INDUSTRIAL INFORMATION SYSTEM IN THE USSR

E Kamala Rao
INSDOC, New Delhi-110012

INTRODUCTION

Though rudiments of industrial information services in the USSR could be traced to the appearance of the first specialized information centres, the Bureaux for Scientific and Technical Information; the concept of industrial information could be comprehended only after the establishment of a number of information institutions in some of the important branches of industries during the year 1945. Further, the phenomenal growth in scientific research, industrial development, organization of the State and Collective Farms, the socialist pattern of society and evolution of the "State System of Scientific and Technical Information" have provided great impetus to the development of the Industrial Information System.

OBJECTIVES

The Industrial Information System is intended to serve different user categories, such as management personnel, research and development scientists, production engineers, service technicians and commercial agencies. It has been planned as an integral part of research and development, design and development and production processes. It is aimed at bringing out a close cooperation between the information agencies and the users; and also at active participation of scientists and engineers in the information work. It is geared to timely provision of relevant information to all the user categories, which in turn, will contribute to the accelerated growth of scientific and technical processes and to the betterment of the general welfare of the people.

FUNCTIONING

The Industrial Information System of the Soviet Union functions on the five different categories of information agencies of the "State System of Scientific and Technical Information" namely, the All-Union, the Central Industry oriented, the Republican, the Regional or Territorial Information Institutions and the Local Information Agencies. The functioning and the publications issued for information dissemination from some of the All-Union information institutions have been described in the previous article (Ann Lib Sci Doc 1975, 22(1), 5-11). The place, objectives, methods of functioning and the publications issued from the Central Industry Oriented, Republican, Territorial and Local information agencies are discussed here with reference to the information supply to the industries in the USSR.

CENTRAL INDUSTRY ORIENTED INFORMATION INSTITUTES

The Central Industry Oriented Information Institutions are main links between the All-Union Scientific and Technical Information Centres and the local information units. These are established under their respective ministries at the Union and Republican levels and are second level information agencies in the hierarchy of the system. They coordinate and guide the work-flow and methodology in the information flow. They are responsible for the accumulation and processing of the domestic and foreign literature; organization and maintenance of branch oriented reference-information files; development of reference information tools like 'Rubricators, coding principles, information retrieval languages' etc. in their particular branches. The stock of these institutions is composed of scientific, technical, engineering and economic literature; deposited manuscripts, patent documents, technical norms, proceedings of conferences, meetings, seminars; as well as information cards and copies of scientific and technical films in each branch. On analysing the accessions, the information publications, such as, bibliographies, abstracting booklets, survey articles, factographic compilations and recommendatory leaflets are prepared and issued periodically, for each major
aspect of the industry concerned. They are not duplication of similar publications issued from the All-Union institutions, but are complementary and extensions.

There are 82 such central industry oriented information institutions such as:

The Central Information Institute for Electrical Engineering called "Informelektro"

The Research Institute of Economics and Information in Radio-electronics,

The Research Institute of Information in Mechanical Engineering,

The Research Institute of Techno-Economic Studies for Chemical Industry,

The Central Institute of Technical and Economic Information on Light Industry,

The Central Research Institute for Instrument making,

The Central Institute of Scientific and Technical Information in the Food Industry,

The Central Institute of Information and Technico-Economic Research of the Coal Industry etc.

SERVICES AND PUBLICATIONS

Further, these institutions provide SDI services in their respective branches, to satisfy standing information needs of the enterprises, collective readers and also individuals from their data base. The concept of SDI service though originally proposed by H. P. Luhn in the USA in 1958, has been widely accepted in the USSR information circles as the most effective means of alerting users to the current literature. Since 1964, many computerized SDI systems have come into operation at some of these central information units. This service is rendered to satisfy either the long term information needs or answer specific requests. All the three types of SDI systems, namely the manual, the semi-mechanized systems which use punch card equipment and the computerized SDI systems are under operation. In each of these groups, inter-disciplinary SDI services are under operation from the regional and the territorial information establishment. The industry oriented services are functioning at local information centres. The services functioning at the local centre levels are mostly manually operated. The functioning of these services is determined by the changing needs of demands. The changes in the requests of users reflect the actual problems to be solved in scientific R&D, D&D and production areas. Further, these orders indicate the trends and tendencies in R&D.

