of communication such as industrial fairs, exhibitions and conferences, visual aids (posters, films) and personal contact (through field extension and advisory officers). To be effective, industrial information

[24] From UNIDO, Issues for Discussion: Industrial Information, 1967 (ID/CONF. 1/A. 21) (mimeo).

has to be tailored to meet the capacity of groups at various levels of training to assimilate it; hence different forms of presentation and communication have to be considered.

Impact of technological and business management information

Some of the main generators of industrial information are administrative agencies (ministries of industry, commerce, trade), public and semi-public industrial institutions (patent and standards offices or productivity centres), research centres, professional and trade associations. The following questions may be discussed in this connexion:

Role to be played by Governments in promoting and co-ordinating the information activities of various agencies;

Co-operation by developing countries to pool their information resources for improved coverage (e.g. reallocation of tasks and specialization in the information coverage for certain industrial sectors or horizontal areas of primary interest to developing countries; establishment of regional documentation, translation and information centres);

Measures to be envisaged by industrialized countries to facilitate access to and exploitation of their well-established industrial information facilities—particularly in the public sector—for the benefit of developing countries;

Initiatives to be taken by the United Nations and other international agencies to encourage and facilitate the flow of industrial information from developed to developing areas and the cross-feeding of experience between developing countries (e.g. by acting as a clearing-house).

Type of information material and type of information services

The topics to be considered with regard to the type of information material and services that might be provided include: the publication of handbooks, specialized periodicals and data sheets in local languages; copyrights and translation rights; functions of industrial documentation and information services and their relationship to scientific documentation centres; establishment of local industrial film lending libraries; extension and advisory services and their potential importance in promoting industrial research and in making industry "information minded"; industrial exhibitions and fairs, demonstration of new products and processes.

The following questions may be discussed:

Responsibilities of national authorities for assuring provision of information to industry in an assimilable form (e.g. promotion of industrial extension services);

Advantages of co-ordinated programmes for purchasing industrial information materials (books, periodicals, films);

Areas of regional co-operation (e.g. publishing and disseminating industrial information by language area);

Concessions to be expected from industrialized countries (e.g. waiving of copyright fees, reduced subscription rates for periodicals and abstract journals, mobile exhibitions of industrial products and processes);

Assistance to be rendered by the United Nations and other international agencies with a view to facilitating the supply of industrial information to developing countries; publication of periodicals with a liaison function (e.g. UNIDO's *Industrial Research and Development News*); provision of data sheets and prototype publications for easy reproduction and translation into local languages.

Provision of personnel for industrial information services

The staffing of industrial information services is hampered by the lack of adequate personnel with a combined background in technology, business management, documentation and public relations.

The following questions might be discussed under this heading:

Status and remuneration of personnel in national industrial extension services;

Characteristics of regional exchange and training schemes for industrial information personnel;

Assistance by developed countries in the establishment of local industrial information services in developing areas (e.g. provision of training opportunities and secondment of senior officers);

Contribution by the United Nations or other international bodies to accelerated provision of local industrial information personnel (international training opportunities, regional seminars, industrial information service manual).

Access to sources of industrial information

To facilitate access to existing sources of information all over the world, comprehensive directories listing and briefly describing the functions of information facilities of importance to industry are required.

Under this heading the following questions may be discussed:

The extent to which Governments—in developing and in developed countries—should assure compilation of national directories and foster general acceptance of an "open door policy" by industrial information bodies;

The role of the United Nations or other international agencies in fostering the preparation and publication of such works (for instance, guide to industrial directories), as well as in promoting open and international exchange of industrial information.

THE DISCUSSION[25]

Regional symposia

The groundwork for the discussion in the Symposium at Athens had been prepared at several regional and interregional symposia, which had examined the problems from the viewpoint of regional interests and co-operation.

The Interregional Seminar on Industrial Research and Development Institutes in Developing Countries, organized by ECOSOC and held in Beirut in 1964, considered "industrial extension services" as covering the activities for transfer of scientific, technical and economic knowledge to industrial practice in order to bridge the gap between research and development, and to promote the use of such services. Particular attention was paid to the role of industrial research institutes in applying the results of research and in the choice of extension methods, including consultancy and industrial information services. Industrial information services were understood to include:

Technical inquiry services to answer specific questions from industrialists on such subjects as methods of production, management techniques, engineering problems, types of equipment, marketing problems and patents;

General information, including trends, possibilities for using specific raw materials, industrial products with potential, processes and projects;

Technical digest services;

Training manuals for managers and technical staff.

