

ARTICLE

Information Space and Information Process: Genesis and Evolution

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1. Introduction

Much has been written on the concept and phenomenon of “information space”. However, most researchers have focused on its technical and technological aspects. We have chosen to examine the close relationship between information space and information processes, analyze the origin and preconditions for the development of information space, and demonstrate how the early elements of this phenomenon have defined the possibilities and conditions for its evolution.

2. Methods of Research

The methods of research include the following general scientific approaches: systemic approach, activity approach and process approach. Besides, we used fundamental concepts of structural levels. It was impossible to analyze such a complex phenomenon without having to recourse to philosophical categories.

3. Result

As a result of our study, the content and scope of the term “information space” are clarified, the structure of this phenomenon is explained, its types and characteristics are described.

ABSTRACT

In this article, the phenomenon of “information space” and its methods of study, its types, elementary structure and qualitative characteristics are discussed, the author's definition of the concept of “information” is given, the structure of the information process, and the phases, which are the basis for the evolution of the information space and the universe of human activity, are considered.

4. Reasoning, Main Statements of Research and Evidence

4.1. Nature and scope of the concept of “information space”

Speaking about information and information resources, we have used the phrase “information space” more than once within which information resources exist. What is concealed behind the phrase “information space”? Maybe the “information space” is just a “figure of speech”... Probably, these words are used as a metaphor. Or is the information space an existing phenomenon, which is the medium of information resources existence? Let us try to clarify the content and scope of the concept of “information space”. Let us also define the elementary and component and functional structure of this phenomenon.

We can dwell on information space only if the phenomenon of the information is clearly understood. We have made the definition of the information offered by A.V. Sokolov more exact^[1, p. 160]. It was caused by the necessity to indicate the reasons for the emergence of information and to show the mechanism of its emergence.

Our essential definition of information is as follows:

Information is a means of adapting a subject to the outside world (natural and social) through created/appropriated meanings expressed by communicative signs^[2]. Many adaptation mechanisms were created, it was important for us to give a generic difference in information adaptation from other ways

of adapting living organisms to their habitats. It seems that this definition solves the problem.

When the phenomenon of “information space” was only in the process of recognition, its definition appeared in the journal “University Book” in the form that was quite typical for the initial level of cognition and which characterized the scope of the concept of “information space”. According to this definition, the information space included "information resources, i.e. databases and data banks, all types of archives, a system of depositories of state information resources, libraries, museums, etc.; information and telecommunication infrastructure; the mass information system; the market of information technologies, means of communication, IT development and telecommunication, information products and services; information security system; a system of interaction between the information space of Russia and the worldwide open networks; system of information legislation"^[3, p. 4].

As we can see, the definition is extensional, and therefore, it does not provide clarity: what the “information space” is in fact.

To investigate this phenomenon, we use the methodology of the system approach and the concept of the basic structural levels, which have again and again led us to positive results in the cognitive process. Let us briefly outline the main points that determined the course of our reasoning in the study of the information space.

Considering the information space, we denote it as a system, i.e. as a whole with integrative properties that are not attributive to its parts, it is certainly a complex system, but it is important to understand if this system is self-regulating or self-developing. The study of the information space as a system is associated with the recognition of "systematicity as an attribute property of matter"^[4, p. 23].

Considering information resources as part of the information space, it is important to realize the information space because according to A. V. Sokolov "the parts can be learned only based on knowledge about the whole... the whole precedes and is not determined by its parts"^[5, p. 13].

Like any other whole, the information space consists of elements, and only their combination

(turning them into components) allows a new phenomenon to emerge. The concept of an element is something that is indivisible and identical to the *ultimate* manifestation of the whole and serves to form the remaining hierarchical levels. The element reflects such a part of the whole, which is its simplest part, quite often it is the original (generating the phenomenon) initial part. In the process of development, the original structure of the whole can be enriched by the appearance of new elements having their designation and their functions. The term “component” is also called the part of the whole, but the component can have a complex structure, and this term denotes "the facilitating force, the partial cause that influences the result"^[6, p. 217].

Elements of any phenomenon can act as components if it is described precisely through a combination of individual elements. A set of components determines the state of any phenomenon at different stages of its ontogeny. Proceeding from such an understanding of the whole, investigating the phenomenon of “information space,” we will find out the intentional characteristics (content) of this concept and offer its essential definition, defining those elements/components that provided the original state of the information space and which *were not lost* in its evolution.

