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Man in the Information Environment*

*R. Jussupov**, V. Sgurev***, V. Zabolotskii**, V. Ivanov***

*** SPIIRAN, Saint Petersburg*
**** Institute of Information Technologies, 1113 Sofia*

Significant information boom has appeared in the last decades in the world, connected with the transition from "industrial society" towards "information society". The everyday life has accustomed such notions as information technologies, information resources, information sphere and information environment. The last ones have appeared not long ago.

In connection with this event many questions arise. What is information environment? What is the human place in it? How do people interact in their information environment? The answers to all these questions, comparatively simple in a cursory approach prove rather complex in their detail discussion. There is no doubt that their thorough scientific and scientific-methodological research is expected. This concerns also the terminology and its meaning aspects.

The following structure has been used in the present paper:

1. The notion of information environment.
2. The information environment in the biosphere-infosphere-noosphere system.
3. The information environment evolution.
4. The information environment structure.
5. The man in the information environment: man - information user, man - information source.
6. Scientific problems.

The study of the problem has shown that this theme is a comparatively new area, not well known.

The application of the "information environment" notion, as well as the fundamental notion "information", connected with the history of Universe and mankind development is much debated. The opinion of N.N. Moiseev [1] has been taken as a basis in this paper, which presumes that one can talk about information only in case it is connected with the study of a purposeful system, i.e., of objects, capable to objective-motivated behaviour. This is characteristic of alive nature only. Further on human information

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environment will be discussed.

The information environment of man has appeared simultaneously with his coming into being. At the same time it is a necessary condition for the existence and the development of homo sapiens, i.e., of the human society as a whole. The state and evolution of the information environment are defined by the stage of mankind development and hence the possibilities and the rate of human society progress depend to a considerable degree on what information environment this society exists in.

The following two working notions – "information" and "information environment" will be used. The information environment will be regarded as a physical space in which the information flows circulate. The information flow can be considered as information that moves in time and in space. The information movement in space is called information transmission and in time – storing.

Information denotes the reflection process results that are appropriate for active performance and take place during each interaction of any objects.

The information flow is formed in the presence of sources, transmission channels and information sinks. Any object possessing information or generating it can serve as an information source, the transmission channel is the media capable to transmit information from the source towards the sink, and the sink is an object, transforming, storing or using information which assures its activities. The objects of the last type are called information consumers or users.

The short but adequate definition about information used generalizes the following more detail definition, namely, the information environment is a set of data bases and banks, the technology of their introduction and application, the information-telecommunication systems and networks, functioning on the basis of universal principles and common rules, providing information interaction among organizations and citizens, as well as satisfying their information requirements.

The information environment is characterized by the volume of the circulating (transmitted and stored) information in it, the power and intensity of the information flows, the information infrastructure. The main characteristics of the information infrastructure are the qualitative and quantitative content of the infrastructure elements, their space allocation and interaction, the information generation and the capacity of the elements and the whole infrastructure. The infrastructure defines the dimensions and the other topological properties of the information environment. The power and the intensity of the information flows characterize the capability of the information environment to produce and reproduce information and the information exchange frequency.

The man is the main user of the information, circulating in the information environment. At the same time this information is produced, collected, transformed and stored in conformance with human information utilities. That is why man is the creator of his own information environment and its main element also, assuring the existence and development of this environment. On the other hand, the information environment plays nowadays such a significant part in human life, that the mere existence of man as a biological type is determined by the development stage and alteration rate of the given environment.

This is explained by the fact, that "the civilization crisis", the presence of which is admitted by many researchers and the essence of which is that the existing technologies, guaranteeing human activity will inevitably lead to the annihilation of life conditions, and consequently, to the destruction of man not only as a social being but also as a biological type, cannot be overcome for the short time, needed for his destruction without the raising of human reasonability upto a stage, at which he will be able to find and realize the correct decisions of some traditional and more complex problems in acceptable terms. This stage means that mankind will be able to increase the intellectual capacities of man and to unite the intellect of all the people in "a collective reason of mankind". The solution of this problem is impossible without the presence of the corre-

sponding information environment. That is why the creation of this environment is one of the most important and significant tasks of mankind.

