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06676



Distr.
LIMITED
ID/WG.204/14
8 October 1975

United Nations Industrial Development Organization

ENGLISH
ORIGINAL: FRENCH

Joint Consultation on the Promotion
of Industrial Research and Services
in Africa

Lagos, Nigeria, 15-19 September 1975

THE NECESSITY FOR INDUSTRIAL INFORMATION
IN DEVELOPING COUNTRIES ^{1/}

by

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^{1/} The views and opinions expressed in this paper are those of the author and do not necessarily reflect the views of the UNIDO Secretariat. This document has been translated from an unedited text.

id.75-7639

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INTRODUCTION

A country's economic growth depends essentially on its agricultural, human and other natural resources, but to a considerable extent also on how these resources are used. The factors governing growth are many. The main factors have been identified as training, research, the expansion of industrial sectors contributing to the development of new energy sources and technologies and to the improvement of technical methods and processes, and, lastly, the establishment and maintenance of extensive and efficient information systems.

Information, then, must be regarded as an essential factor in resource development; indeed, one might even say that information, and especially industrial information, is as much an integral part of a country's national resources as are its energy or human resources, since the exploitation of other resources depends on it.

I. DEFINITION OF INDUSTRIAL INFORMATION

Information can be defined as an aggregate of ideas, knowledge or numerical data which can be transferred in various ways from one point to another or from one person to another. In a more restrictive sense, the term "industrial information" refers to those specific elements of scientific, technical and economic knowledge which can be transmitted and used to facilitate and speed up the process of economic growth. The role of an industrial information service, therefore, will be to furnish industry with these various items of scientific and economic information, as well as with other information on the management of enterprises, the properties and treatment of raw materials, or new techniques and research findings pertaining to industrial production.

However, the role of industrial information does not stop there. If industry is to be given information, the information service must collect the necessary data, and it is within industry itself that it will find the elements of information it seeks. Industrial information is therefore not a one-way process, nor can it operate to promote development unless there is a willingness on the part of its users not only to receive but also to supply information.

II. TYPES OF INFORMATION THAT ARE USEFUL

As we shall see later on, an industrial information service must be tailored, on the one hand, to the nature and competence of its customers and, on the other, to the type of information needed, but this is not to say that information, even when so tailored, can provide solutions to all the customers' problems. Industrial information

can never be a substitute, in the running of a business, for a competent and experienced staff. It can only help to supplement and update existing scientific or economic knowledge; it cannot compensate for fundamental deficiencies. Similarly, the best industrial information cannot alter the fundamental characteristics of an enterprise, but it can help to enable an existing structure to be used to the best possible effect. In the specific context of the developing countries, industrial information is no miraculous panacea for narrowing the technology gap, but it will assist in creating a climate favourable to development, if only by facilitating the transfer of technology between the highly industrialized countries and the others.

What is the range of industrial information today? For the layman, industrial information is generally confined to technical information and, sometimes, information of a scientific or economic nature. We shall see, however, that industrial information covers more areas than that. The data relate to:

(a) Raw materials and intermediate products used in the industrial process

World-wide, regional and national production; figures relating to consumption, market situation, trends in domestic and foreign trade. (Quality standards, new products to replace traditional goods, technical data).

(b) Economic infrastructure

Public services, provision and cost of utilities, transport: rates and capacity, manpower, training facilities, trade unions, recruitment.

(c) Technology

Processes and techniques, adaptation to local conditions, machines and materials, innovation, prices, maintenance, parts, plant layout, productivity, investment costs, return, feasibility, etc.

(d) Products

Design, treatment of raw materials, packaging, quality control, standards.

Markets, domestic and foreign competition, cost-benefit analysis, export possibilities, supply and demand situation.

(e) Industrial legislation

Company law, fiscal system, customs duties, intellectual property protection, industrialization policy, investment code, export promotion, exchange controls.

(f) Industrial organizations

Associations, industrial chambers, co-operatives, subcontracting possibilities.

(g) Financing aspects

Capital, bank loans, supplier's credit, collection problems, etc.

(h) Administrative aspects

Stocks management, organization, programming, etc.

Certain of these items may seem to fall outside the sphere of industrial information, but it must be realized that even a product which has been manufactured with the greatest care and under conditions of maximum profitability is worthless if it is not tailored to the wishes and habits of the consumer or if the product is already glutting the national market.

III. THE USEFULNESS OF INDUSTRIAL INFORMATION

The concept of information implies a certain dynamism. Information somewhat resembles a living commodity following paths of varying degrees of complexity on its way to the consumers. The information must be given a form that the consumer can assimilate, and this will depend on who the consumer is: a French-speaking business manager will be unable to put to profitable use a technical paper written in Chinese unless he can find a specialist with a knowledge of the two languages and competence in the subject in question. Similarly, no printed or handwritten text is likely to be of much help to an illiterate who may nevertheless be in charge of an enterprise and require industrial information.

