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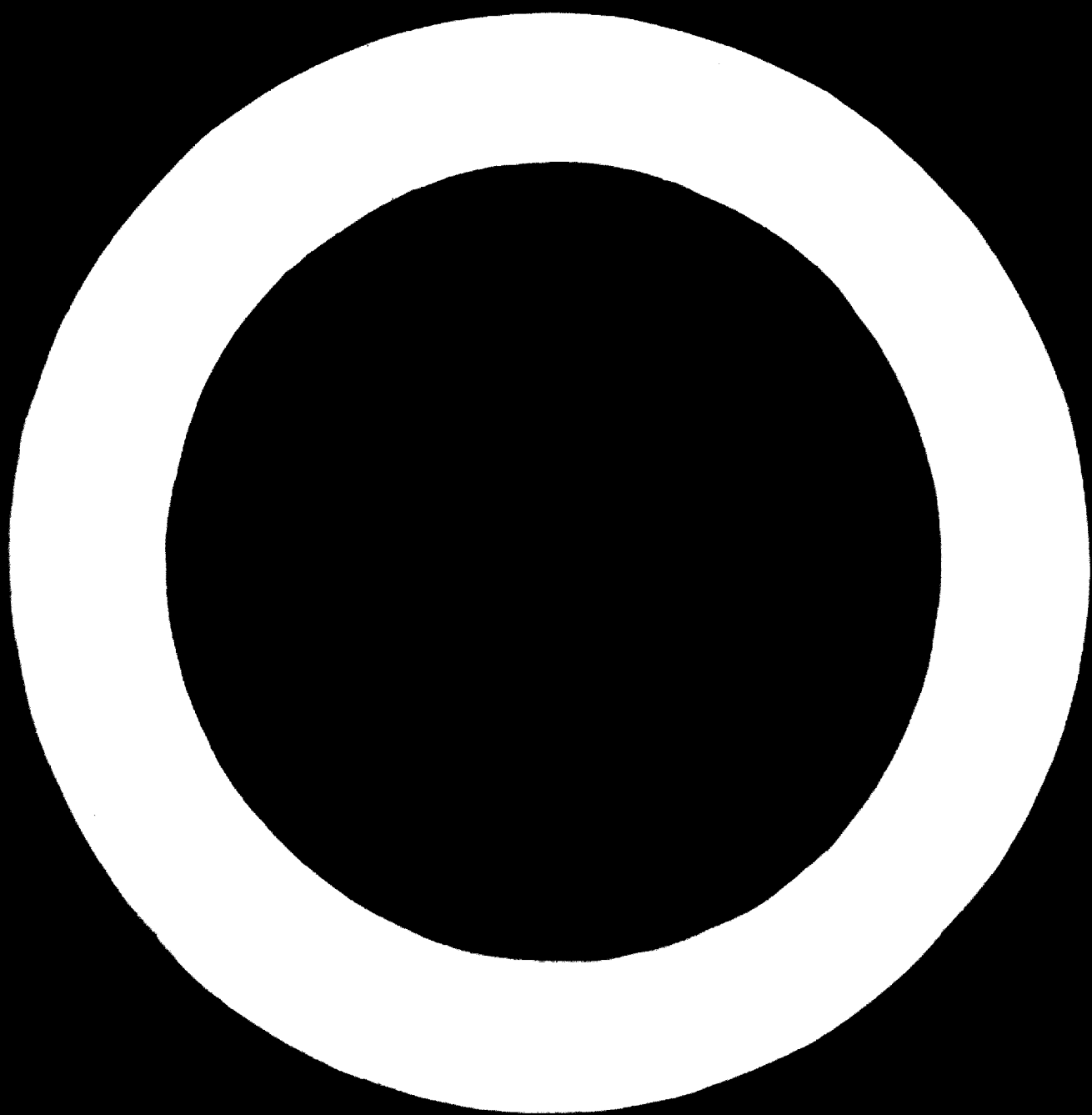
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I. THE ROLE OF INDUSTRIAL INFORMATION SERVICES IN INDUSTRIAL DEVELOPMENT

The life of a society is based upon material production. People need food, clothing and other material goods in order to live, and these commodities must, therefore, be produced.

The branch of production which has the task of exploiting and processing natural resources, processing and refining agricultural produce and other raw-materials is industry. Industry, having turned into a rapidly developing branch of production, is vitally important to the socio-economy. It applies the latest scientific accomplishments and feats of engineering ; at the same time, the needs of industry react upon and increase the scientific and technical development. This interaction results in the rapid growth of industrial productivity and consequently in increased production. Today the state of economic development in a country is determined by the state of its industrial development.

Because the developing countries wish for rapid development the progress of industry is certainly of primary importance to them.

In industrial development, or more strictly speaking, in the development of industry, the existence of raw-materials, manpower and finance are decisive. Equally important to the development of industry, is the knowledge of "how to produce"; knowledge of "from where to buy", such as information on sources of supply; knowledge of "to whom to sell" such as information on consumer markets, etc. This technical-economic information is basic to industrial development.