The information cards, which are posted from the local and branch information units form an important source of ascending flow to the central information institute and are incorporated into the data files. These are prepared from the results of the current R&D projects, their phases and partial technical solutions, new production techniques, technical processes and proposals for innovation.

REPUBLICAN INFORMATION INSTITUTIONS

The Republican Institutes of Scientific and Technical Information and Technico-Economic Studies, 15 in the whole of the USSR, serve the information needs of the industries which are not served by the central-industry oriented information institutions or the managerial agencies of the republics. Their reference information collections are characteristic of their specific needs and reflect their industry base and agricultural potentialities. The archives of patent documents and the technical normative documents form the integral part of the general stock of these institutions. To this stock are added the information cards supplied by the local agencies. The information publications, issued from these organisations are in both the languages, the Russian and their national language. The information supplied by the All-Union institutions is, sometimes, translated and utilized for compiling these publications. The publications are also characteristic of their regional needs. For instance, the Uzbek SSR information publications are mainly devoted to the problems of cotton growing and textile industry and the publications issued from the Georgian SSR information institute are on tea and coffee cultivation and their processing.

TERRITORIAL INFORMATION CENTRES

Each of the Inter-disciplinary Territorial Centres for Scientific and Technical Information and Publicity, consists of a central scientific and technical library and publicity house. Their collections are somewhat analogous to those of republican information institutes and provide specific information services and organize propaganda work also. The "Leningrad Territorial Inter-Branch Institute of Scientific and Technical Information", being one of the largest territorial institutions, has an enquiry reference catalogue of one million cards of non-standard reference collection. Annually, about 4 million requests are being met with, from this collection. In addition to more than a million documents and periodicals, the collection of the library contains all patent specifications of the world. Standards, microfilms and unpublished R&D, and D&D reports enrich the collection.

SERVICES

The Institute has a "Mechanized Information Section" which maintains the information and inven-
to know the local demands; while doing so, gathers information on new inventions made in the enterprises. On identifying the information needs of groups of workers, SDI personal services are being provided on 35 specific topics, such as Automatic Control Systems, Welding etc. and on some narrow agricultural specializations.

PUBLICATIONS

The publications regularly issued to disseminate the collected and organized information include:

1. Information leaf-letters issued as signal information media on about 20 topics like unpatented innovations, reports etc.
2. Information sheets, which deal with the new inventions that are put into practice in that territory. The data is arranged by the UDC system in these sheets which are called as maps.
3. Lists of designs and equipment collected from the reference collections.
4. Lists of new patents.
5. Bibliographies and

LOCAL INFORMATION UNITS

The Local Information Centres of Scientific and Technical Information are represented by departments and bureaux of scientific and technical information at large enterprises, research and development organizations, factories and collective and state farms. These are the main users of the information processed by all other information centres, from the all-union level to the territorial level, and in their turn are responsible for supplying it to all other agencies concerned with that particular field at the grass-root level. They are responsible for raising the efficiency of research and development activities, fulfillment of annual and five-year plans, and improving the professional competence of the personnel in their specific fields. The collections of these agencies are specific to their field, include books, periodicals and all the relevant reference and bibliographic tools published by the information centres at higher level. They analyse and generate desired information from their collection and actively participate in the fulfilment of the set targets. They post the organized information, generated from the active R&D work of the agencies to the central industry-oriented republican and territorial information institutions. The local information organs function through their library and technical information units. A translation cell is also attached to each of these agencies. There are about 9,000 local translation cells attached to such bureaux at different industrial enterprises and research institutes in the USSR.

The local information bureau of the "Mosrentgen Plant", a medium sized X-ray machine engineering enterprise with 15,000 workers, houses about 60,000 books, 160 journals in 20 languages and other bibliographic tools. Similarly, the information centre of the "Bolchevick Confectionery Factory" with 2,500 workers, has 2,725 volumes of books and gets only 15 periodical titles. The technical library of the "Masovich Automobile Plant", a big industrial enterprise with 4000 engineers and about 20,000 workers, possesses 142,000 books on all aspects of automobile engineering, and 150 periodicals. Manually operated SDI personal services are being provided to the top level engineers and technicians at these local information units. These local information units organize technical weeks, technical schools, exhibitions; publish leaflets, pamphlets and put on posters as a means of propaganda.