During the process of mankind evolution the information environment, being altered, has increased its volume, the volume of the circulating and stored information, the intensity and power of the information flows in the information environment. The most sharp changes at that appear together with the use of new approaches realizing the information processes.

The following characteristic branches can be separated in the development of the information environment: 1) the appearance of man as a specific type of a biological being – the development of the information environment; 2) the birth of speech – the beginning of social communication and the formation of human society as biological and social community of people; 3) the invention of written word – the design of a system accumulating and storing knowledge and information; 4) the formation of the state – the development of economic and politic community, the accelerating of information environment development; 5) the use of electrical and computing techniques – the design of new forms in information acquisition, processing and storing, the involving of the information environment as a production power.

The design, the development and wide application of new information techniques and technologies lead to a radical change in the way of life and in the quality of labour. This process is the scientific-technical and technological basis of society and at the same time it serves to transform it, to realize mankind transition from industrial towards information society.

During the informatization process there is rapid growth of human information environment, the information environment of the separate person reaching the dimensions of society information environment, the last one becoming universal information environment with powerful well-developed information infrastructure and common information fund. The power and intensity of the information flows will grow considerably and the volume of the information, circulating in the information environment also.

Upto now the growth of the information volume, generated and produced by mankind, has followed the exponential law. This growth has an explosive character. Nowadays there are symptoms for the presence of an information "boom". Thus, whether in the last decades the doubling of the information quantity has taken place for fifty years, at the present moment an equivalent result is obtained for one year. There are no symptoms for slowing down the information develoment rate in the near future.

This change of the information environment will inevitably contradict to the psychophysical capacities of man connected with information reception. Modern man is able to accept, i.e., receive and process information flows, the intensity of which does not exceed 100 bits/s. The basic part (about 90%) in the flow accepted belongs to visual information. In case the intensity of the information flow exceeds the admissible level, the human capacity starts to decrease until the complete interrupt of information reception.

There are several directions in the attempts to overcome the contradiction above mentioned.

The first one is connected with the discovery and use of new existing, but not entirely known psycho-physical abilities of man, providing the multiple increase of his information capacity. This untraditional direction is rather attractive, but more problematic also.

The second direction concerns the improvement of the human intellectual abilities. The main approach in the realization of this direction is the design of new information techniques and information technologies, new methods of information processing and representation, the transmission of a larger part of the information activity in information systems on the basis of new information technologies.

The third direction is connected with the formation of mankind "collective reason". This means the paralleling of the information processes among the society members in

the solution of complex intellectual problems.

The real way to overcome the contradiction discussed will be found rather in the reasonable combination of the three directions above pointed.

The following can be noted about the place of the information environment in the biosphere-infosphere-noosphere system.

The biosphere has existed on earth until the appearance of man. In connection with the theory of I.V. Vernadski the biosphere has perfected to the sphere of reason - noosphere. It is obvious that reason is connected with the whole information "section" of society life, which is adequate to the notion of information environment. That is why we can assume that the creation and development of the information environment is the necessary condition for the transition of the biosphere into noosphere. In connection with this such a notion as infosphere is regarded as the first phase of the noosphere or infonoosphere.

The structuring of the information environment can be done according to different features.

Having in mind the scale, the information environment of man, family, group, state, human society, or of the worldwide information society can be classified.

With respect to the influence of the information environment on man the following interacting stages can be separated: 1) genetic (biological) – the information environment of human biological nature; 2) personal – the information environment of the psychic and psychological human "Ego"; 3) social – the information environment of people community; 4) social-economic – the information environment of the economic and social activity of the people, including the state; 5) global – mankind information environment.

The information environment of the biological nature of man has appeared simultaneously with his coming into being. The genetic codes, implicitly used in the genealogy of couples, the information about the existence and survival of man in different life conditions - all this is just one aspect of the problem. The human organism itself creates and generates different fields, that are a part of his general information environment. Certain knowledge, the methods of its use have appeared in ancient times and continue to attract human interest due to the insufficient data about these phenomena.