The term “information space” has emerged relatively recently. In Russia, it was actively used concerning the discussion of the issues of state information policy and the adoption and implementation of the concept of the information society. For example, in the “Concept of the Information Society Formation in Russia,” adopted in 1995, it was noted that "the formation of an information society"^[7, p. 8].

4.2. Genesis and evolution of information space

Westartdescribingthegenesisandevolution of information space from restoring the moment of its genesis and considering the process of its development. It is known that for the scientific reproduction of any object under study, it is effective to restore the sequence of appearance of each of its elements. As O. P. Korshunov notes, it is necessary to start from the initial point of origin, "from the simplest cell, considering the object under study in the

dialectical unity of its reality and development"^[8, p.192]. "It is possible to correctly understand the current state (structure of functioning) of an object only based on its genesis. At the same time, it is impossible to identify a genetically initial point without analyzing the modern, most developed object"^[8, p. 194].

Today, most people associate the information space with new information technologies, with the processes of their creation and implementation. Does it mean that the information space didn't exist before the advent of computer technology? One of the authoritative Russian specialists in the sphere of information, O. V. Kedrovsky believes that the information space "exists (regardless of concepts and programs) as one of the main conditions of our life"^[9, p.2]. No doubt, this statement is true! The system phenomenon of "information space" can reveal deep roots. It is an attribute of the information process as such.

We borrowed the description of Information Process from V. Z. Kogan^[10] but some additions and refinements were made to his scheme. The Information Process begins with the collision of the individual with reality, it is a Pre-Phase of the process, it includes contemplation and perception, through which the reflection of fragments of reality (facts of existence) takes place in the consciousness and as a result, sensory images are formed. The image creation opens the phase of information production, it allocates the following semantic procedures: representation, image creation and the introduction of meaning in it, as well as the establishment of a relationship between meanings. But, the sensory image is difficult to keep in memory, it may disappear after a while. The short life of image, preservation results in the necessity of its designation coding through the code, symbol, i.e. through the sign. The designation through the sign provides the materialization of meaning, the creation/use of the sign is the most important element of the process of emergence/origin of the information. Signs arise as a particular agreement between individuals and ultimately form a language. The information production phase ends with the establishment of an information product. The created information is stored in memory or remained recorded on some media- this is the phase of storing information. The stored information can be transferred to another

individual who will accept signs, decode them, and extract a meaning—these processes are called the information transfer phase. The information transfer is the beginning of communication activities. The phase of information transfer includes time and spatial characteristics, i.e. communication can be characterized by the time necessary for the information transfer and the possible distance (available for communication) between the communication participants. The phase of transfer is followed by the phase of information consumption, it includes the sign perception and the process of its recognition, decoding i.e. the transfer of the sign into the meaning. Then there's the inclusion of meanings in the consciousness of the individual who has received the information, so the establishment of relationships takes place between meanings and signs denoting them, all these procedures can be considered semantic phenomena. The post phase of the information process is the use of information; the last phase is the beginning of other, non — information activities. In the post phase, there is a metamorphosis: the information product turns into an information resource, which together with raw materials and the tool is used by a person in all kinds of activities. Such processes are present in many spheres of activity, for example, flour is the product of milling and the raw material resource for bread-baking, there are many examples of the use of flour. As for information resources, we would like to add: today, it is generally recognized that they are necessary and an obligatory component in the production of material and spiritual wealth, the description and mathematical calculations of the information resources transformation into tangible goods or services are found, for example, in B. E. Odintsov and A. N. Romanov^[11]. The information resource creation is the result and achieved the goal of the information process. Moreover, the achievement of the goal is a criterion that allows us to recognize the process as successful. Besides, the information created in each process has a clear applied purpose: either it is a resource for production/education/leisure or it can be a resource for the continuation of scientific knowledge.

For us, the constituent elements of the information process are "abstractions of the first kind, they form the primary, so-called source and empirical material of cognition"^[8, p. 186] of the phenomenon of information

space that emerges as a result of the development of the information process. Proving this statement, we use the words of O. P. Korshunov. The concepts of “process” and “system” are inextricably connected. One of the postulates of the systemic approach is as follows: there can not be systems about which one could say that they exist without a process^[12, p. 8].