Information channelled from more advanced countries enables developing countries to make use of the latest technical achievements and eliminates their necessity to pass through all the technological stages already undertaken by the more advanced countries. In this way they can join in world production on a higher level, and so raise the living standards of their citizens at a faster rate. The objective sought by means of information, is the lessening of the gap that exists between developed and developing countries.

The average growth of the Gross National Product (GNP) in developing countries can be estimated at 4.4% between 1960 and 1967, 5.5% in 1968, and 5.7% in 1969. The average growth of industrial production can be regarded as 3% and that of agriculture as 5%, in 1969. These figures come from statistics collected from many countries. They are general estimates rather than specific indications of the trends in individual countries. The progress of development is, of course, at different stages in the various developing countries. Certain countries, for instance those producing oil in the Near East, are developing at a far greater pace than average. But even if the gap does lessen between some developing countries and the industrialized countries, it is not so with the majority, largely because of their constant increase in population. Their advance, however, is much more rational in the field of industrial development, including industrial information.

Today the problems of obtaining and disseminating information are very complicated. The quantity of published information is rapidly increasing and so also is the quantity of not published literature, whilst trade literature and industrial know-how continues to be of vital importance to industry. To illustrate this point I would like to mention that the total of new patents in the world annually is several hundred thousand, and the holdings of the world patents reach 12 million; while about three million articles appear annually in some 50,000 scientific periodicals.

The great success of the scientific and technical revolution of our day is due to the fact that scientific results are utilized and transferred directly into production with remarkable rapidity.

Since the experts' technological knowledge obtained through higher education becomes out-of-date within a period of ten years or so, the technical level represented by them becomes correspondingly obsolete. It is, therefore, necessary for experts to keep abreast of new knowledge, not only to develop, but just to maintain the technical level in industry.

A trained professional at practically any level will have been working in his field for about forty years. During these forty years he will need to be constantly in touch with the latest developments in

his subject. A relatively small proportion of educated professionals are in a position to attend even one refresher course. It is important therefore, that professionals be kept abreast of developments in their fields. Information services can greatly assist in solving this problem.

Large sums of money are invested by industrialized countries in their research and development activities. It is, of course, in the interests of the industrialized countries not to invest in what has been discovered previously. This is all the more important for developing countries which are usually already suffering from lack of professional staff. But for this reason too the industrialized countries also pay great attention to systematizing their industrial information services.

An author's abstract from the "Dattelle Technical Review,"<sup>1/</sup> reads as follows, viz: "The author discusses the probable form of the United States information system as it will develop in the next decade. He considers the influence of the federal government on the process and suggests how a standardized system will eventually be adopted by both federal and private information systems"; and another citation reads: "... it seems likely that the United States national scientific and technical information system of 1978 may well have the following characteristics: It will:-

(a) be supported largely (about 90%) by public funds;

(b) be composed of a :

- i. national standards sub-system
- ii. national document depot sub-system
- iii. national standard reference data sub-system
- iv. network of publicly funded information analysis centers
- v. national library sub-system

(c) include, as operating partners, those professional societies whose information systems are subsidized by public funds;

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<sup>1/</sup> "Dattelle Technical Review"; The evolving United States National Scientific and Technical Information System, Gustavus S. Simpson, Jr. Vol. 17. No. 5-6, May-June 1968. P.21

- (d) include as independent associates those professional societies that operate privately funded information systems;
- (e) include as an inter-competing group those publishers interested in commercial distribution of the products of publicly funded information analysis centers and in the repackaging, updating, copyrighting and merchandising of public-domain information. "

In various industrialized countries central organisations are being established which are responsible for the scientific and technical information in that country, especially information necessary for industrial production and development. Such more recently established organisations are the following: The National Committee for Scientific and Technical Documentation, France (decree No. 68-1270, 9.12.1968). The UNESCO Bulletin for Libraries <sup>2/</sup> reported, vis:

"The purpose of this committee is to study and to propose to the Government measures for implementing a national policy in respect of scientific and technical documentation, and in particular, to keep self informed of the activities of the various centres, to compare the results obtained and to co-ordinate these activities by facilitating the reciprocal exchange of information and stimulating initiative; to define rules aimed at harmonising and standardizing equipment, linguistic tools and methods; to advise the Ministry of Foreign Affairs on everything connected with the policy of international co-operation in scientific and technical documentation and to supervise the implementation of this policy by the various bodies concerned.

The National Committee for Documentation has as its president the General Delegate for Scientific and Technical Research. It has de jure members, six representatives of the industrial users of documentation and two experts specialized in biological and medical problems.

The committee's nine de jure members include; the Director of Libraries, the Director of Documentation at the General Secretariat of the Government, the Director of the Documentation Centre of the National Centre for Scientific Research (CNRS), the Director of Documentation at the Atomic Energy Commissariat and the Delegate for Information Science."