R&D AND UNPUBLISHED INFORMATION

In spite of the rapid growth of various information controlling tools, vast amount of research and development results fall outside the purview of the published sources. These information items are meant for limited circulation and quite a mass of R&D and D&D information goes into production process unpublished. To control such unpublished information stream, specialised information agencies have come into existence in most of the advanced countries of the world. The All-union Scientific and Technical Information Centre for R&D Projects came into existence in the year 1968 to register and stock all current and completed research and development projects, dissertations, algorithms and programmes in the USSR. The communication of unpublished information helps in avoiding the duplication of R&D work and also expedites the industrial production process.

PUBLICATIONS

1. R&D Abstracts. The accessed material is processed and the registration cards of the approved research projects are prepared. Abstracts of interim reports on successive research phases are also prepared along with these of completed projects and published.

2. Current Awareness Indexes. These are issued to publicize the registered input. All the central industrial information agencies take the responsibility of disseminating the R&D infor-
Industrial catalogues are important special publications and indicators of industrial development, technological characteristics, like, the size of the plant, methodologies adopted in processes and many other infeable parameters. For controlling this vast inflow, specialised indexes are being used from the All-union (State) Scientific and Technical Library (GPNTB).

**PUBLICATIONS**

1. New Industrial Trade Catalogues Index Series: For the compilation of this series, the material is divided into various user oriented information groups, such as, Designs of Machines, Designs of Industrial Structures, Designs of Engines, Designs of Chemical Engineering Equipment, and so on and catalogue indexes are issued regularly.

2. Current Reports Series: Changes made in Manufacture of Articles, Specifications of Specific Products, Catalogues of Production Processes, Trade Catalogues of Capitalistic Countries etc. are also published in this series.

3. Directories of Unexploited Processes are also published. From these sources, data sheets of equipment and any other required service is provided. The copies of the catalogues or the originals are supplied to all the institutions through the appropriate information agencies.

**INDUSTRIAL INFORMATION FLOW**

Industrial information is at an interface between the general information and the specific industry and its supply is linked with industrial production through successive stages of information flow between the all-union, central industry oriented and local information agencies. Information is preconditioned to different stages, namely to research and development, design and development, design assessment, project construction, direct production and to the technical report writing stages. In a given project, as all these stages proceed in a cyclic progressive succession, the information supply also reflects the same courses. The information provided at R&D and D&D stages is of academic nature and is mostly supplied from the all-union institutions of scientific and technical information. The information supplied at all the other stages is from the central industry oriented and also from the local information bureaux.

For information supply, four types of users have been recognized: the academic scientists, the members of the State Planning Committee and Ministers, the industrial management and the specialised worker force. The first group is served by the all-union institutions, the second by branch information institutions, the third exclusively by the local bureaux and the fourth category by all the information agencies. There are 13 all-union information institutions, excluding that of social sciences, more than 160 specialised republican and central institutions of scientific and technical information and about 9,000 information departments and bureaux housed in leading industrial enterprises and research organizations.

Information supply to industry is through many specialized systems each of them originating from their central information institution and providing specific services to the group of local information bureaux and information departments of R&D institutions, D&D organizations and industrial enterprises attached to it. The "Central Information Centre of Instrument Making" has developed a specialised system called as "Referat System" which functions on MINSK-22 computer and provides information supply to all the allied industries. Monthly SDI bulletins and abstracts in 8 special areas are supplied to permanent reader groups along with specialised reference services. Another automated information descriptor IR system has been developed by the "Central Institute of Scientific and Technical Information in Electrical Engineering" of the USSR Ministry of Electrical Engineering Industry. This system also operates on MINSK-22 computer with a data base of more than 250,000 documents. From a base of 10,000 documents in English language, another sub-system, named "Kachestvo" which obviates the translation barrier, is functioning efficiently for retrieving information through the product names, manufacturers, designers and so on. The overall reference and information collection of the various organizations and enterprises under this institute has reached a total of 20 million printed items. From this base about 300,000 industrial requests are replied in a year. The Institute has a dynamic reference collection which showed an increase of two million item entries in the last four years. Similarly, most of the central industry oriented information institutions are striving to develop their own IR subsystems. These systems have advantages of single time input, upkeep and multipurpose and multi-dimensional information generation and dissemination capacity through their publications.