4.3. Evolution of information space and information barriers as objective factors of its development

In the process of evolution, the information space becomes an extremely complex system phenomenon. Its current level is characterized by an extremely diverse set of its components. Each phase of the information process generates “new” kinds of material and spiritual activity and some interrelated and interdependent social and systemic phenomena. Thus, the information production phase gave rise to science and artistic creativity. Under the influence of a temporary factor, the information production phase has isolated the information storage phase in the information process structure, the severe need for communication for the survival of the society has formed the information transfer phase, and various types of information, including documentary activity, were formed on these two phases of the information process. The consumption phase has formed an information component in all types of material and spiritual production. In post-phase, when information is used in a particular activity, the goal of the information process is achieved and information is included as an adaptive tool component of spiritual and material transforming activity.

Revealing the evolutionary transformation of the information space and the information resources that exist in it, we will not be able to avoid the description of information barriers because they create the problem that mankind overcomes moving along the road of civilization, including technological progress. On the way of information advancement, some barriers appear, these are physical obstacles related to time, distance, and terrain features. People began to overcome the physical space barrier, which was originally generated by the limitations of sensory perception, by amplifying sound and light signals. Over time, technical capabilities have increased, and today, mankind has

very successfully overcome these information barriers via printed and electronic communications, it contributes to the achievement of high-quality information space in terms of length, volume and density. Now, the issue of overcoming territorially remote objects is being solved both olfactory, tactile and tasty means. The efficiency of overcoming territorial barriers increases by many times due to the use of technical progress capabilities, in particular, information and communication technologies. However, the progressive development of the information space generates other information barriers of a different nature, and *the need to adapt* a person to the information space through overcoming various information barriers largely explains the appearance of the species diversity of information resources.

Physical (territorial, temporal, etc.) information barriers that restrict access to information are genetically first. To overcome these barriers, a person records information, creates a document, and then collects and stores documents, so there is a social documentary institution that has communicative, cumulative and memorial functions. Largely, the functions of the information institution are set by the documents that this institution stores and transmits during the implementation of different stages of the information process. Implementation of these functions generates technologies for collection, storage, and also “memorization” of documents through the creation of bibliographic information. All these technologies are aimed at primary and secondary documents and become the basis for the provision of corresponding services. The creation of bibliographic information and the subsequent emergence of other information retrieval languages allows an individual (often with the help of an information institution) to overcome navigational and search (spatial) barriers. These barriers are overcome during the implementation of the navigation function of the information institution through the provision of identification and search for documents. To overcome navigational and search barriers, an individual must have a certain level of information culture. Another group of information barriers, which we called de-unifying, is related to the fact that publishers and other subjects of the information space don't comply with standards for the

creation of documents and their description with the help of bibliographic, secondary semantic and other models, which prevents from ordering information processes and jeopardizes the integrity of the information space. From content, purpose, language, material construction, sign and others, the multiplicity and variety of documents gives rise to assorted information barriers that are overcome through the implementation of the selective function of the information institution, through the creation of technology for selecting documents for storage and technologies for their provision in compliance with the requirements and social characteristics of information consumers. Due to the selection of documents, a quantitative information barrier is also overcome. It reflects the inability of the consumer to master all the documents suitable for him in terms of temporal and physiological characteristics. The selective function and corresponding technologies can be aimed **not** only at overcoming information barriers but also at creating ideological, educational, information barriers that are set by the founder of the information structure, as well as by the moral, ethnical and legal norms of the society. As we see, the adaptation of a person to the information space generates not only a specific variety of information resources but also a variety of information technologies. Today, some of them are now called archaic, part of them are referred to as new information (communicative) ones.

4.4. Concept of "Information Space"

It is important to find out what is hidden behind the concept of "space" because it is known that the most essential properties of the original phenomenon are inherited by all of its later forms.

In mathematics, the opposite of space is the point. One of the prominent contemporary philosophers, A.V. Nesterov in the article "Philosophy of Information" defines a point as a collection of elements consisting of one element, and contrasts it with a space consisting of a set of points^[13, p. 5]. Nicholas of Cusa found the connection between the point and space even in the 15th century^[14, p. 422]. Due to the contribution of Nicholas of Cusa, it became possible to define *space through the unity of discontinuity and continuity*.