For a very long time, man was satisfied with the spoken word as the medium of information. Writing was developed when the need arose to give information a less transitory nature. With the invention of printing, an important milestone was reached in the accumulation and dissemination of information. Other information media and channels have made their appearance in more recent times - films, magnetic tape, the telephone, television, the cinema, radio and communication satellites. For the present, however, although perhaps not for very much longer, the printed word continues to be the most widely used medium of information. For several centuries following Gutenberg's invention the number of printed documents increased steadily, but over the last 100 years the document growth curve has begun an extraordinarily rapid climb. According to UNESCO statistics, in the year 1800 there were 100 periodicals being published throughout the world; by 1850 the figure had risen to 1,000; in 1900 it had reached 10,000 and today

the amount of printed matter which is produced every year. If the periodicals figure continues to grow at the same rate, by the year 2000, at the present time, 1 billion sheets of printed matter will be produced, and this enormous volume is growing at an ever-increasing rate.

That this amount of printed matter, which is produced every three weeks, is the result of the "document explosion".

The main problem of information science is less one of locating data than of determining the best way to use all the information available to him. It is apparent, therefore, that it will require assistance in extracting pertinent data or information from the mass of printed matter.

The catalyst for this revolution of printed matter is not far off. In 1968, George Odgers, in his work Automation of Humanism, notes that if the United States Journal of Fundamental Physical Science were to continue to grow in volume as it had done in the previous twenty years, by the year 2000 it would weigh more than the earth. One can look forward, then, to a wealth of information carriers in the decades to come, but let us leave the prediction of these developments to the futurologists and return to the consideration of the information they generate by the mass of documents annually published. Unable to go through this documentation himself, the user will turn to a documentation centre specializing in the area in which he is interested. The documentation centre acts in two ways. First, it stores that fraction of the sum total of existing information which pertains to its special area, and, secondly, it distributes to its customers the information they need to use, the essential purpose of documentation, which is: "to transform into a reasonable probability the possibility that everyone has of obtaining the information he desires when he wants it" (C. Doutry, Revue de l'Association d'Etude pour l'Expansion de la Recherche Scientifique (AEERS), No. 19, 1964).

The first phase includes a number of different stages:

- (a) The selection of those documents which pertain to the disciplines covered by the specialized centre from the documentation published throughout the world (scanning).
- (b) The condensation of the documents. This involves the preparation of a **summary** expressing the substance of the document; for example, a ten-page article might be condensed to ten lines.
- (c) The indexing of the document. At this stage, the key concepts discussed in the document are extracted and translated into documentary language (univocal terms or a code). The result is a further condensation of the document - from ten lines to ten words.

- (d) The identification of the document. The document is identified in every possible way and a reference card is prepared for it (author, title, journal, originating organization, publisher, volume number, page number, original language, etc.).
- (e) The cataloguing or storage of the documentary data. This involves committing the identification, condensation or indexing to a suitable medium to permit the publication, in some form or other, of a synoptic bulletin or abstract bulletin.
- (f) Indexing data storage. The indexing data are recorded in some kind of memory system organized to facilitate research.
- (g) Document quality and handling control. This is merely a means of checking the quality of the data recorded and the progress of the document during processing as a means of preventing information loss.

The second phase is concerned with the extraction of relevant information to meet the needs of users. This phase includes the following operations:

- (h) The formulation of the question. Whether this is a permanent question or an occasional inquiry, it must be put into precise natural language understandable to the documentation centre operator.
- (i) The indexing of the question consists in extracting the concepts from the question and translating it into documentary language.
- (j) The systematizing of the question (search formulation). This involves ordering the indexed concepts within the framework of a researching (retrieval) system.
- (k) The researching itself consists in extracting from the indexed document holdings those references which may have a bearing on the question asked.
- (l) A reference screening is necessary to sort out from the mass of documents of probable interest turned up by the researching procedure those documents which are the most relevant.
- (m) The final phase is the dissemination of the information to the user, in a form which will vary according to the nature of the user, the dissemination channels used and the type of question, whether permanent or occasional. A method of dissemination which is particularly well suited to users who are either very busy or lack a talent for synthesizing is the method of "informative dissemination". With this method, instead of sending the customer reproductions of articles and documents or bibliographies, the documentation centre synthesizes these documents itself in such a way as to reply to the user's specific question.

It is not necessary to go further in our discussion that these document operations can be classified into two categories. The first category covers operations which require technical - that is, which involve an interpretation, judgement or synthesis. All other operations, which include such activities as storage, cataloguing, document researching, reproduction, dissemination and process control, are certainly essential, they require a particularly high level of skill. Once the system for the classification, identification, cataloguing and storage of the information has been worked out, these operations can be routinely performed with only a few operators with training and experience in document-processing techniques. The second category of operations, on the other hand, such as selection, condensation, indexing, reference screening or interpretive dissemination, requires an element of human judgement - that is, it calls for technical specialists or economists who are highly qualified and have a broad scientific background.