**DISSEMINATION CHANNELS**

The information support to industry is provided through various channels of communications.
like publications, lectures, seminars, conferences, radio broadcasts, telecasts, cinema, etc. Of all these, documentary channels have been found to be the most effective in transforming the technological processes and advanced know-how from R&D phase to industrial production. Methods and modes of specialised document flow and the supply of information publications to industries are the important forces in accelerating industrial production. Thus the main functions of the industrial information agencies in the USSR are:

1. generating and disseminating the primary and secondary documents;
2. organizing reference information services like SDI and specific request responses; and
3. providing continuous information support to accelerate production and its improvements.

DOCUMENT FLOW

The document flow is specific and so organised to support the scientific and technical activities in an industry, from conceptual framing of technological objectives to their industrial implementation and exploitation. Thus the document support is mainly focused on:

1. devices which include machines, equipment, plans, instruments, design patterns, assemblies, etc.;
2. materials and methods, which encompass engineering procedures for processing raw materials and articles, manufacturing articles, techniques of controlling equipment; and
3. processes, like power transmission, transformation, etc.

Specialised documents are generated for each industry for different information users such as, managers, research scientists, and design, process, project and production engineers. As information being the essential component in industrial management, the managerial staff are supplied with analytical surveys which bring out trends in R&D and industrial implementation, appropriate technologies, and internal and external trade. Surveys of market trends, reports on industrial dynamism, state-of-art surveys etc. are some of the essential document sources. Suitable documents are generated and supplied to different sections engaged in industrial development. They range from designs, calculations, schematic diagrams, prototypes, features of analogous new objects. The document support given to the engineering staff of the enterprise is concentrated with the information on pre-conditions of production, manufacturing of individual parts and assemblies etc.

From this stage, continuous supply of information in the form of SDI bulletins, abstracting publications, specific query-answers, information sheets and cards which show the trends and progress in specific industry is maintained from the central and local information agencies. Information cards and sheets form the ascending flow of information from local to central information institutions. Thus, in the Soviet Union, the information agencies are so arranged to place workload of information searching on documentalists and information scientists instead of leaving it to the scientists and engineers. It is stated that this arrangement is accelerating the industrial production.

TECHNOLOGY CLUBS

Further there are 'Technology Clubs' which serve as main links between the information suppliers and the recipients. These are generally attached to the all-union and central-branch information centres. For instance, there is a club for scientific and technical information dissemination to promote standardization at the All-Union Research Institute of Scientific and Technical Information, Classification and Coding. There are 91 Technological Clubs in the USSR of which 17 are connected to coal-mining, 4 to oil extraction, 36 to railway transport, 8 to metallurgy, 7 to engineering and 19 to other industries. Besides these, there are clubs at all industrial enterprises, and technical information offices which take active part in information dissemination work. These clubs are instrumental in organizing inter- and intra-factory seminars for sharing advanced experiences. Excursions and business trips form part of the information exchange programme.

AUTOMATION OF INFORMATION PROCESSING

As early as 1959, Academician A.I. Berg had envisioned a three-tiered, pyramidal, nationwide computer network for collection and dissemination of economic information in the Soviet Union. The proposed three levels correspond to those in the scientific and technical information system, namely, the base level, the central-industrial information level and the top all-union level. The computer, Minsk-22, a small second generation versatile scientific machine was introduced in the USSR in the early sixties. Since then, Minsk-22 and Minsk-32 are being used in the all-union and the central information institutions for information control and dissemination. At the all-union institutions, the computers are generally used to bring out their current awareness publications like the signal information bibliographies and also to expedite their publications rather than for providing personal services. At VINITI, a Minsk-22 is used to expedite the publication of their "signal information" bulletins and for the control of acquisition files. An automated system on Minsk-32 is in operation for controlling inter-library loans at the All-Union Scientific and Technical Library (GPNTB).
Efforts are being made to provide regular personal services, for groups as well as individuals from the central industry-oriented, republican and the territorial information institutions by using computers. Each institution adopts its own methodology for isolating and standardizing descriptors, introduces desired coding techniques, develops its own information retrieval language, organizes - search strategies and retrieval techniques, suited to their computers. The 'Referat' system, an IRS on instrument making, automation and controls, is in operation for the last four years in the Central Information Institute for Instrument Making. The Central Information Institute of Light Industry has developed an IRS, called the Crystal-Leg-Rom. A large descriptor utilizing IRS entitled "Kachestvo" is in operation at the Central Information Institute of Electrical Engineering. The 'Patent' of the All-Union Institute of Patent Information and Technico-Economic Research has acquired a third generation computer, Razon-3 for patent searches.