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<sup>2/</sup> United Nations Educational Scientific and Cultural Organisation (UNESCO) Bulletin for Libraries, Vol. XXIII. No. 4



In Italy the I. N. I. has been established. The Science Policy News<sup>3/</sup> reports, viz.,

"The general aim is to promote an information policy appropriate to Italy's economic and social development policy. Through its Parliamentary Council, INI will act on the legislative level to help the adoption of common policies and disciplines within the European Community.

The first practical activities of INI concern the development and application of new information and documentation techniques, the standardization of techniques and methodologies, a more functional concept of information within the public administration and its relations outside, and a national campaign for the creation of local libraries capable of satisfying the needs of a modern community."

In the United Kingdom, according to Aslib Proceedings<sup>4/</sup> the question is examined on branch level, viz:

"The CIRIA Information Liaison Group has set up four working parties to study how to improve the production and dissemination of information for the construction industry. The areas to be covered are:

1. An evaluation of the usefulness of abstracts and their standardization ;
2. a. Preparation of a comprehensive programme of surveys of techniques, digests, advisory leaflets on recent developments, with particular reference to content, style and presentation ;  
b. the development of data and information sheets with particular reference to content and layout;
3. Films and film strips;
4. Other visual aids. "

These examples are given to illustrate the factors involved for developing countries in building up their own industrial information system. It would seem that the Government has the task of organizing and co-ordinating, to some extent, the industrial information systems, even when it is outside the governmental organization. Naturally, the information systems of socialist countries are organized from the

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<sup>3/</sup> Science Policy News, Vol. I, No. 1. July, 1969.

<sup>4/</sup> Aslib Proceedings, Vol. 21, No. 4., 1969. p. 31

beginning by the government and remain under government administration. With due consideration to past development, it would seem advantageous for those developing countries with an industrial information system in the pioneering stage, to build up their systems under governmental organization and co-ordination from the very beginning.

## II. TERMINOLOGY

Unfortunately, the terminology of information is not always clear. To avoid misunderstanding, let us try to define some frequently used terms, before dealing with the substance of the whole subject.

Information is understood to be a verbal or literal, numerical or graphical representation of an event, activity or condition in the past, present or future. This definition serves to show that information itself is an extensive and universal concept calling for additional, more precise denotations to reveal what it is in content, purpose, destination (i.e. whom it may concern) and method of communication. In the case of industrial information it is quite obvious that the content is information necessary for the industry (technological, economic, statistical, marketing, etc.); the purpose is development, operation or keeping the level; the destination is developers, operators engineers, technicians, skilled workers; the method is any sort of communication (special literature, audio-visual aids, etc.). This spectrum should not be restricted even in the case of developing countries.

An information system is understood to be a special organization directed by definite rules of operation to keep up services for the oral or written numerical or graphical record of a past, present, or future event, activity or condition in a given field. An information system covers several sub-systems like for example, the industrial information system, the statistical information system, etc. From these examples it is quite obvious that the sub-systems overlap each other, so that an information system cannot be regarded simply as the sum of the sub-systems.

This situation is further complicated by the fact that an information system as well as its sub- or partial systems can be built

up both on national and international levels. Furthermore, a national system or sub-system can make use also of an international system or service organically built into its own system; a national system can also act as a sub-system within an international system.

Information systems can be developed into information networks. Generally, we speak about an information network in the case of using uniform equipment (e.g. computer-network); utilizing similar information media ( e.g. film); or performing similar functions (e.g. library-network). In most cases, an information system is understood to be a certain combination of the above-mentioned three elements.

Documentation is understood to be the collecting, registering, classifying and processing of documents in order to make them available for information purposes. Documentation is of great value to information services in the fields of science, research, industry, economics, etc. Therefore to organize documentation, is an indispensable prerequisite to the information services.

The document is understood to be the subject of documentation. Recently the term "document" has developed a more general usage according to which all basic materials containing information can be regarded as documents. The classical scientific, technical, economic document once consisted basically of books and periodicals. Nowadays, we distinguish between:

- documents of special literature;
- those published or commercially available, special literature which can usually be found in libraries and includes books and periodicals ;
- those not published, special literature which is not commercially available and cannot be found in every library ; trade periodicals and trade literature; research and development reports, and dissertations. Patents, standards, regulations and instructions also belong here, but should be mentioned with emphasis as they are of special importance from the point of view of industrial information ;
- scientific and technical films as information media (the films themselves being found in film-libraries);
- other audio or visual aids as information media (which can be found in special depositories).

These are the most important categories.

Lately, the documentation of data and the separate collection of data have growing significance. They can also be organised in two ways - documentation containing critical data consisting of supervised data only, or documentation covering any sort of data aimed at further usage. The store of data available for certain users is called a data-bank.

Documents are collected in depositories. Their arrangement depends on the information media, i.e. the kind of documents. Even within the same kind there are many possible variations. Whatever the document there are many different methods of processing and making it available.

In the field of scientific, technical and economical special literature, and in its processing we can distinguish between two types of institutes which frequently appear as separate sections of the same organization and have two different tasks:

- a special library which has the task of collecting, classifying, storing, and making the documents available; and
- an information centre or unit which differs from a special library primarily in the inequality of its input and output. It does not necessarily have a depository of its own, and in rendering information services, may use documentation from other sources.