In philosophy, the category "space" is one of the most developed. Space and time are forms of being of

matter. Species concepts are formed from the generic concept of "*space*," and the category "space" has the greatest level of abstraction. From this point of view, the definition of space given by the Polish philosopher Ellen Metzger is rather revealing. "In addition to the ability to be filled, space has no other property; if we abstract from setting a separate place and its filling, there is nothing empty and dead"^[6, p. 370] (italicized by me—T. B.). Contemporary philosophers distinguish real space, it is the object of study in Science disciplines, and thanks to its study, conceptual space emerges, "i.e. some scientific idea about real space and perceptual space, i.e. apparent space."^[15, p. 58]

Perceptual space is a space perceived by a person. The development of perceptual space is connected with the individual's activity, individual structures of the society or the society as a whole. When studying the information space, the methodology of the spatial approach is the most effective one. That approach was developed by us. The essence of the spatial approach and its *basic procedures* used in this cognitive tool are described in the article "Methodology of spatial approach in library science: the prevalence and specificity of the application"^[16]. Procedures aimed at studying the information space include determining the purpose of the emergence and development of space; identifying parts and elements of the hierarchical structure of space; identifying and typifying subjects of space; the study of integrative processes occurring between subjects of space; identifying subject (individual or organization) performing the functions of the chief designer of the space under study; harmonizing general and specific criteria for assessing the functioning of space; defining conditions for preserving the integrity of space and the mechanisms for achieving its unity.

The space filled with information is created by the person and, hence, it can be considered from the activity approach. According to the activity approach, all components of activity can be united only with the help of the goal. The goal is always set outside of an individual system by a system of higher rank. No doubt, the goal of creating an information space is the formation of a comfortable human environment, filled with information that is available to a person in the course of his activity and used for it.

In philosophy, “space is characterized by the extent, structure, co-existence and interaction of elements in all material systems”^[17, p. 370]. These generic characteristics of the concept of “space” are used to denote extended, structured and, crucially, coexisting and interacting objects associated with a particular place. The place of filling information can be an extremely small territory (regarding a document, it is limited by the text, file, page) and the territory of the region, country, and the world (globe).

The parameters and characteristics of the information space are determined by the properties of information, which became the basis for its creation and generated information communication. After all, the information mobility has become a factor in the information space, i.e. property of expansion in space. Information communication is a prerequisite for the emergence of an information space. Nevertheless, the emergence of information is the first stage of human adaptation to the environment and (or) the prerequisite for further transformation of the environment through activity. Thus, for the sake of adaptation to the environment, due to the communication of information, the information space emerges and expands, and it has the property and functions of instrumentality, supportiveness, it is an infrastructural part of the society. The growth of information in time and the diversity of its types caused the increasing complexity of the information space, and, at the same time, it became a factor contributing to the emergence of new qualities (external manifestations) that the information and space did not have.

To consider the information space, we will have to turn to the notion of “relations”. The concept of “space” was born in mathematics, where it is defined as the set of objects between which *certain relations* are established. The philosophical definition of space emphasizes that its very essence is the coexistence of interacting objects. Moreover, interacting objects are those objects that enter into some *relations*. According to the Brief Philosophical Encyclopedia, the theory of relations studies “the moment of the interconnection of many kinds of things that have a subjective or objective, abstract or concrete form”^[6, p. 325]. The decisive difference between the term “relation” and other concepts is in their relative generalization. “Relations is

part of a hierarchy based on the degree of specificity or limitation”^[6, p.326].

Without referring to the term “relations,” it is not only impossible to describe the information space and to form the corresponding concept, but it is also impossible to clarify its boundaries and its specificity. After all, the definition of the information space shall reveal the logical relations (*connections*) existing between its essential, primarily, *functional and structural elements*.

4.5.Types of Space and its Structuring

Information space can be structured by the characteristics of information resources, which are determined by their intended use for a particular area of activity. In this case, we can talk about the information space—scientific, recreational, production—created following the objectives of the activity. The use/consideration of information properties allows to optimize the information process and to create an information space (as a model of the real world) with minimal means. Thus, for example, the characteristics of the purpose of the information resource are used in the formation of the industry-specific and/or departmental information space; in turn, the features of the functioning of an information space act as a factor in the successful activity of the individual or certain social groups. Each subject, each of the spheres and industry activities forms its own information space, the specifics of which is largely determined by certain types of information resources. Thus, such property as information structuring sets different types of relations between objects of the information space in the framework of both individual information phenomena and the information space as a whole.

