INFORMATION RESOURCES FOR SUSTAINABLE DEVELOPMENT OF SOCIETY

Arskyi Y.M., and **Chernyi A.I.**
VINITI, Moscow, Russia.

Keywords: abstract journals, books, CD-ROMs, databanks, databases, digitalization, current-awareness services, electronic journals, electronic publications, diskettes, infopacks, information 'garbage', information overloads, information resources, information society, information supermarkets, informatization, infosphere, Internet, International Federation for Information and Documentation (FID), paper deacidification, paper publications, paperless society, patent specifications, printed publications, proceedings of scientific conferences, research reports, scholarly journals, science citation indexes, scientific communication, scientific information, sci-tech literature, sustainable development, tables of contents (TOC), UNESCO, UNISIST program, World Wide Web (WWW)

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1. The role of information in sustainable development

The task of information support for the sustainable development of society has at least three different aspects:

- the use of mass-media for changing the orientation of modern society from the ideals of unlimited consumption and hedonism to the ideals of modesty, thrift and protection of the environment from pollution and destruction;
- the use of information as a possible substitute for the two main traditional resources of society, i.e. of matter (materials) and energy;
- information support for scientific research directed towards the solution of global problems.

Hereinafter these aspects are considered separately.

The core of the concept of sustainable development of society is the assumption that humankind has not yet lost the possibility for radical re-evaluation of its present representation of itself or for cardinal change of its common values. These changes are necessary for humankind to leave the path which leads to unavoidable catastrophe.

Because of the uncontrolled development in the last few centuries humankind has brought upon itself some disastrous consequences: it has implanted false and harmful illusions into the mass consciousness, lost its ties with traditions, drawn itself into the devilish cycle of continuously increasing production and consumption, and has made pleasure-seeking an aim and way of life. The mass-media have helped to make such illusions dominant in public opinion. These issues were clearly set out in the early reports of the Club of Rome.

It is evident that for radical change of public opinion and re-orientation of the people to genuine values, it is necessary to make purposeful, persistent and long-term efforts in families, schools, research institutions, and every area of social life. And in this work mass-media must play a very important role.

The unique features of information are that it is neither matter nor energy, and that it is not lost when consumed. But under certain conditions the information is able to perform the functions of these two traditional resources of society. The essence of the information society which is arising now lies in the fact that information to a great extent serves as a substitute for matter and energy, which are irrevocably lost when consumed. Moreover, unlimited procurement and consumption of these resources causes ever-growing damage to environment.

The construction of the information society has become possible due to the invention of the computer—the greatest achievement of science and technology in the twentieth century. But the concept of informatization is broader than mere implantation of computers and computer-based technologies in all areas of social life. Total computerization is only the external, visible side of this much more complex phenomenon: informatization demands the complete revision and reconstruction of many traditional approaches and methods used for solution of practical tasks.

The use of microprocessors for control, for example, of heating systems, automobile engines, elevators, etc. helps us to save energy, and only in this sense one must understand the phrase that information may partially substitute energy. The use of computerized management systems in hospitals helps to reduce the duration of patient treatments and hence the cost and the time of their stay in hospital. So it has the effect of apparently expanding hospitals or creating new ones. The use of computers for traffic control increases the carrying capacity of streets as if it makes them wider. Due to the use of e-mail it is not necessary to use writing paper and energy to transport letters from one point to another. Certainly, it is still necessary to expend electrical energy for transmitting the texts via e-mail, but this expending is by far less than was required for their traditional transportation. The use of computers in research and development projects helps to reduce their duration and improves the quality.

These and many more examples show that substituting the consumption of non-renewable materials and energy with information—to whatever possible extent—constitutes one of the main directions towards sustainable development of society. Herein, the Internet and 'internetization' of society are to play a very important role, although the Internet generates many new negative phenomena which must become the objects of close attention and thorough studies for psychologists, physicians and

sociologists.

The third aspect of the information support of sustainable development of society, which is considered here at greater length, is the use of information resources—both existing and yet to be specially created—for accelerating research and development directed towards the solution of global problems arising because of the uncontrolled development of society.

Scientific research and its application in all areas of social life provide the only way of escaping from the cycle of global problems and to shift to the sustainable development of society. To this end scientific research and development throughout the world should be re-oriented to the solution of the following vital tasks:

- to study the biological interactions of people with their environment (ecology);
- to study the harmful effects on the environment caused by the processes of production and consumption (protection of environment from injurious economic activities of people);
- to develop and implant resource-saving technologies which are used in production and everyday life, and
- to change the model of social behavior of people (to reject the philosophy of hedonism and unlimited consumption, to cultivate thrift and sense of personal responsibility for the quality of life, etc.).

From the tasks formulated above it follows that the redirection of scientific research towards sustainable development of society should cover practically all domains of science, technology, economy and culture.