In several countries including industrialized countries, such as the United Kingdom and Canada, the special libraries are at the same time documentation and information institutes. We can also find examples of information institutes operating a special library and documentation section( e.g. OMKDK in Hungary).

It is wrong to suppose that the document basis for industrial information services is equal to that of a standard library. They are only partially equal. The difference is not based on the amount of special literature. It is evident that libraries too have their specialists who are familiar with collecting, registering and making all types of documents available. Obviously, it is possible for libraries to handle new types of documents and to effect their own processing and circulation, but this does not mean reducing the industrial information conveyed in the document or lessening the professional knowledge of information processing.

### III. INDUSTRIAL INFORMATION REQUIREMENTS OF THE DEVELOPING COUNTRIES

It is difficult to determine the industrial information requirements of the developing countries because of their individual differences. In fact, the category of developing countries itself is difficult to determine, as it involves so wide a range. When determining their requirements, we should start from the actual country itself. Here however, we have to generalize, simply to expose some fundamental problems without attempting to cover every aspect involved. Nevertheless, even these fundamental problems must be assessed specifically for the country in question, as general formulae do not apply.

Obviously it is the task of an industrial information system to fulfill industrial information requirements. The system affects both those who are informed and those who inform, whether they be individuals, enterprises or institutes. Those who inform are generally, at the same time, informed themselves otherwise they would not be in a position to give information. Generally it is true that those who are informed will give reciprocal information on themselves. Thus information flows in two directions.

It should be noted that although we are relating problems of communicating information to developing countries, that these problems do not apply exclusively to the developing countries. In 1968 the question arose as to whether the "technological gap" between the West European countries and the United States might result from an insufficient flow of information. Even in industrialized countries provision for channelling information must be fought for as also must the efficient means of utilization of the information itself - both are necessary for economic development. Good first impressions of information services can help to raise regular demands. It is most important that those who render information give exact and accurate answers to the questions received. Answers must be:

- expressed understandably and simply
- facilitate and encourage the decision; too much information should not be given

Supplying information is a service. The inquirer must be given the information he needs in the form most suitable for his utilization and detailed to suit his purpose. It is the informers duty to advise on details and to help the inquirer to put his questions clearly.

Since we have to generalize, the individual requirements of individual users cannot be dealt with here; but the most effective methods of information services for large groups of inquirers in the developing countries with their different levels of development, should be outlined.

Formerly, scientific information could be clearly distinguished from the information necessary in industry, although not without difficulty. Since scientific results have become so rapidly utilized in production, the distinction is even more difficult to make and it is extremely difficult to determine the users' information needs on such a basis.

Until the industrial revolution the most important communication medium was books. The knowledge of the past was condensed in libraries, the field of the sciences, with its obvious dividing lines, was easy to survey. When the scientific and technical revolutions began, periodicals in addition to books became the most important communication media. Sciences differentiated further and their information media overlapped. However, in the interests of lucidity, first bibliography, then documentation were organized.

During the scientific and technical revolution, science became one of the productive forces. With the appearance of marginal sciences, an integration of the sciences could be observed together with specialization. The most important communication media at this point became research and technical reports, trade periodicals, trade literature, catalogues - suppliers and producers - price lists, patents, standards, regulations, instructions and industrial know-how. Great importance is given to exhibitions, seminars and study tours for the exchange of experience. Information and documentation services with different objectives, have increased to such an extent that information on them also had to be organized and published.

In what follows, I shall attempt to answer questions on the groups into which users of information may be classified in the industrial areas of developing countries, as well as their different kinds of demands and the methods by which they can be satisfied. This kind of grouping is inevitably arbitrary and open to criticism. However, some sort of grouping is necessary, although it must be understood that the generalization does not cover specific demands. I shall deliberately exclude the scholars' and researchers' demands and concentrate on the demands for information on practical management, industrial policy ; and on an analysis of the demands for information made by industrial enterprises and how far they can be satisfied, as far as the limitations of this paper will permit.

The first question to be answered is "What are the needs of industrial administration in the field of information, so that it can promote industrial development by satisfying the information demands of the administration itself?"

The second question concerns the duties of the administration in the field of information for the industry in regard to services which should be made available such as promotion to meet the information demands in industry.

The third question concerns the tasks of the industries themselves when receiving information and processing it for their own use in their own speciality, and in addition, processing information on their organization for government authorities and other enterprises similar to themselves.

Undoubtedly, the ideal situation is when the whole information system is under government management, so that information and documentation is not in private hands. Ideally, all information should be under government monopoly, so that it is at the disposal of every citizen alike. Several such networks are known who have government ownership and are not private monopolies, e.g. the telephone network, the post network. At the same time, the fact that individual people or enterprises are more or less well-informed cannot be disregarded completely where information is concerned, and this inevitably causes

advantages to one side or the other. It is noticeable, of course, that where the information system is under a responsible administration aiming at the possibility of everyone being well-informed, the disadvantages of unequal access to information are considerably less.