However, while reproducing the information space in the process of thinking activity, the cognizer must always remember that all spheres of information communications have the status of server, or tool concerning the basic, served sectors. At the initial stage of the society development, the information space served as a more successful adaptation of people to the natural environment of their habitat, it was a tool of object-transforming activity aimed at satisfying the human physiological needs and was filled with appropriate types of information resources. Subsequently, when other activities emerged, the

information space began to serve these types of activities and the goals of the entire universe of human actions, and it consequently got filled with the most diverse types and forms of information resources that the person created. It can be explained by the fact that the objectivity of the emergence of different types of information space is associated with the mandatory information component of any activity. After all, "any activity is procedural regarding its aims, it is proportionate to the acting person by results"^[18, p. 16].

and proportionality is very often associated with the possibilities of awareness (understanding) and assimilation of meanings contained in the information resource.

The phenomenon of information resource is integrated with the purpose of the activity. To achieve the goal of the activity, i.e., various processes are directed at receiving its result: motor, technological, and mental ones. The latter usually precedes any other and have an informational nature. Information manifests its generic properties in information phenomena, naturally becoming an objective factor of their diversity. Hence, the more complicated the universe of human activity is, the more complex and diverse the relations between information phenomena (objects) become, i.e. the information space becomes more complicated. Yu. S. Zubov and N. A. Slyadneva say that "space is primarily estimated through its development, the saturation with traces of human impact, its signification (toponymy) is manifested through informativeness, "noosphere"^[19, p. 14].

This is how "synergetic spatiality is manifested as a human-like, body-mastered environment"^[20, p. 38], and increasingly this environment becomes an artificial nature where a person exists. We do not live and act in the primordial world of nature, but in the "technosphere," man is a kind of hybrid of the organism and the technical device^[21].

The level of saturation of the personal information space with specific or abstract concepts determines the differences between the individuals' information thesauri. As it is typical in computer science, the term "thesaurus" is used here to mean "a systematized set of data about a sphere, thesaurus allows to model the world economically"^[22, p. 158]. Formation of the thesaurus, its enrichment with new meanings is the

main content of the information activity of the individual. *The information thesaurus is a system of semantic images*, which are a synthesis of visual, auditory, olfactory, taste, tactile images, i.e. images formed through all five senses given to a person by nature. It is also a system of concepts formed by semantic images. Our understanding of the individual information thesaurus is closest to the definition of the "subjective thesaurus" given by B.M. Velichkovsky. He considers this concept as "organized knowledge, belonging to the subject, about words and other verbal symbols, about their meanings, about the relations between them, and about the rules, formulas and algorithms used to manipulate these symbols, concepts and relationships"^[22, p. 159].

This approach reveals the dialectical relationship between knowledge and language and allows us to talk about the information thesaurus as an ideal structure. To render our views on the essence of the information space of the society, it will be quite enough to operate with the notion of an "individual information thesaurus" in the above-mentioned meaning without further delving into its structure and mechanism of emergence.

Thus, information activity, like any other, is proportionate to the acting person. The individual's informational thesaurus is something that a person can embrace with his consciousness, first, at the level of contemplation, and then at the level of abstractions, and after that systematize the received abstractions. In other words, the individual interacts with the habitat with the help of his thesaurus and adapts to it. Material and spiritual objects serve as a medium. Thus, the functioning of an individual thesaurus becomes the basis for the emergence of *an individual/personal information space*.