The focus of this research should also include the culture and everyday life of indigenous people, especially those with no writing systems (e.g. of bushmen of southern Africa, aborigines of Australia, Papuans of New Guinea, etc.). For thousands of years these people, who considered themselves as an integral part of nature, lived in full harmony with it. They did not put themselves above nature, nor violate its laws, and did not behave as conquerors of the land. Therefore, nature was not alien or hostile to them. In 1620, Francis Bacon warned in his treatise *Novum Organum* that man is only the servant and interpreter of nature and that nature may be mastered only by subordination to its laws.

Throughout their history indigenous people have accumulated great and valuable experience of conflict-free interactions with nature. Undoubtedly, this experience has been reflected in the culture and everyday life of these people. Therefore, the latter should become the objects of special research. Their folklore is of particular interest, because it reflects the ideas of many generations of people about their place and role in nature, and about their relationships with it. Moreover, the folklore is an integral part of human culture and therefore should be recorded and saved.

2. Efficiency of information dissemination

To solve the global problems it is necessary to substantially increase the effectiveness of

scientific research. It needs to be more economical and resource-saving, first of all by reducing unnecessary repetition of the same research projects; it should be more 'ecologically clean', and should not pollute the area of scientific communication with such 'information garbage' as unverified data, repeat papers containing the information published earlier, quasi-scientific materials, etc.

It is well-known that the effectiveness of scientific research is very dependent on the system of scientific communication and information: the faster the information is disseminated through the informal and formal channels of the communication system, the more it is accessible to the scientists and specialists, the higher is the rate of scientific research, the less is their repetition, and the sooner the results are put into practice. Therefore, improvement of the systems of scientific communication and information should be included into the range of tasks required in the shift to sustainable development of society.

Systems of scientific communication and information should be developed in the following main directions:

- acceleration of dissemination of primary information amidst its potential users and increase of its completeness;
- improvement of the quality of information included in scientific circulation, i.e. reduction of 'information garbage', and
- improvement of accessibility of scientific information to scientists and specialists, especially with regard to its cost.

For advancement in these directions the main means are the development and implantation of new information technologies, especially of those which are based on the use of elements of artificial intelligence. It is clear that each of these directions requires the development and use of particular methods and tools.

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Biographical Sketches

Yury Mikhailovich ARSKY was born in Leningrad in November 1936. He graduated from the Faculty of Geology of the Moscow Lomonosov State University in 1959. He has been a Doctor of Geology and Mineralogy since 1979, a Professor since 1980, a Corresponding Member of the Russian Academy of Sciences since 1990, a Full Member of the Academy of Natural Sciences of the Russian Federation since 1996, a Full Member of the Academy of Mining since 1995, and a Full Member of the International Academy of Information Processes and Technologies since 1995.

Since 1992 to the present Prof. Arsky is the Director of the All-Russian Institute for Scientific and Technical Information of the Russian Academy of Sciences and the Ministry of Science and Technology of the Russian Federation. He is a member of the Expert Council under the Government of the Russian Federation, Senior Councilor in ecology and economics of the Government of the Russian Federation under the Economic Commission of the United Nations, Member of the Council and Chief of the European Commission of the Federation for Information and Documentation. The main trends of Prof. Arsky's activities are:

- system analysis of projects in development of mineral resources;
- new advanced information technologies;
- creation of large-scale databases and databanks in natural and technical sciences; Editor in Chief of the VINITI's Abstract Journal (annual description of more than 1 million scientific publications in 40 languages);
- information support of federal target programs and state scientific and technical programs;
- state examination of domestic and foreign projects;
- participation in realization of international programs: TACIS, Infoterra etc.

Since 1995 he has been the head of the Laboratory of the Geoeconomics of the Geological faculty of the Moscow Lomonosov State University. 15 theses have been defended under his guidance. He is the head of the Dissertation Council for conferring doctoral degrees.

Prof. Arsky is the author of more than three hundred scientific publications, including monographs on "Infosphere" (Moscow, 1996), and "Information Market in Russia" (Moscow, 1996), etc.

Chernyi Arkadij Ivanovich was born in February 1929 in Stanica Dolzhanskaja, Krasnodarskij kraj, Russia. He was educated at the Moscow Institute of Orientology (1946–1952). Since 1952 he is working at the All-Russia Institute for Scientific and Technical Information (Russian Academy of Sciences) in various positions: research worker, head of methodological department, deputy-director for research (1968–1978, 1989–1991), and head of information department (1991–present). Prof. Ivanovich's main

fields of professional interests are theoretical foundations of information science, information retrieval systems, automatic processing of S&T information, and problems of information society. He is the author or co-author of more then 270 publications, including 15 monographs; some of these publications have been translated and issued in China, Italy, Japan, Germany, Poland, Romania, USA. and other countries. Since 1963 he has been a member of the editorial board of the abstract journal *Informatika*, and since 1987, chief-editor of this journal. Since 1963 he has also been a member of the editorial board of the main Russian professional journal on information science and technology—*Scientific and Technical Information.*