[25] See also *Report of the International Symposium on Industrial Development, Athens 1967* (ID/11) (United Nations publication, Sales No.: 69.II.B.7).

The seminar urged developing countries to establish industrial research and development facilities and information services where they did not exist or to strengthen existing services. With respect to information services, the seminar concluded that the United Nations should enlarge its programme to assist developing countries in equipping and operating information services and in training their personnel; should disseminate information on the functioning of industrial research, development and information institutions; and should facilitate the exchange of information and visits of personnel among countries.

The Asian Conference on Industrialization, held in Manila in 1965, followed the Beirut discussions and suggested certain guidelines for the establishment of an industrial research institute. The institute should initially be a technical information supply plant, making use of the results of research performed elsewhere. It would function as a question-and-answer system, engaging technicians to visit industrial undertakings and to supply information on up-to-date processes, equipment and products. It would advise on factory layout, selection of machinery, production costing, technical consultation with manufacturers, and would publicize technical journals for the information of specialists and the general public and the maintenance of an up-to-date technical reference library.

At the regional symposium held in Africa in 1966, attention was drawn to a United Nations-assisted project in Uganda, where a Management Training and Advisory Centre is being built up with a view to helping Ugandans to become entrepreneurs by providing them with advisory services and instruction in simple management practices, accounting and marketing, technological guidance and practical demonstrations. The Uganda centre will collect and collate information and documentation about equipment, machinery, tools, methods, practices and techniques.

The Symposium was informed of the recommendation of the United Nations Advisory Committee on the Application of Science and Technology to Development (UNACAST) that a network of institutes be built up in each developing country to study ways and means of applying the results of research to local agriculture and industry, and to promote the spread of scientific and technological information. The Symposium concluded that a regional scientific information and documentation centre should disseminate technical information and results of research throughout Africa. Existing research facilities should be fully exploited before

new institutions were proposed, and African countries should use existing research facilities to help other African countries.

At the Conference of Industrial Development for the Arab States held in Kuwait in 1966, it was noted that there was a tendency to set up more projects of a type that had been proved successful rather than attempting new and untried projects, and that this led to excess capacity in established lines instead of to diversification. This tendency could be curbed by institutions for the improvement of industrial management, which would keep management informed of potential products. The Symposium recommended that a United Nations centre be set up as a clearing-house for exchange of information between national and regional research centres.

An important topic discussed at the Latin American Symposium on Industrial Development, held in Santiago in 1966, was the problem of adapting techniques and machinery obtained from abroad to the special circumstances of the importing country, as, for example, the relative cost of capital and labour, factory sizes and installed capacity and the adaptation of the characteristics of the product to local market requirements. Wise selection of these techniques and machinery must be based on a knowledge of the ranges available and skill in comparing alternatives in terms of technical performance and economic return. Latin American enterprises often lacked the experience to select and compare successfully. Methods of advising local enterprises on these subjects should be studied.

Discussion at the International Symposium

Stress was laid on the importance of adequate national counterparts and correspondents in the exchange of information and on the need for personnel to process documentary information. Developing countries have great difficulties in handling the enormous fund of information on industrial development and processing it for practical use.

The contents of publications intended for circulation in developing countries should be presented in such a way as to facilitate translation into local languages.

The value of technical films was recognized, but it was noted that to be useful they must be directed to local industrial needs, and that the cost of film production would be prohibitive for some countries.

Attention should be given to the establishment of industrial extension services in the transfer and practical application of knowledge and experience. Such services might be attached to existing local research centres or technical colleges to serve as a two-way channel between the expertise and information of these institutions and their users. Priority should be given to training extension personnel.

The consensus was that UNIDO should serve as a clearing-house for industrial information by using its own resources and by referring inquiries to appropriate sources. UNIDO should compile information in certain areas not covered by other bodies, such as sources of industrial and technological information, feasibility studies, and directories of suppliers of industrial equipment.

Recommendations approved[16]

In recognition of the importance of making pertinent industrial information available, it was recommended that UNIDO, in co-operation with other international, regional and national agencies, give urgent consideration to the establishment of an international clearing-house for industrial information; this would locate sources of information on or provide answers to specific inquiries.

Developing and advanced countries should join in the exchange of industrial information and continue to make every effort towards extending the facilities of their established documentation and information services to industrial users in developing countries.

Developing countries should make increased use of industrial extension services in the transfer of research results and other industrial information to productive application, and particular attention should be given, therefore, to the training of industrial extension personnel.