N.B. Zinoviev introduces three types of individual personal space: object, interpersonal, and cognitive^[23]. Let's see how these types of space are related to each other, as they are "absorbed" by the information space of the individual, and then by the information space of the society, during the development of the information process. The *object space* is stable enough regarding the time factor (long-lasting), but its duration limit is determined by the ability to perceive/reflect objects through the senses

(through seeing, hearing, etc.). However, when objects are reflected in the human mind when they are named (creating/using *nomens*), they (objects) indirectly begin to be present in the mind of the individual in the form of images and lexical (linguistic) units, and in this form “reflected and named objects” become elements of the *cognitive* space. The limits of the cognitive space are related to the human intellect and qualitative characteristics of his/her memory. So, the individual cognitive information space is formed due to the interaction of the individual with other objects of space, to which his thought is directed. In this case, information is *consumed*, and enrichment and/or clarification of the semantic images of the information thesaurus often occurs. In the emerging human consciousness, in the ontogenesis of the individual, fragments of the reflected world are combined into a single picture of the world, which is sometimes distorted, sometimes more or less true, but originally imaginative, then verbal and figurative, and finally conceptual. In the individual’s mind, the product of the reflection of the objective world as a whole or its units and structures turns into knowledge. The cognitive space is based on the lexical *units of the language*, when they are transmitted to another individual, *interpersonal* space emerges with the help of speech, thus the interaction of the information creator and information consumer takes place.

Information communication is possible only in material form, therefore *oral speech*, together with an informational thesaurus created with the help of natural languages, are obligatory *components* (i.e., elements acting in combination and unity) of the initial pre-verbal and/or verbal (word) forms of the information space. The information space of the society developed simultaneously with the word (oral communication). It was necessary as one of the conditions for the success of the joint subject-transforming activity of individuals that formed the society.

The *subject* creating, cumulating or transmitting (disseminating, transmitting) information is *the center of the information space*. The subject is created by a system of a higher level. Regarding the information space, it is society. Interpersonal space is limited by the number of subjects of communication. If the number of subjects of communication increases, it becomes

necessary to coordinate their actions, i.e. information transfer *management* is required, so communication process management emerges, and the information space is ordered. New functions are assigned to one of the subjects of communication, it regulates the sequence of the exchange of information messages. For example, in a family, as in a minimal cell of the society, the head of it is usually responsible for managing interpersonal communication, the elder or leader is responsible for it at a tribe meeting; in contemporary situations, the chairman of the meeting is the responsible one. With interpersonal information communication, new information is entered into the general information flow of the information space, and each of the subjects accumulates from this general information space into their individual space something that corresponds to their intellectual level, needs and interests. However, because of functioning as a manager, the subject that manages the communication process organically tries to cumulate the transmitted information in full. As a result, their information space is more saturated with meanings than others’ spaces. Thus, even in the structure of interpersonal oral verbal space, with an increase in subjects of communication, an element that provides *a common information space* objectively arises—it is the manager of the communication process. Based on interpersonal space, the social information space is formed, and the *managerial element* in it becomes an objective (necessary) and organic *component*.

Therefore, the most common form of the information process in the form of verbal (oral) communication is the initial form in which it is possible to single out the original elements: the information creator, the information consumer, the word/speech. Information creator and consumer have a resource function—they assign meanings and render them via communicative signs, i.e. via speech, the latter is the rendered information, and therefore it has a communicative function. When the information process changes from the interpersonal to the social one, the manager appears with an organizational (organizational and managerial) function.

Nevertheless, such an obligatory characteristic of space as *the place of filling* (see the definition of space given by Metzger and cited above) makes us recognize

the territorial sign that came from the physical space the initial basis for structuring the information space of the society and pay attention to its study.

The common territory and joint activities led to joining individuals within the framework of the first societies. The first form of society was the clan. Then comes the tribe. The tribe is a society that precedes the formation of states. In the early stages of development, the information space meaningfully consisted of informational thesauri belonging to members of very limited human communities—clans, tribes, which shared family ties, common language and a common place of residence (a territorial sign of the society). The primitive information space was not rigid, it was neither hierarchical nor centered, or rather, it was hierarchical and centered to the extent there was hierarchy and centralization in the organization of the community. With the increase in hierarchy and centralization in the organization of the society in the form of tribes, the level of hierarchical organization and information space increased. The decisive factor in the development of human society was its unification in the form of the state. The state becomes the main subject managing the creation of a *territorial* information space.

At the early stage of the development of the information space, its main objects were individual information thesauri of members of the society, in this form, there were information resources that served as the initial basic element of the information space of the first societies. The specificity of the information space of the ancient people was determined not only by the ways (mechanisms) of managing communication processes (i.e., the functioning of the managerial component) but also by the features of their cognition, the level of the language development. Primitive people had a figurative and verbal reflection of the world.