Government organizations in charge of the Government's industrial policy need information in order to determine their policies (i.e. the main purpose and directions to be followed in development).

Where industry is in national possession there also the main technological problems must be dealt with by the government. The national economy of foreign countries in comparison with their own, should be recognised as well as their own resources, facilities, and as already mentioned, the most developed technologies in these fields to be developed with all their advantages and disadvantages. In order to make decisions on government industrial policy, a full understanding of the problems that exist must be reached by surveying all the relevant factors. This can be done by the information department preparing surveys for decisions, and this processed information is then compiled; such a compilation cannot be brought from another country, but must be prepared by each country itself, industrialized or developing. Although such information departments concerned with the preparation of decision-making information, cannot be found in every developed country, they do exist although differently organized and integrated in the information system of a country. The preparation of the foregoing type of information requires basic material, national statistical and similar data and documentary information from abroad. The latter can be original documents (i.e. primary sources or selections that have already been processed to certain ends - secondary sources). Such selected material can also be ordered from foreign information institutes.

Organizing a system of statistical information is an administrative task, which will not be dealt with here. But I would like to consider the organization of a national system of technical-economic information with special stress on the marketing information, rather than on other technical information systems. At the same time it should be noted that within a country we can distinguish individual sub-systems operating



more or less independently of each other, while in an industrial enterprise all the sub- and partial systems appear to be linked in close interrelationship.

As regards an industrial enterprise, we can divide information into two main groups:

- i) information coming from inside the enterprise, which must partly remain inside assisting management activities, and partly has to be disseminated externally:
  - a) compulsorily supplying statistical and other data;  
or:
  - b) rendered to other users on demand, e.g. informing customers on the activities of the enterprise.
- ii) information coming from external sources to the industrial enterprise such as statistical information, market-economic information, information necessary for production and for maintaining the technological level, as well as information necessary for development: technical, financial, legislative, etc.

The users of information inside an enterprise and their demands can be classified as follows:

The management of an enterprise needs information from outside and inside alike, primarily in order to prepare and make decisions. Here marketing-economic information, trade catalogues and prospectuses of suppliers play an important role.

The technical staff needs information from outside, selected with care for their own field. For this category of users we must not forget the significance of the oral or written information which comes from personal meetings, studytours, exhibitions etc.

The shop-foremen's and skilled workers' primary information medium is the technical film, an audio-visual means by which linguistic difficulties can most easily be overcome. These films are available from abroad. However, the information on film has to be organised in order to make the necessary selection of films possible.

Development engineers rather than scientific researcher workers are in great need of information: besides periodicals they need first of all catalogues, prospectus on literature suppliers and information on exchange of experiences, personal meetings, visits to

exhibitions, etc.

When speaking about satisfying the needs for information, one should stress the importance of not giving too much. Careful selection must be made in advance, and in the case of managers, survey information for preparing decisions must be made available. This implies, however, a danger of bias and influencing, which should always be strictly avoided.

Our next question is from where to obtain the necessary information to meet the demands of different groups of users in an enterprise.

Each country provides in different ways for the quantity of information needed by its industrial enterprises. Generally, the big firms all over the world make provision for procuring their own information, i.e. they have large information departments. In all industrialized countries there are, however, institutes which render information services for enterprises that are unable to run adequate information departments of their own. In some countries they are governmentally supported; in others they are government-run institutions, and sometimes they figure as non-profit organisations. Some of the most highly developed industrialized countries, e.g. Canada and the United Kingdom, supply their medium-sized and small firms with information by supporting information advisers with public funds, who are then entirely at the disposal of these enterprises.

The government contribution to running information services for industry can be organized in many ways, both on a national level in national institutes and on branch level in branch institutes. Scientific and techno-economic information can also be joint or separate. The essential point is always the same: the government contributes to enable the processing of certain types of information to be put at the disposal of industrial enterprises.

It is difficult to answer the question on what should be done by a developing country that has not yet considered national organization of information services for industry.

According to some opinion greater use should be made of the possibilities of setting up information services on a more advanced technical level than were used at the outset by some countries. If so, industrial information services could be organized with computerization.

ECOCOC made a report on the state of computer technology and computerization in developing countries entitled: "Application of Computer Technology for Development" and stated that 12 of the 39 developing countries examined have computers in operation, 12 countries are now introducing computers, whilst the other countries have not yet planned computerization. If these 39 developing countries can be taken as representational, we can say that before long about 32 per cent of the developing countries will be operating computers. It seems, therefore, logical to plan the information system whenever possible with computers. Although this suggestion should be taken into consideration, it cannot be applied universally because the information to be communicated for industry through computers needs complicated organization, sophisticated preparation and considerable intellectual and material investment. It seems more advisable at the initial stage for developing countries to use the classical manual methods of information processing, and to adopt the computerized systems only at a later stage of development. But, wherever possible, a system should be adopted which could later be computerized easily.