In certain fields directly related to industrial development, UNIDO should consider the feasibility of compiling comprehensive documentation as a basis for providing information and advice on request, if such compilation is not being undertaken elsewhere. Examples of fields which might be covered by such a service would be: sources of industrial information, feasibility studies and directories for the supply of industrial equipment.

[16] See also *Report of the International Symposium on Industrial Development, Athens 1967* (ID/11) (United Nations publication, Sales No.: 69.II.B.7).

UNITED NATIONS ACTION TO PROMOTE THE TRANSFER OF INDUSTRIAL INFORMATION TO DEVELOPING COUNTRIES

The ready supply and effective communication of industrial information is an essential factor in accelerating the transfer of technology to developing countries. The role played by international organizations in achieving this objective is fundamentally one of co-ordinating, systematizing and expediting the flow of extant information to industrial users. The functions of the United Nations system in this domain are, first, to assist developing areas in setting up and strengthening their national information systems and, second, to co-ordinate the information transfer process within the international network. Before turning to the aims and activities of UNIDO in the industrial information sector, a brief account is given of other United Nations agencies in such related fields as scientific and technical information and documentation.

United Nations Educational, Scientific and Cultural Organization (UNESCO)

UNESCO has, from the outset, realized the importance of libraries and documentation centres as a means of accelerating scientific, economic and industrial development. Since 1950, UNESCO has been advising its member states to establish scientific and documentation centres and has rendered practical assistance for their creation in the form of provision of experts, fellowships and equipment within the framework of the United Nations Programme of Technical Assistance. It has been usual for UNESCO to provide a team of experts for a period of up to five years to participate in the organization and operation of a new centre and to train the local staff.

Under this scheme, UNESCO has collaborated with local governments in the establishment of scientific and documentation centres in

Belgrade, Cairo, Karachi, Manila, Mexico City, Montevideo, New Delhi and Rio de Janeiro. This task is currently being undertaken in Bangkok, Djakarta, Havana and Seoul. Only one of these centres—that in Belgrade—is devoted exclusively to information for industry. The activities and services of the Belgrade centre include the collection of specialized literature; library and reading room facilities; publications; document reproduction units; reference and translation services; and the dissemination of information by means of organized publicity.

In the general field of documentation, UNESCO has published a series of bibliographical and reference works to facilitate greater international co-operation. Among others, the *UNESCO Bulletin for Libraries*, first issued in 1947, is a valuable means of promoting up-to-date methods of documentation.

The importance attached to scientific and technical documentation led to the setting up, in 1967, of the International Advisory Committee of UNESCO on Bibliography, Documentation and Terminology (IACOD), with special subcommittees composed of leading specialists from all parts of the world. In this committee, the representatives of non-governmental organizations concerned with information and documentation, such as the International Federation of Documentation (FID), the International Council of Scientific Unions (ICSU) and the International Federation of Library Associations (IFLA) are also playing an active part.

At the end of 1967, UNESCO and ICSU began a joint project on the communication of scientific information. An ICSU/UNESCO central committee has been formed to study the feasibility of a world science and technical information system paying special attention to the needs of the developing countries.

In view of the close ties that have been established between UNESCO and FID, mention should be made of the activities of FID, which has long been working in the field of scientific and technical information and documentation. During the 73 years of its history, FID has been adopting and advocating new ideas to meet the ever-increasing demands of the scientific and technical community for quick access to relevant information. Besides its promotion of the Universal Decimal Classification, the main tasks of the federation include:

The co-ordination of the documentation activities of international and national organizations;

The study of problems of basic scientific and technical information;

The promotion of the training of information personnel;

Studies and evaluation of forms of communication used in providing technical information to industry;

Assistance to developing countries in the creation of their national information and documentation services.

Food and Agriculture Organization of the United Nations (FAO)

The FAO Documentation Centre in Rome has since its inception in 1967 been serving both developing and developed countries by supplying and disseminating selected information on the food, fishery and forest industries. The introduction of computer facilities at FAO headquarters has greatly assisted the centre in expanding the scope of its information services.