IV. INDUSTRIAL INFORMATION IN ZAIRE

As we explained above, industrial information is indispensable for development and growth in any field.

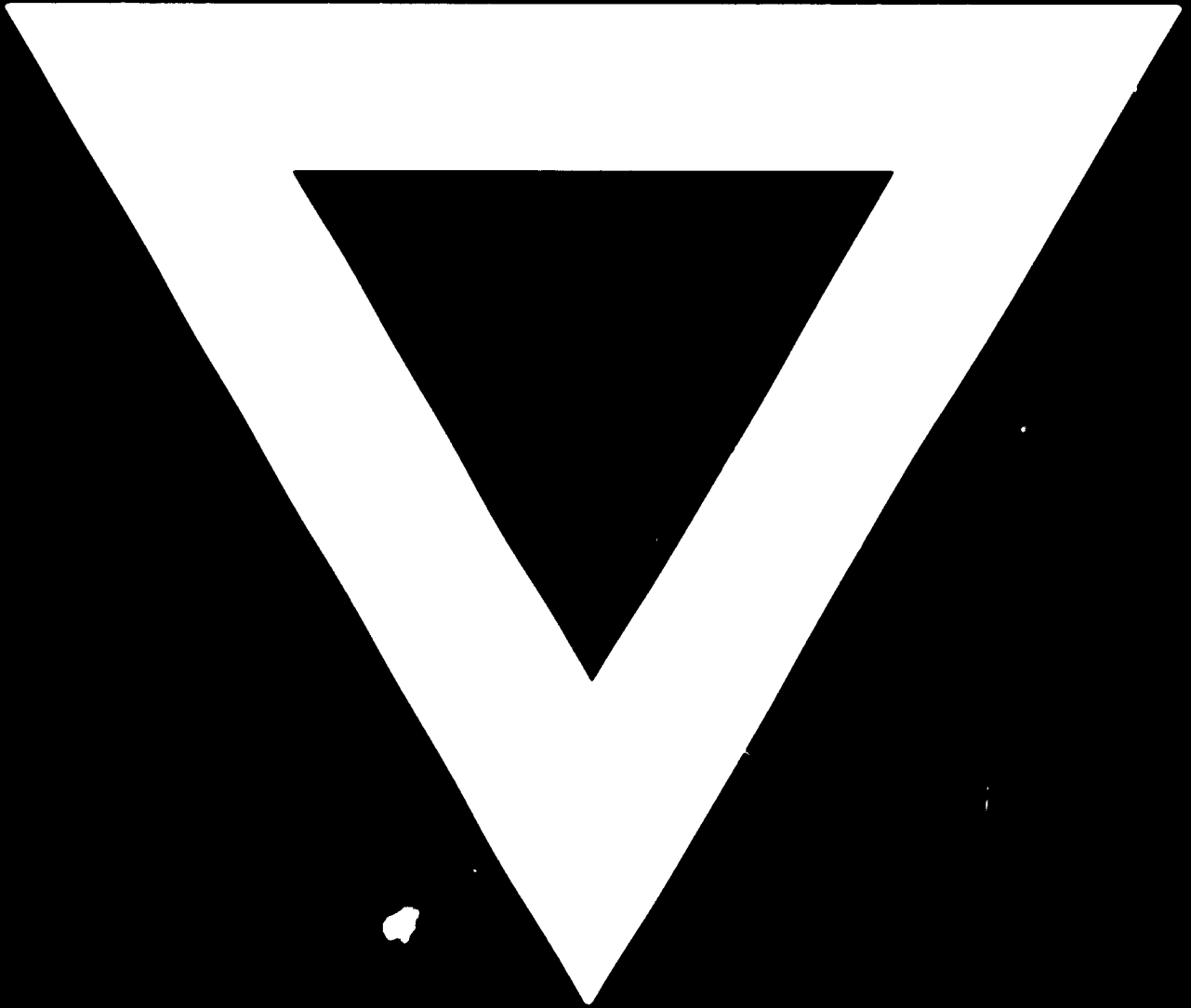
At the present time, Zaire is faced with some difficulties with regard to obtaining industrial information. There are a few organizations which supply some industrial information in various fields. These different services possess a considerable amount of information in their respective areas of work. There is, however, no national centre which could co-ordinate this information; often there is duplication of information between one service and another.

To avoid such duplication, a national industrial information centre should be set up to collect information from the various services within the country and from information centres in Africa and other parts of the world.

At present, the services mentioned above act on their own, independently of each other.

In Africa, as in other parts of the world, there are already a few industrial information centres which are very well equipped, with microfiches, computers, etc.

In conclusion, we can say that industrial information does actually exist; what we need now, in order not to discover America once again, is to set up a National Industrial Information Centre which can co-operate with other centres in Africa and other parts of the world and thus ensure rapid expansion in this field in our countries.



76.01.16