The first task of the government is to select an organization to be responsible for industrial information activities. This organization might also be responsible for library activities or it might be quite independent. Examples of both kinds of organization can be found in industrialized as well as in developing countries.

Experience shows that in many cases countries do not have independent technical library networks, but technical libraries carry out information activities in the fields of both technical sciences and industry. In other countries, however, technical libraries and industrial information institutes are separate from each other. This might be so because of the detachment of the information institutes from

the technical libraries, or by their being separately established.

The next task of the government would be the establishment of an industrial information centre or unit, if there is not one already, to be attached to a central organization, industrial ministry or planning office. In addition to its subordination to a central organisation it is most advantageous for this information centre to be established near an operating technical library, perhaps a university library, as a depository will be needed.

In order to lessen the industrial gap between the developed and developing countries, the reduction of the information gap is essential.

Industry in developing countries cannot be fully developed without regard to industrial progress in developed countries, and without taking into consideration the conditions existing abroad. Likewise, it would be a mistake to organize the industrial information system in a developing country regardless of the information services and possibilities of access to information in existence throughout the world. The available international and national services should be utilized and should be built organically into their own system, as is in fact already the practice in industrialized countries. Independent systems should be drawn up only where special information facilities do not already exist.

The central industrial information organization should take into full account international or national services given in languages which are understood in the country and should avoid preparation of information already processed and obtainable. The organization should also consider information activities in other developing countries and not duplicate processing or compilation already available in the appropriate language. Co-operation and comparative studies on the information facilities in neighbouring countries are also necessary for the establishment of depositories most relevant to the national industries.

First of all the central industrial information organization must play the role of a national clearing-house.

One of its chief tasks is to discover and register the information sources existing in the country in libraries, industrial enterprises and so on with information departments in operation and ready to give service. The wide range of potential users must be informed of the information facilities available.

A register of technical translations and technical translators existing in the country must be organized. Facilities for preparing translations as well as information on translations should also be organized.

A union catalogue should be established in the professional fields most important for the country of expensive and not easily available documents to avoid duplicated acquisition and processing.

In the fields most important to the country's industry some depositories should be operated, e.g.:

- a depository of patents
- a depository of standards
- a depository of prospectuses, catalogues (trade literature)
- a depository or registry, e.g. of research projects covered by public funds, already bought industrial know-how licences etc.

Documentation services in the most important fields for national industries which are available abroad in world languages should be subscribed to. By utilizing and selecting these, the SDI (Selective Dissemination of Information) services can be operated. It must be emphasized again that the principal problem for industry is not to be informed of scientific research discoveries but rather to receive news of supplier enterprises through trade periodicals, prospectuses, catalogues, and news of standards, patents, etc. rendered to them on an SDI basis. By using this service, provided there are further information facilities in the country, a division of labour can be realized either according to the types of documents processed, or to the different professional branches. Both divisions of labour have their advantages and disadvantages, but it is impossible to go into details here.

In addition to the subscribing of processed material, the

servicing of original documents should also be organized in order to satisfy demands for more detailed information. For this purpose, the national holdings of special literature must be known, institutes abroad must be contacted and reprographic, copying and multiplying facilities must be made available.

Such a well-equipped central information organization can be charged with compiling information for preparing decisions for the use of the industries' policy-making bodies.

It is practical to register at the central information organization data on international and significant national conferences, congresses, including their participants, held in the professional fields which are most important for the nation's industry. Travel reports can also be registered, and if a country has not sent any representatives to participate at these meetings, a delegate of the information organization could attend in order to collect and make available the information materials provided for those who are interested.

At the beginning, the central information organization could establish an advisory (consulting) service, so that expert consultants would supply information on demand, and later visit the enterprises regularly with on-the-spot assistance.

This form of advisory service is calculated to inform the consultants themselves as well as the organization on industrial activities and new techniques for the exchange of experiences. Where the consultant recognizes a commendable method, he may bring those who work on similar activities together. An example is seen in the Soviet Union: when some useful innovation or outstanding method is found, the information service immediately begins to organize an exchange of experiences among institutes or enterprises of similar technology.

The publicizing and promotion of information activities is also the task of the central organization.

The central information institute follows up this course of development and expands its activities according to requirement.

Occasionally, independent information institutes serving one special branch of industry might detach from the central institute and the same occurs with some special forms of information media too, e.g. standards and patents.

Unfortunately, within the limits of this paper we cannot go into detail on the problems of internal organization, technical competence, equipment finance and the staffing of an information institute. However, I would like to remark on the topic of finance that government support of libraries is the general practice today, and at the same time the running costs of information services must be met, if possible, by users of the information service. There are good reasons against free information services: usually information received uncharged is not criticized but is accepted even when it proves valueless and inaccurate. Nevertheless, in countries where there are few users in a field, the payment of running costs by such great charges on the user that, for the most part, not wanting to pay them, he would rather renounce the information itself. This is of course quite unintended. Where users are few, the government should support information institutes and not all costs should be covered by the user.

Finally, it must not be forgotten that there are two kinds of information in every information system:

- a) information that is essential regardless of cost, and
- b) information which is useful but as background material which for the moment might be dispensable.