Thus, one of the tasks assigned to the centre is to make readily available to FAO member governments and other interested international and national bodies, in addition to FAO staff, field personnel and other United Nations agencies, the technical, economic and social information contained in FAO publications and documents. A subject index with the corresponding bibliographical data is issued in a monthly bulletin, *FAO Documentation—Current Index.*

International Labour Organisation (ILO)

The ILO Documentation Branch in Geneva consists of a documentation service and library, the operations of which have been fully integrated. All incoming material received by the Documentation Branch is processed and indexed with the aid of computer facilities for the purpose of issuing a weekly information bulletin and undertaking literature searches. The information provided by these services covers such fields as industrial and technological manpower, the training of industrial workers, industrial working conditions and industrial management.

United Nations Industrial Development Organization (UNIDO)

In pursuance of the UN General Assembly Resolution,[87] which defined the over-all objectives of UNIDO, and following the recommendations of the International Symposium on Industrial Development

[87] Resolution 2152 (XXI) of 17 November 1966, which resulted in the creation of UNIDO as an autonomous organization within the United Nations.

held in Athens in 1967,[28] an Industrial Information Service has been established at UNIDO Headquarters in Vienna. The purpose of the service is to assist in the industrialization process in developing areas by acting as an international clearing-house, and its function, both at headquarters and in the field, is to establish channels of communication whereby information consumers in developing countries are linked with readily accessible sources of industrial information in a world-wide information transfer network.

Headquarters activities of the UNIDO Industrial Information Service

The activities of the Industrial Information Service at UNIDO Headquarters are divided into five main areas of operation:

The creation of channels of communication;

Industrial documentation unit and specialized data collection;

Inquiry and advisory services;

Clearing-house for audio-visual aids;

Publications unit.

The creation of channels of communication

The transfer of industrial information to developing areas necessarily involves a two-way communication process. In broad terms, therefore, the flow of industrial information to and from developing countries depends on the existence of effective channels of communication between information consumers and suppliers. The UNIDO Industrial Information Service is developing these channels by setting up, first, a network of correspondents in developing countries and, second, a network of information suppliers in industrialized countries.

Correspondents forming part of the network in developing countries will, where possible, be attached to a local body concerned with industrial promotion, development or research. These correspondents will initially have two main tasks: (*a*) to stimulate the demand for information, particularly at the grass roots level of industry—they will channel inquiries to the Industrial Information Service and screen the replies; (*b*) to disseminate all types of information material on technology and industrial management suited to the circumstances and needs of the people they serve as well as information on the activities of UNIDO.

[28] See Chapter 3, p. 37 *supra*.

A further function will be to feed back to UNIDO the information and experience acquired in their own region that is of potential value to other developing areas.

A large part of the initial effort of the service has been directed to identifying bodies or individuals that will co-operate in launching and undertaking the work. The approach adopted is necessarily pragmatic. Thus, in countries in which UNIDO has established relations with industrial development centres or research institutes, UNIDO seeks to ensure that these bodies are organized so that they are able to facilitate the maintenance and dissemination of technological and industrial information. In other countries, it may prove more practical for the service's correspondent to be attached to the local chamber of commerce, technical institute or a government department.

UNIDO might assist developing countries where scientific and technical documentation centres have been set up by enlarging the staff of such centres with one or two information officers and an engineer. Acting as extension officers, they would visit local industries and enterprises in order to create among the personnel an awareness of industrial information and of the benefits it can bring.

The network of information suppliers will include specialized information centres, research institutes, technical libraries and universities as well as individual experts located mainly in industrialized countries. These information suppliers may be called upon to answer individual inquiries or to provide specific information or documentation services, either free of charge or for a fee.

If the accumulated fund of technical knowledge is to be effectively tapped, two factors must be borne in mind: (*a*) the interest of specialized information suppliers must be aroused and their continuing co-operation secured; and (*b*) the information must be communicated to the consumer rapidly and in a form that he can easily understand and apply.

Industrial documentation unit and specialized data collection

The Industrial Information Service collects specialized data in areas of particular relevance to the work of UNIDO and where no systematized information is readily available from other sources. Besides such specialized collections, the intake of material also includes: publications such as directories, catalogues, bibliographies, abstracts; reports and studies, especially those issued by the United Nations system; works of reference and books on industrial economics and technology;

data and publications relating to industrialization in developing countries; and periodicals, of which approximately 1,000 are received and scanned annually.

The three functions of the industrial documentation unit (IDU) are to acquire, systematize and disseminate information material. In addition to serving UNIDO personnel both at headquarters and in the field, the facilities of IDU are available to any interested body or individual concerned with industrial development.

