

The Concept of Information Resources and Other Components of the Theory of Information-Resource Science

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Abstract—This paper continues the description of the development of the problems in the new scientific field of Information-resource science, sums up the development of modern organizational methodical and technological scientific research, and considers the theoretical aspects of the study of new phenomena: the creation of scientific definitions; identification of the essence, properties, and functions of information resources; definition of the metasystem of their functioning; and the establishment of the forms of relationships between information resources and major concepts of related sciences. The inevitability of the transition from classical rationality to non-classical and post-classical rationalities is predicted.

Keywords: information resource science, information resource, essence, properties, functions, definition

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INFORMATION-RESOURCE SCIENCE: RESULTS OF DEVELOPMENT

Information-resource science is developing today as a part of information science, but its development is important for both scientists and practitioners in a variety of document and communication fields [1]. The current prevalence of organizational and technological aspects in the cognition of information resources resulted in a new scientific field, viz., information-resource science, being identified as classical scientific knowledge that uses cognition methods that include observation, generalization, the simplest analysis and synthesis, and experiments. Publications devoted to the theory of information resources exist, but these, despite their name, actually do not set goals that are characteristic of applied rather than theoretical scientific knowledge. As an example, the publication entitled “Information resources: problems of theory and practice” declared that the subject of the study of the theory is “...research on the properties and interrelationships of [information resources], ... constant solution of the optimization task with a changing optimization criterion...” [2, p. 18], among the priority tasks, it declares “the creation of the mathematical, economic, financial, and legal descriptions of information resources and putting them into use” [2, p. 20]. We can assume that the differentiation of theoretical and applied knowledge has not yet taken place in information-resource science, while the word “theory” is used in the meaning “science,” which is typical for the classical, in essence, the first stage of science.

The highest achievements that are made at the classical stage of the development of any science are the creation of classifications and typologies and formulation of definitions based on describing the objects of study. We are certain that knowledge will be differentiated into historical, theoretical, and applied (organizational technological and methodical) aspects at the following stage of the development of information science, i.e., in non-classical science. At the new stage, theoretical knowledge will intensively develop and it will become common to use the potential of the diversity of scientific cognition procedures; for example, the wide expansion of the information, activity, and systemic approaches is already observed in sciences of the document and communication cycle. The systemic approach is particularly efficient if it is represented by both systematic structural and systemic functional analyses and tied to the concept of major structural levels.

Information-resource science is still characterized by the vagueness of its own theory, many problems have not been set at all, and others have been solved at the intuitive level or only in the branch aspects of economy and law. Meanwhile, the theory of information-resource science must define the place of this scientific field in the system of document and communication knowledge in accordance with its scope of tasks, must give the clear definition of the metasystem within which information resources function, formulate a subject of study, and ascertain the relationships of information resources with the phenomena and *information*, *book*, and *document* concepts in full measure, i.e., scientifically rather than intuitively. In addi-

tion, the theory must establish the scope of its subject of study and propose the definition of information resources, which as yet does not exist, since their essence is not clear, their functions, structure, specific, and typological characteristics have not been named, and the laws and regularities of their development and functioning have not been revealed.

Let us very briefly present our views on a number of the issues listed above.

The metasystem of information resources is the dual “information–consumer” system. *Book*, *document*, and *information resources* are particular concepts that reflect special cases of the functioning of this system. The common and different (distinct) phenomena and concepts of the system must be ascertained as exactly and completely as possible by scientists who work in the field of document and communication sciences. Of course, the following issue requires a scientific explanation: the inclusion of information resources among *documentary phenomena* or the opposite, i.e., the substantiation of their recognition as *non-documentary phenomena*. It is necessary to identify the essential and applied functions [3–5] of information resources with consideration for their genetic relationships with other information components while relying upon the already identified properties of information (communicativeness, value, character representation/language representation, etc.) [6]. In order to create a complete theory, it is necessary to solve one more important problem of scientific cognition, namely, the laws and regularities of the functioning of information resources in the information space must be identified. In the meantime, we can only guess about the determinacy of the emergence and functioning of this phenomenon in accordance with the inter-branch laws and regularities that act in the information space [3, 7]; among them, there is the law of the overcoming of information barriers by establishing the correspondence between information resources and consumers and the law of the emergence of secondary information that allows the functioning of information resources and hierarchization and structuring of the web space. The observed stability of Web pages on the sites of authorities and educational institutions and mobility/dynamism of Web pages on commercial and news sites appear to be a special pattern of the functioning of information resources.