Consequently, their information space was filled with images. The pre-conceptual level of cognition led to the fact that the group consciousness of the ancient people created an information space based on very specific concepts. Gradually, people who mastered abstract-conceptual thinking appeared in the bosom of this human community, and the results of their information and thought activity were added to the

information thesaurus of each of them and entered the information space of the society. The further development of the society led to an increase in the number of people with abstract thinking that contributed to the language development, and further to the development of science and knowledge-based practice and, in turn, it enriched the individual thesauri of members of the society.

Contemporary society is highly differentiated in terms of the level of its members' consciousness development. There are people with thesauruses, which include scientific knowledge; there are carriers of mass conceptual consciousness arising from the obligatory education and mass communication media functioning; as well as individuals whose consciousness remains primarily pre-conceptual, including only separate elements of conceptual thinking. Therefore, the peculiarities of individuals affect the quality of their information space, which is developed and constructed by them in the process of their ontogenesis, and indirectly affects the quality of the information space of the society.

Hence, the quality of the information thesaurus is determined by the subjective abilities of a person to fully and multifacetely reflect and realize the reality, to see the interconnection of its objects, to operate with meanings to a certain degree. V.Z. Kogan asserts that "the picture of the observed and reflected world can be adequate or distorted depending on the thesauruses of different modalities. In the end, nature and society don't speak to people by themselves, but in the form in which they are revealed through our way of posing questions, and there is the thesaurus at the bottom of the latter"^[10 p. 4]. The individual's information thesaurus is subjective and changeable. It is impossible to completely remove the information subjectivity, but for the sake of concerted action, it is necessary to reduce it as much as possible, to unify it. According to the definition given by Yu. N. Stolyarov, "knowledge is always objectified"^[24, p. 56]. The structuring of information, its integration into the information thesaurus of an individual or society, i.e. the transfer of information to knowledge ^[25 p.247], and the objectification of information. The truth and consistency of knowledge are tested by practice

(experience), i.e. objectification is carried out in the phase of information use.

The information space of the individual is constantly replenished because of the appropriation of information that has been already created by someone else and due to the continuous process of reflecting the physical (material) and spiritual objects of the human environment, by transferring physical objects to the ideal (mastered by consciousness) via the creation and/or assimilation of words that are selected/created for their designation. The functioning of the information thesaurus, which can exist only through a word (language), is *a sufficient condition* for the emergence of the information space of the individual. The individual's information thesaurus is *the ultimate whole phenomenon in the information space of the society*, its division into components upgrades the analysis to the level of semantic or other units within the information thesaurus. An example of such a subdivision of the information space was given when the framework of the concept of "individual thesaurus" was discussed and when the individual objective, cognitive and interpersonal space was reproduced.

The individual's information thesaurus created and functioning via the language and transmitted via speech, is *an individual information space* and at the same time, *it is an element of the information space of the society*, its original, initial part. The information space of the society is always external concerning the individual's information thesaurus. Due to their subsequent deployment (and transmission), information thesauri of individuals form the information space of the society. First, the information space of the society is a chaos of sensory images, created meanings, individual signs and words, then it is ordered by the formation of a language system and after that, the informational space of the society appears as an organic whole at any stage of development. It is known that an organic whole is a self-developing system. "Integrity is a fundamental characteristic of a complicated system, and at the same time, it serves as a criterion for its development, while the phenomenon serves as internally contradictory, where its various components are in a state of competition and mutual enrichment"^[26]. The basic sign of an organic whole is its dialectical dismemberment^[8 p. 181]. The information space of the society and

individuals' information thesauri constitute the whole and represent the unity of opposites in their development. The information space of the society is enriched due to individual thesauri of the members of the community and nourishes them because the part and the whole are united, and therefore, from this or that perspective, they convert into one another without difficulty^[8, p. 182]. By its quantitative and qualitative characteristics, the information space of the society exceeds the simple sum of individual information thesauri, as a systemic phenomenon, it has much greater potential for successful functioning.