The specialized data collections listed below, which are either being established by the Industrial Information Service or are projected, are complementary to the IDU holdings:

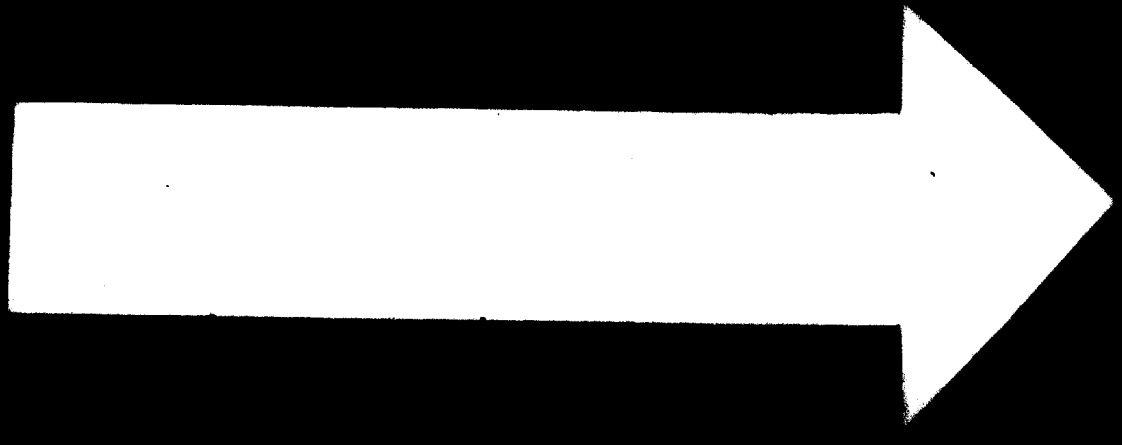
The UNIDO Roster of Industrial Consultants contains comprehensive data on organizations and firms throughout the world that provide consulting and technical services in the field of industrial development.

An extensive international collection of directories of suppliers of industrial equipment has been built up to provide one of the essential reference tools for the UNIDO Advisory Service for the Supply of Industrial Equipment.

A collection of technical assistance reports and feasibility studies generated by the United Nations system in the industrial sector is being assembled. The value of these documents lies in their potential applicability to similar problems existing in various places. Abstracts of the reports and studies are to be compiled and issued in a quarterly publication, *Industrial Development Abstracts*.

The service is assembling background information on the scope and functions of industrial institutions and organizations in developing countries. This information will be published in the form of an Industrial Agencies Handbook which will list, by country, local bodies of a public and semi-public nature that are able to provide both technical and financial assistance to industrial enterprises.

To perform its clearing-house function, the service must expand its specialized collection of reference works systematically; this means acquiring and analysing directories, guides and catalogues. A long-term objective is to publish a *Universal Directory of Sources of Information* to enable information consumers in developing countries to have direct access to pertinent sources of information throughout the world.



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IDU has set up an Industrial Information System (INDIS), which is engaged in indexing UNIDO documents, technical assistance reports and feasibility studies. This processing will result in the production of computerized indexes. This work, together with the computerization of the roster, will make for rapid retrieval of information.

Inquiry and advisory services

The clearing-house function of the Industrial Information Service is performed through the UNIDO Industrial Inquiry Service and the Advisory Service for the Supply of Industrial Equipment. These services seek to meet the information requirements of individual inquirers in developing countries by providing them with information and advice on specific questions or problems. The services are available to officials and technical staff of public and semi-public bodies concerned with industrial development and to managers of industrial enterprises.

The steady flow of inquiries sent to the Industrial Inquiry Service includes such diverse areas as investment promotion and quality control as well as specific subjects such as fish processing and the feasibility of establishing a steel works in a country in which none exists.

To provide answers to such a range of questions, the Industrial Inquiry Service relies on two sources of information: (*a*) the internal resources of UNIDO, comprising its own experts at headquarters, the Industrial Documentation Unit and the specialized data collections; and (*b*) the service's network of suppliers of information. The service has already established contact with a wide variety of sources of information and is drawing on an international reservoir of existing knowledge that will eventually cover the field of industrial development throughout the world. The International Iron and Steel Institute in Brussels, the National Research Council in Ottawa, the American Clearing-house for Federal Scientific and Technical Information in Springfield, Virginia, the Japan Information Centre of Science and Technology in Tokyo, the Tropical Products Institute in London, the Soviet All-Union Institute of Scientific and Technical Information in Moscow, and the International Organization for Standardization in Geneva are among the many institutions acting as correspondents for the service.

A few examples of the wide range of inquiries received by the service are described below.