The staff of information institutes is partly full-time, partly part-time, and technical staff must be recognized as experts in their field.

It is worth considering in developing countries that have an information organization in operation with publications and services, whether it would be advisable to build up the national central information institute from these services already in existence.

One has to deal separately with the possibility of countries

with the same language, suitably close to one another, supporting the establishment of regional information institutes. A regional information institute is advantageous because initial and running costs can be shared. Also international organizations are willing to promote such efforts.

When is the establishment of a regional institute possible? When there is a common language in the region and the aims of communication are similar. Without this, success cannot be expected. Another great advantage of a regional information institute is that international assistance and professional staff can be obtained more easily. Where an information institute services a larger area and has greater facilities, a computerized information system using processed computerized information can be introduced earlier. This information has the advantage of being readily available in world languages and in many fields; only services for selection and retrieval have to be organized.

In summary, for management in industrial enterprises knowledge of methods and processes directly applicable to industry are still in greater demand than that of scientific results.

This information comprises standards, instructions, specifications, inspection rules and data on supplier firms. It consists of condensed knowledge that originates in scientific research and development. It must be utilized by competent professionals, each in their own field. Knowledge of all this material is especially important to a firm in its own special field, because performance can be improved by surveying the activities of other firms, and consequently improved output relies on such knowledge. This is especially true for the developing countries, who might buy ready equipment rather than design and produce it themselves.

As mentioned before, the industrial enterprise uses information on itself partly internally, partly externally. It has to disseminate information on itself to business partners outside, information not to be equated with propaganda, besides using this information for inside administration.



All these tasks are diversified within the organization of an industrial enterprise, and it is very difficult to resolve them into one system. On the one hand information must be given for legal reasons and on the other hand for economic reasons. When giving technical-economic information externally, there are also underlying economic motives that are not apparent and frequently overlooked. Requests for information should be collected in the enterprise, and the dissemination of information received should be organized too.

Obviously it is advisable to have information liaison officers operating in the enterprises who are in regular contact with the central - or branch-information institutes. These officers should be provided by the industrial enterprise itself in the interests of development.

I would like to draw attention to the fact that the information service is a profession which must not only be organized but developed and taught as well. Research and development activities in information services are chiefly the concern of the big industrialized countries.

Those who want to work in the field of information should be professionally trained. What kind of staff is needed? This, of course, depends on the special tasks to be performed. In any case technical education is necessary, and provision for economists to collaborate with engineers to evaluate information for decision-making etc. There should be librarians, archivists, etc. to handle collecting, registering and classifying of documents so that they are available on demand. Administrative and supporting assistant staff is always necessary as well as trained staff for photocopying, printing etc.

Not only those who prepare information but also the users must know about the possible ways of being informed. So on the one side the processing of information, and on the other side the utilization of the sources of information should be taught. This means that in higher education great attention should be paid so that students know about the accessibility of information, not only the information sources of scientific data but also data on standard management and

the organization and operation of an enterprise.

Special attention must be drawn to the possibilities that exist in the industrialized countries and international organisations, who might give significant help in training future experts of developing countries in their own courses.

#### IV. INFORMATION ACTIVITIES OF INTERNATIONAL ORGANIZATIONS AND THE DEVELOPING COUNTRIES

International organizations, inter-governmental or non-inter-governmental alike, play an important role in supplying the developing countries with information, especially industrial information.

The OECD Scientific and Technical Information Policy Group prepared and published a report in 1969 on international organizations with more extensive information activities. In this compilation, 27 international organizations, inter-, and non-inter-governmental, are to be found - though this figure must not be regarded as complete.

Scientific research and information rendered to industry through international organizations is generally interrelated.

The UNIDO and OECD Development Centre render industrial information explicitly for developing countries.

Although without any information service of its own, the Fédération Internationale de Documentation (FID) has two committees actively concerned with the development and promotion of industrial information systems in developing countries. These Committees are the FID/II (Information for Industry) and the FID/DC (Developing Countries). The former deals in general with the problems of information necessary for industry, whilst the latter discovers how best to convey the information required in the developing countries and assists in the organisation of information systems and works out recommendations.

On the basis of a contract between UNESCO and FID, the FID/DC Committee is at present preparing a study on the national structure of documentation and library organization in countries at different stages of development, among them about 30 developing countries.

This survey is made in order to make recommendations to developing countries on how to build up and develop their documentation and library system while taking into account the experience of the developed countries.

In the course of preparing this study, but also earlier at the Committee Meetings of the FID/DC - the question arose of coordinating the activities of international and national organisations concerned with furnishing information and establishing information systems in developing countries.

The Draft of the Committee Working Programme for 1971 includes an item in this connection: with the support of UNESCO and cooperating, if possible, with IFLA, FID/DC, a meeting of the interested delegates of those non-inter-governmental international and national organisations which are dealing with information problems in developing countries will be organized, i.e. to coordinate the activities of the non-inter-governmental organisations. If successful, significant improvements can be expected in supplying the industry of developing countries with information.