All these aspects are very important for the development of the theory of information-resource science, but the primary task is still to form the group of basic concepts and to define them. The term and concept of information resources are, of course, the first and initial issues for *information-resource* science. Attempts to provide a definition of information resources have been made more than once; these scientific issues involve information scientists, library scientists, and bibliography researchers [2, 5, 8, 9].

THE TERM *INFORMATION RESOURCES*: ATTEMPTS TO CREATE A DEFINITION

One of the theoretical problems that are usually solved by scientists at the first stage of the formation of a branch of knowledge when defining a branch scientific concept is to search for the parent of the specialized practices and to determine the nature or maternal generic “bosom” of a scientific field. Scientists who have studied information resources in recent years use words such as *information*, *knowledge*, *data*, *material*, and *resource* as generic concepts in defining them.

Here are a several definitions of information resources that were created at different times. The authors of the book *Infosphere* define information resources as “created and available information stocks” [10, p. 37]. The manual on regional studies by M.P. Komarov uses the concept of “knowledge” to define information resources: “information resources are knowledge on the state and means of development that permits efficient solutions” [11, p. 13], while the manual on the information law of Russia gives the following definition: “An information resource is information that was created and (or) found, registered, and assessed with certain (assigned) laws of degradation and renewal” [12]. GOST 7.0–99 *Information and Library Activities. Bibliography* presents information resources as “a collection of data organized for efficiently obtaining reliable information” [13, p. 24]. The concept of *information resources* was considered in detail in the book by G.R. Gromov *National Information Resources: Problems of Commercial Operation*, in which the author defines information resources as a direct product of collective intellectual activities and connects them to some territory or its population [14]. The *information resources* concept is somewhat differently interpreted by B. Odintsov, “information resources are understood [by him] as the totality of information gained and accumulated in the development of science and practical activities of people for use in production, management, and everyday life” [15].

The views of scientists on the relationship between the concepts of *information resources* and *documents* differ: a significant number of workers define the nature of all information resources as a documentary phenomenon [8, 9, 16]; others divide information resources into documentary and non-documentary resources. The position of A.V. Sokolov, who considers web information resources as undocumented electronic information and relates the channels of its distribution to documented electronic information, is indicative in this respect [5, pp. 319–320]. He names the hyperlink instrument as an example of an undocumented resource that is information [5, p. 383]; he believes that the content of information resources (both traditional and machine) lies in meanings rather than all information. Perhaps, this is true, if it is recognized that information can be not only a means of communication, if we rely upon his definition of