AUTOMATION IN INDUSTRY

Computerized systems for information as well as for other operations, have come into operation at local or plant level, in bigger industrial establishments. An automated system is in operation with a third generation computer at the 'Moskovich Automobile Plant'. The Lvov Automated Control System is in operation at the 'Lvov Television Plant' in the Ukraine. Computer is being used for monitoring the production of nitric sub acid and for calculating the production and consumption of ammonia at the 'Severodonetsk Chemical Combine'.

From different information centres, various types of specific user services are being offered by using computers. They are:

1. SDI Service, every year a user profile is constructed and monthly information leaflets are issued;
2. retrospective search and the resulting specific bibliographic and specific query answer services;
3. preparation and publication of specialised abstracting services on specific aspects, and
4. supply of abstracts on marginal punch cards to the users as well as to the local information centres.

Effective feedback systems have been developed to ascertain the relevance of the supplied information to the users. The Central Information Institute of Light Industry supplies an assessment scale, in terms of short descriptors, along with the desired information which is processed and retrieved by the Crystal-Leg-Rom system. On the basis of the degree of relevance, the user rates the supplied information on the scale of 1-5 points and sends it to the supplier. From this, the supplier improves the information services. Similarly, at many places, their own specific relevance scales have been developed.

All these efforts go to fulfill the plan, which is aiming at creating a network of 800 regional data processing centres of third generation computers by 1980. These data banks are supposed to contain the data on region's population, industry, agriculture, transport, housing and so on.

It is proposed to improve the information system in general and industrial information supply in particular through further development of its activities at different stages, through interaction and coordination of its separate units, mechanization and automation of information collection, storage, retrieval and preparation of information publications. Attempts are made to develop a single integrated automated scientific and technical information system by coordinating different information sub-systems. A large-scale utilization of computers, small-graphic-arts and communication equipment for information processing and training of highly qualified information scientists to solve the problems of depth analysis, multidimensional correlation and synthesizing of specialized information are envisaged in future, in the scientific and technical information supply of the USSR.

CONCLUSIONS

A comprehensive centralised scientific and technical information system has advantages with respect to coverage, interdisciplinary approach; accessibility for wider sections of the users, and finance and manpower economy. When operated only with conventional methods of information processing techniques and controlling tools, the system has some drawbacks, like operational delays, bureaucratic growth, impersonal attitudes, etc. But such drawbacks can be overcome with automation and improved management methodology. For a large developing country like India, which has a huge scientific and technological, educational and research infrastructure, a centralised system of scientific and technical formation has the advantage of retaining the existing useful institutional set-ups without dislocating them much.

A centralised system is not necessarily for a limited number of organisations at a single level, but an integrated network of institutions at different levels and fields with decentralized responsibilities, dynamic information flow between coordinate and subordinate organizations appears to be quite effective for developing countries. As in the Soviet Union, a small number of computers of appropriate capacity, may fulfill the desired requirements in different areas of science and technology, research
and development, policy formulations and decision making. In India, it has been proposed to integrate all information agencies into a centralized network, namely, 'The National Information System for Science and Technology' (NISSAT), in the Fifth Five Year Plan period.

The limitations of the State System of Scientific and Technical Information have been brought out by Medvedev. The delay of one to one and half years between the publication of the research article in the scientific periodical and appearance of its abstract in the Referativnyi Zhurnal (RZ) appears to be partially due to the delay caused by centralised system. Efforts are being made to overcome this limitation to some extent, by the 'Express Information' bulletins published from most of the All-union institutions which are trying to obviate the language barrier also, by providing elaborate digest for a few very important articles published in foreign journals. Further, specialized bibliographies are issued to alert the scientists to the important articles from the most productive foreign journals. This major defect is being overcome, to some extent by enriching the local information bureaux with all the important primary journals in a specific area, SDI bulletins and personal reference services in the Soviet Union.

In spite of the massive efforts, it appeared that there is every possibility of redundancy in information supply and not much of economy has been achieved either in terms of finances or manpower in the USSR, because of not discarding earlier institutions and practices, after organizing more and more new information agencies and units. However, supply of the industrial information through the nation wide, centralised scientific and technical information system, appears to be of importance to developing countries, which have limited resources for R&D and scientific and technical information.

REFERENCES