4.6. Qualitative Characteristics of Information Space

It is difficult to form the social information space and it is explained by the discreteness of messages (rendered fragments of information thesauri) and the subjects who create and receive them. Discreteness of information messages is obvious, but both information creators and consumers are also discrete. Individuals have temporary limitations related to a person's life expectancy. So in the development of the information space, the tribal sign of any space is manifested—the unity of discontinuous and continuous. Continuity is provided by the constant communication process of people's communication, the ability to render information from the individual to the individual, from generation to generation. Communicativeness of the information space, its discreteness, which is due to the scattering of information and its distribution, have become the conditions for strengthening the information space. The disappearance of information at one point, through its movement and/or distribution, preserves information at other points of space, in which the information thesauri of other individuals operate. It is speculative, i.e. abstract, it is possible to reproduce the original information space, which consisted of a set of points (individual thesauri); its extent was measured by the possibility of the direct rendering of an information message to a certain distance both verbal and non-verbal/pre-verbal. The limitations in the extent of the information space are also related to the time that is necessary for rendering information, i.e. with the speed of rendering the information message from the individual to the individual.

The information thesaurus, as an independent and self-sufficient element for the emergence of an information space, can exist autonomously. However, this status cannot be prolonged. Then the individual has a space deficit. *The deficit of space* is often overcome by the expansion of the cognitive and/or interpersonal space. The need for interpersonal and then for social information space arises in the process of individuals' joint activity. In any society of any scale, there is an objective need for sharing knowledge about the objective reality reflected by individual consciousness, so individuals belonging to this or that society start using information resources together.

Human civilization contributes to activity differentiation and accustoms the person to planned and ordered joint actions^[6, p. 508]. Leaders of the clans and tribes, the system of traditions, prescriptions and taboos controlled the human community and, undoubtedly, could influence the formation of the language and information thesauri, i.e. information resources; the ways of rendering them, and thus the quality of the information space of the society. Thus, the information space has a prominent social aspect and can be interpreted as *the relationship between people and their communities about information resources*. Hence, we can conclude: the evolution of the information space increases the importance of the managerial component of the information space because the manager is the most vivid carrier of properties and meanings that are common to the whole society.

The information space is a *non-additive whole*, it does not only inherit the properties of its original elements—space and information—but also, being a new phenomenon, it has its characteristics. In our opinion, these properties are the extent, volume and density. The *extent* of the information space can be characterized by the distance at which the necessary information resources are available to the individual. According to the encyclopaedical dictionary, the concept of “*volume*” can be defined as “the general limit of inscribed bodies.” Concerning the information space, this concept can *characterize* the number of information resources included in the information space of one or another extent, i.e. *the number of available information resources*. The concept of

“*density*” in mathematics is the inverse of volume. Concerning the information space, the concept of “*density*” can help determine the *saturation* of an information space with *information resources*. This characteristic can be derived in the information space with a certain extent while considering the ratio of the number of *information resources regarding the creators of information resources or regarding their consumers*. Thus, we have to talk about *different types of information space density*: by the number of information creators and by the number of information consumers.

The introduction of qualitative characteristics of the information space through the concepts of “*extent*”, “*volume*” and “*density*” shall allow us to develop quantitative indicators of these characteristics in future and equip researchers of the information space and information space practitioners with new tools for assessing the development of a particular information space; but it will be possible only due to specially developed software programs. The introduction of the coefficients of extent, volume and density shall allow us to use the tools of comparative analysis regarding different kinds of information space.

All the problems stated in the article are considered from the author's perspective. Most aspects of the consideration of the phenomenon of “information space” were proposed for the first time, and reflected on the general scientific and philosophical approaches.

We were able to speculatively reproduce the genesis and evolution of the information space, suggest the basis for differentiation and outline its types, as well as reveal its main characteristics and consider the content and scope of the concept of “information space”. The article suggests approaches to perceiving the essence of this phenomenon. However, the essential definition is not formulated. Moreover, the levels of the information space and the forms for ensuring its integrity are not considered. The role and ability of the state to influence the maintenance of its integrity is not revealed. All these new aspects can be considered in following articles.

Further study of the phenomenon of “information space” involves formulating an essential description of the phenomenon and concept of “information space”, examining the levels and ways of ensuring its integrity,

and determining the role of the state in achieving its unity.

5. Conclusion

The aims and objectives specified in the introduction have been achieved, and it is important to continue publishing research about the phenomenon of “information space”.

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