An inquiry from a medium-sized developing country interested in establishing an iron and steel industry and having the necessary raw

materials and energy resources requested information on methods of pig-iron production and on small and medium-capacity iron and steel industries in other countries. The inquirer was sent a description of the production methods used at a newly established steel works in Mexico and technical information from a European iron and steel institute. It was also suggested that a representative from the developing country participate in a UNIDO symposium on the techno-economic principles on which the iron and steel industry in developing countries should be based.

A large developing country is faced with overpopulation in its rural areas. The village industries commission wished to know whether it would be better to develop cottage industries rather than large industries and, if so, whether to base them on intermediate technologies. Such an inquiry is referred to UNIDO experts specializing in intermediate and appropriate technology and to external correspondents and may lead to the provision of technical assistance in the field.

Some inquirers seek advice on technical problems that have arisen because of unique conditions or materials. A request was received from a country of the Middle East for guidance in improving the traditional methods of processing rice-bran oil to enable it to be used for the manufacture of toilet soap. Since the local oil mills were not equipped to produce oil of a suitable quality, tallow had to be imported. Specialist organizations were consulted. The file that was built up from various sources included information on equipment for the continuous extraction of rice oil and a digest on a filtration/extraction process permitting the simultaneous recovery of wax and oil from rice bran.

The aim of the Advisory Service for the Supply of Industrial Equipment is to assist developing countries to procure industrial plant and machinery. The Advisory Service provides inquirers with comprehensive or selective lists of suppliers of equipment and with the ranges of their products. Additional information supplied by the Advisory Service covers such questions as general price ranges of equipment, quality considerations, the formulation of specifications and terms of delivery and payment. It may be possible to broaden the scope of the Advisory Service by identifying and collecting studies, catalogues and other available material on prices and price trends of selected types of industrial equipment and making them available to purchasing personnel in developing countries.

In response to specific requests, UNIDO provides experts to advise government authorities on setting up national centres for purchasing

industrial equipment and to train personnel in the techniques of purchasing. In this connexion, UNIDO is publishing a *Manual on Industrial Equipment Purchasing in Developing Countries.*

Based on its specialized collection, the service is compiling a guide to industrial directories in order to assist local purchasing managers in the acquisition and selection of directories applicable to their particular sphere of activity. With the publication of this guide, efforts will also be made to encourage publishers of national directories to standardize and enlarge the scope of information on the manufacturers listed.

Clearing-house for audio-visual aids

A large part of the population all over the world is informed, educated and trained today by a wide variety of audio-visual aids. Besides films, these aids include slides, film loops, magnetic bands, flannel graphs, exhibitions, photographs, radio tapes and discs. Audio-visual aids are particularly suited for use in developing countries. They can often achieve in weeks what books, pamphlets or leaflets cannot do in months. Moreover, the sound tracks can be dubbed in regional languages. UNIDO is, therefore, compiling from national and international sources a comprehensive register of industrial films, indexed by source, subject, language, technical data and conditions of availability and plans to establish a library of them for use by developing countries. Industrial undertakings, non-profit bodies, national and international organizations producing industrial films will be approached for a gift or loan of films.

Publications unit

The publications unit issues a quarterly bulletin and a monthly newsletter.

The *Industrial Research and Development News*, published quarterly in English, French and Spanish, has a circulation of 3,000. The magazine is directed to those concerned with industrial growth in developing countries, particularly those engaged in industrial research. Besides regular features, such as the "Research Projects" and "Answers to Industrial Inquiries", it includes articles contributed by experts from different countries; each issue contains a special feature on a current problem, such as financial planning of development projects.

The "UNIDO Newsletter" is published monthly in English, French and Spanish. The present circulation of 20,000 will increase in the near

future when the Newsletter will be available in Russian and possibly other languages. With the aim of keeping a wide audience informed of the current activities of UNIDO, this publication contains brief reports on field projects, meetings, missions, new publications and other items of general interest.

Field activities of the UNIDO Industrial Information Service

The field activities of the Industrial Information Service are oriented to assisting developing countries in the creation and strengthening of their national information systems. The type of assistance that can be provided includes provision of experts to advise in the field, the award of fellowships and the building up of local institutions with grants from the United Nations Development Programme/Special Fund (UNDP/SF).