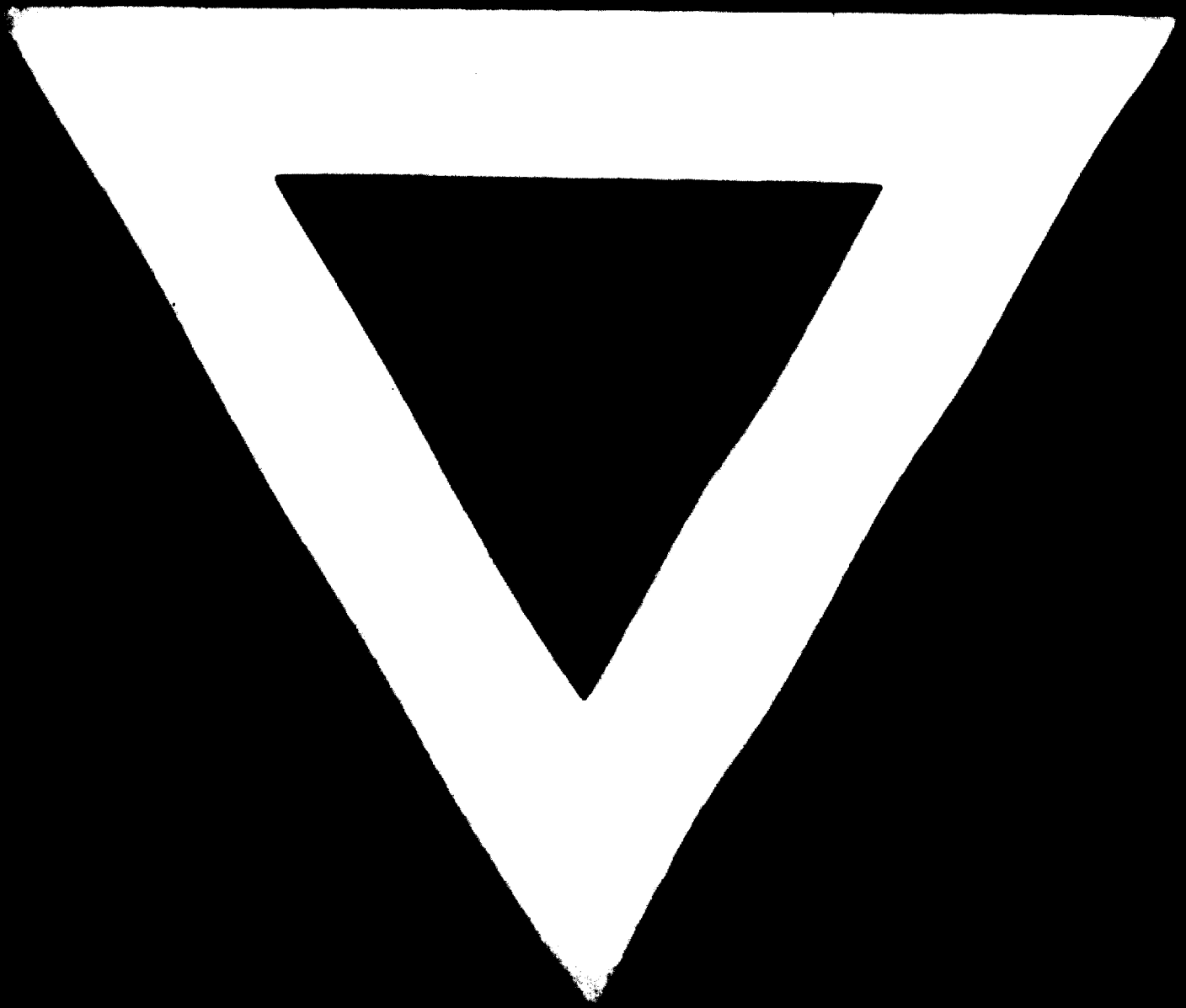
As I have already mentioned, in the developing countries it is advisable to take into account the national information services in other countries using the same language, and to avoid preparing information ready and available elsewhere. To enable a developing country to select the proper information, a co-operative inquiry service must be utilised, if possible within the framework of an international organisation (e.g. UNIDO). Such an inquiry service already dealing with information, should consider the following questions with regard to any branch of industry:

- which are the national or international information services and publications in world languages?
- which are the national information organisations that answer questions?
- which are the national information organisations collecting trade literature (prospectuses and catalogues) that are ready to give information to the developing countries?

- from where can non-professional information aids such as technical films, illustrated technological descriptions, etc. be obtained?

The lessening of the development gap depends to a great extent on the reduction of the information gap. The investment required, however, in information services, in establishing organisations and buying ready material must not be underestimated. The beneficial result of this investment cannot be measured in itself but only in relation to the user - and even then can only be guessed at. The experience of the industrialized countries shows that, not providing facilities for information in the long run costs much more than actually providing them. If the developing countries would learn by the experience of the industrialized countries, they should press forward, backed by their governments, in every effort to establish their own industrial information system.





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