The information environment of human biological nature is connected with the information environment of the human psychic and psychological "Ego". On one hand the biological features of man reflect directly the psychic status of man, on the other - the individual abilities in the formation, processing and use of the information flows. The type of information environment reflects not only the inborn abilities for such an activity, but also the level of education and learning.

It should be noted that the levels of information environment above mentioned are influenced by the restricted information capacity of man himself, who is able to receive and assume any information, if its intensity does not exceed, as already mentioned, 70-100 bits/s. Anyway, upto this moment the human information capacity at the level of subconcience remains undefined. It is expected that the summed capacity under certain conditions is several times higher.

The social level of the information environment shows its "section" in people community. Here the information flows are distributed according to laws, that differ from the laws at biological or personal levels. For example, there is a law in sociology, called "law of the crowd", when the information flow of a group of people defines the behaviour of the separate individual. At the same time there is also explicit or implicit influence of the social level on the individual in society. This is comprehended information, distributed by oral speech, by mass media, written speech and uncomprehended one, transmitted subconsciously during communication.

The social-economic level is determined by the activity of people, organized to solve different problems in different formal organizations, including the state. Such an activity

is usually submitted to given rules, laws, regulating the behaviour of each participator, which leads to the structuring of the information flows, the more or less comprehended development of the information environment, the use of new forms for its organization, electronic control devices, information networks and so on.

The global level characterizes the information environment of the whole humanity in planetary sense, and further on even in the scale of the Solar system. It is formed by the collective reason of humanity as a whole. It should be noted that the beginning of this formation has started in the Great geographic discoveries time, but it has been developed most intensively since XIX-th century with the invention of some new communication instruments by mankind - ships, telegraph, telephone, radio. The investigations of space, the space flights, the direct introduction of these results in life have further extended this. It can be confirmed that the level of information environment is still at its formation stage, its Renaissance has not come yet.

If we accept that the information environment includes as basic components: 1) the information resources; 2) the organizational structures, providing the functioning and development of the information environment; 3) the means for the information interaction of the subjects and their access to the information resources on the basis of the corresponding information technologies, then the structuring of the information environment can be done accounting these components. Thus with respect to the information resources in the information environment one can separate sectors of mass and special information, which on their turn can possess a considerable number of subclasses.

The information environment is a new, rather complicated object of research, requiring for its investigation the attempts of many specialists: engineers, doctors, biologists, lawyers, economists, etc.

The following can be noted about the great number of scientific problems, already actively discussed.

The requirements, connected with the precision of the notion and essence of information still remain. Different points of view appear at that, sometimes of specific character.

In the last years some investigations have been carried out, connected with the attempts to find and explain the trinity of information, energetic and material elements in the interaction of the alive objects and the material world and to explain from these positions many extraordinary phenomena. It is expected that at positive result these investigations will lead to a new picture of the object, called today information environment.

Upto now we have discussed the question of the motive for the creation of unique communication language in unique information environment.

The problems of the information influence on man at biological, including genetic level, the questions of man information culture education - including the development of normal information requirements, imply further study. It is not clear enough how man will behave under the conditions of powerful information media.

The problem about the influence of information noise on man is in the stage of its formulating. Each information flow effecting the man, but not apprehended consciously by him can be accepted as information noise.

The counting of the scientific, methodological and organizational problems that are not solved can be continued. In general, there exist a lot of questions that have not received their complete answer within the terms of the problems concerning human interaction with the information environment discussed.

It is most probable that humanity will decide them step by step during its development.

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Человек в информационном пространстве

Р. Юсупов, В. Сгурев**, В. Заболотский*, В. Иванов**

** СПИИРАН, Санкт Петербург*
*** Институт информационных технологий, 1113 София*

(Р е з ю м е)

Рассматриваются проблемы, связанные с переходом от индустриального к информационному обществу. Указывается, что одним из наиболее важных понятий, которые возникают при этом, является информационное пространство.

Обсуждаются разные стороны информационного пространства: его эволюция и структуры, возникающие связи в системе биосфера – инфосфера – ноосфера, место человека в информационном пространстве и др.

Проблемы информационного пространства рассматриваются с одной стороны на техническом и информационно-технологическом уровне, а с другой – с более общих философских позиций.