Expert advice in the field

At the request of Governments, UNIDO experts are provided to advise on such questions as the establishment and operation of industrial documentation, information and extension services; the organization of specialized information centres, for instance, analysis centres for different industries or libraries of industrial films; and the setting up of purchasing centres. Experts are also provided to assist local authorities and industrial enterprises to select industrial equipment, formulate specifications, prepare tenders and evaluate offers. UNIDO experts may also be requested to supervise the application of information provided by the Industrial Information Service.

Fellowships

Fellowships are awarded in order to provide both trainees and incumbent personnel from developing countries with theoretical training and valuable practical experience. Fellowships are offered to documentation, information and extension officers and purchasing managers for training in industrial information and purchasing techniques.

Special Fund projects

The third type of assistance, financed by UNDP/SF, permits a more comprehensive approach to be adopted in the building-up and organization of local information facilities.

Two current (1970) projects of the UNIDO Industrial Information Service will serve as examples of this type of activity. At the request of member states in the region, an expert will spend six weeks with the Industrial Development Centre for the Arab States (IDCAS) to carry out a preliminary study on the establishment of a regional industrial information and documentation centre. IDCAS recognizes that the constant flow and feedback of industrial information to and from the Arab States, other developing countries, industrialized countries and international organizations is an absolute necessity if it is to fulfil its aim of promoting political, economic, social and cultural co-operation among its fourteen member states with a view to increasing the rate of development of the region.

The heads of state of the Common Afro-Malagasy Organization (OCAM) have expressed interest in the establishment of a similar documentation centre, which it is felt would promote and strengthen international co-operation within the region (15 member states).

Both of the above-mentioned regional industrial information and documentation centres will be based on a network of specialized sub-centres and, in addition to encouraging the regional pooling of information, will co-ordinate activities such as translating and training in order to avoid a duplication of efforts in the area. Other functions of the centres would be: to operate an inquiry service; to organize an industrial extension service; to establish collections of technical assistance reports and feasibility studies concerning industrial projects in the region.

Co-operation of UNIDO with the United Nations Advisory Committee on the Application of Science and Technology to Development (UNACAST)

The developing countries can speed the pace of their economic growth by exploiting the technologies of the industrialized countries. However, the processes and machines intended for use in industrialized countries cannot usually be employed in developing countries without adaptation to the local climatic, economic and social conditions that are often very different.

The paucity of reliable data on the utilization of new plants, equipment and manufacturing techniques in developing countries under different conditions has hitherto caused difficulties in making the modifications that may be necessary to attain optimum results. Only a few experiences have been adequately reported—for example, the pilot

plant for the manufacture of transistor radio sets at Utrecht in the Netherlands which simulated the technical, social, economic and managerial conditions in developing countries. Such projects enable the efficiency of the methods adopted in the transfer of technology to a developing country and the training of local personnel to be tested and revised.

UNIDO, acting through the Industrial Information Service and in co-operation with UNACAST and the regional economic commissions, has undertaken to search out and report on instances in which industrial technology has been successfully adapted to the conditions in developing countries and on plants that have been specially designed to meet the needs of these countries. The results of this work are to be published regularly by the Industrial Information Service.

Annex 1

UNIDO ASSISTANCE IN THE FIELD OF INDUSTRIAL INFORMATION

A. Areas relating to industrial information in which UNIDO is in a position to provide technical assistance

Assessment of industrial information needs;

Establishment and operation of industrial documentation and information services;

Establishment and operation of industrial extension and field officer services;

Planning, establishment and operation of information analysis centres to serve a particular industry or a specialized field;

Planning, establishment and operation of industrial film services;

Planning, establishment and operation of national purchasing centres;

Assessment and identification of industrial equipment requirements;

Preparation of specifications for the purchase of industrial equipment;

Elaboration of tenders;

Invitation and evaluation of offers;

Follow-up of information provided in response to specific industrial inquiries in order to ensure its proper application;

Training of industrial documentation, information and extension officers;

Training of industrial supply and purchasing managers;

Procurement of expertise;

The transfer of information technologies from developed to developing countries.

B. Selected major technical assistance projects

Projects implemented or under implementation by UNIDO in areas related to the field of industrial information

Clearing-house and referral centre for industrial information and for audio-visual aids for industry;

Industrial inquiry service;

Advisory service for the supply of industrial equipment;

Roster of industrial consultants;

Experts and advisers to assist in the establishment and operation of five regional and some fifteen national industrial information and documentation services.

Annex 2

MEETINGS, SYMPOSIA AND WORKING GROUPS ORGANIZED BY UNIDO, OR BY THE UNITED NATIONS PRIOR TO THE INCEPTION OF UNIDO

	Location	*Date*
Interregional Seminar on Industrial Research and Development Institutes in Developing Countries	Beirut, Lebanon	November-December 1964
Asian Conference on Industrialization	Manila	December 1965
Symposium on Industrial Development in Africa	Cairo	January-February 1966
Symposium on Industrial Development in Arab Countries	Kuwait	March 1966
Symposium on Industrial Development in Latin America	Santiago, Chile	March 1966
Expert Group on the Establishment of an Advisory Service for the Supply of Industrial Equipment to Developing Countries	New York	November 1967

Annex 3

SELECTED LIST OF DOCUMENTS AND PUBLICATIONS ON INDUSTRIAL INFORMATION

UNITED NATIONS

Survey on the Organization and Functioning of Abstracting Services in Various Branches of Science and Technology, 1962 (document E/3618) (mimeo.).

A Working Approach toward a World System Effecting the Flow of Technical Information for Development, prepared by J. B. Liebermann, 1966 (document STD/5/Transfer/2) (mimeo.).

Application of Computer Technology for Development, 1970 (document E/4800) (mimeo.).

CENTRE FOR INDUSTRIAL DEVELOPMENT (PREDECESSOR OF UNIDO)

Arrangements for the Dissemination of Information on Industrial Technology, 1964 (document E/C. 5/51 and Corr. 1 and 2) (mimeo.).

Institutions for Industrial Development. Dissemination of Information on Industrial Research, 1966 (document E/C.5/120) (mimeo.).

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Industrial Research and Development News (quarterly bulletin issued in English, French and Spanish).

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Exchange of Scientific Abstracts of Documents relating to Applied Economics, 1966 and 1967 (document E/ECE/591 and E/ECE/646) (mimeo.).

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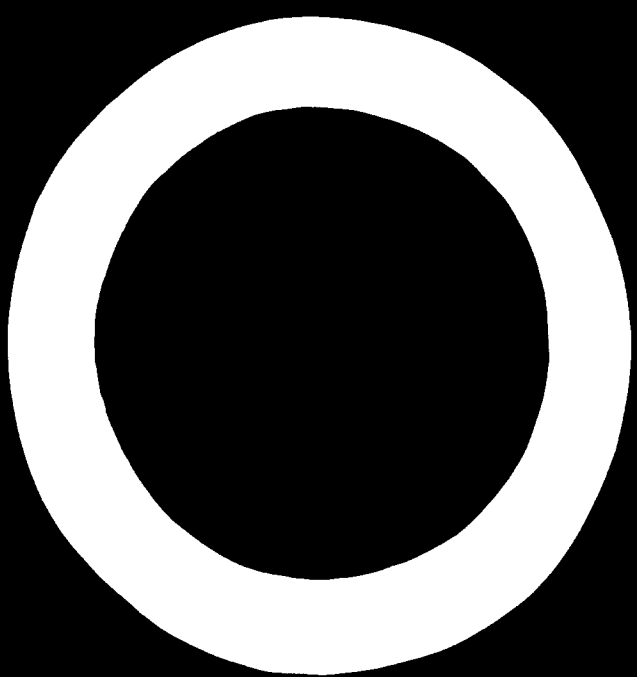

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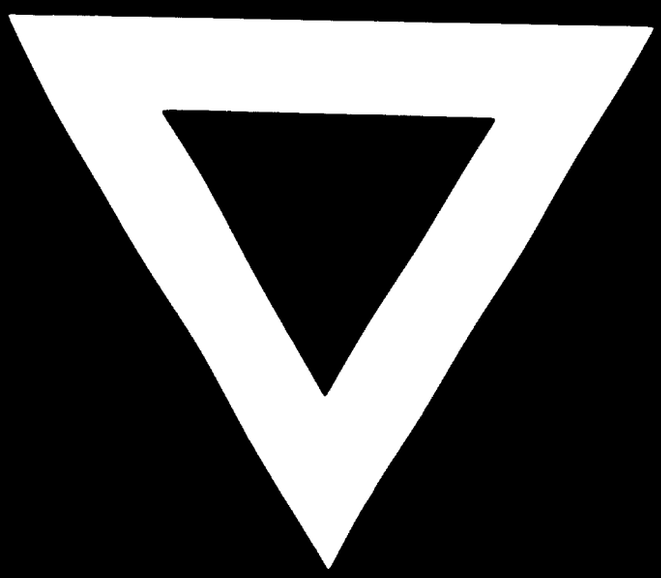

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