information: “Information is an instrument for the expression of meanings in the communicable sign form” [17, p. 416]. Of course, information resources are far from being a uniform phenomenon. Currently, information resources are considered to include websites and different information systems, including search systems, databases and databanks, hyperlinks or a distributed hypertext WWW system as a whole, many different programs, electronic libraries, portals, as well as often traditional libraries, archives, museums, and/or their funds and collections. Different types of information resources include those of public authorities, librarian and bibliographical, scientific information, patent, socio-cultural, educational, archival, museum, statistical, economic, financial, demographic, medical, geological, biological, hydrometeorological, space resources, and many others. Existing resources are being constantly updated, and thousands of new sites appear every day in the Internet. Under these conditions, both websites and electronic libraries are considered either as an individual type of resource, or as a source of information resources. A significant part of information resources is textual information; however, there are examples of information resources based on the use of other sign systems, for example, cartographic graphic resources. Electronic and non-electronic, traditional and machine resources are distinguished as special types of information resources. The term *information resources* designates various information products (data, analytical information, databases, databanks, search systems, software, and many other objects). There are many classifications of information resources; unfortunately, they do not give a complete scientific picture of numerous and diverse phenomena [2, 18–21]. Thus, we have to state that today’s cognition and understanding of the phenomenon of an *information resource* make a very complex, strongly tied conceptual “knot,” in which the concepts of *information*, *document*, *knowledge*, and *data*, as well as all types of variations of serious reflections and rash judgments about the traditional (printed and handwritten) and non-traditional (electronic and machine) forms of their functioning are chaotically intertwined.

Let us add the following: at present, the term of *information resources* is used in both the ontological and gnoseological meanings, i.e., as a generalized name of a number of information products/systems and as an abstract scientific category. It would be more constructive to distinguish these concepts in the cognition process and designate them with different terms, but this will be possible only if a certain level of theoretical knowledge is achieved in identifying the essence of information resources and determining the forms of their existence.

THE FORMULATION OF THE ESSENTIAL DEFINITION OF INFORMATION RESOURCES

Based on the analysis of the state of the development of major components in the theoretical part of information-resource science, we can begin the discussion about **the major concept of the new theory** as an object or subject of study of information resources science that is simultaneously the initial concept in the field of scientific cognition.

The very complex question about the nature of *information resources* can be solved by restoring their genesis. We have already speculatively tracked the genesis of information resources in the dissertation study of the information space on the subject “A Public Library as a Part of the Information Space: Theoretical and Methodical Bases” [22]. Information resources turned out to be a product that appears as a result of any information process; moreover, the creation of an information resource is the very goal of any information process. Note that the term *information resource* is very seldom used in abstract (speculative) considerations about information processes and the words *information* and *information message* are used more often. Information always existed as a target and result of information activity and it was always used in a variety of areas, but the term *information resource* appeared comparatively recently; it was born in our time, when informatization as well as the origin and development of the information market came to be discussed. Hence, it is correct to define an information resource through the *result* and *product of the information process* concepts; however it is evidently not enough, the definition must also contain other conceptual (meaningful) characteristics.

Undoubtedly, it is important to establish **the principles of delimitation of information resources** from the subjects of study of other scientific concepts for the purpose of reflection and the performance of scientific procedures, but this can be done only if their definition is formulated, i.e., if the definition of the *information resource* phenomenon is created. However, we have failed to find an essential definition that reflects the generic and specific characteristics of an information resource among many definitions of information resources that have been revealed. However, it is principally important to cognize the generic and specific characteristics of this phenomenon to make its definition, and to reveal its properties and functions. Each information phenomenon has certain properties, which determine its functional potential, and, without revealing the functions of an object of study, it is impossible to explain the causes of its origin and to build an essential definition.

In the article “The properties of information as the potential of its hierarchical functioning and specific diversity” [6], we attempted to describe the functions of information that may arise on the basis of the properties of a studied object. The function was defined as

“... the outward manifestation of the properties of some object in this system of relationships” [23, p. 719]. We ascertained that natural or generic functions were formed based on the generic properties of a phenomenon and that properties were inherited by the phenomenon from its previous states; a specific function that arises with the birth of a new phenomenon explains the cause of its origin and its destination. A set of generic and specific characteristics (properties) is the essential characteristic of a studied phenomenon. These characteristics persist during the entire period of the existence of the phenomenon. If the properties of the studied phenomenon are destroyed, it ceases to function or simply disappears. Information resources have an entire pleiad of generic properties, viz., communicativeness, value, character representation/language representation, and other properties, but the instrumental and resource potential are their specific characteristic. It is known that a person who carries out some activity uses information as a means or instrument in different spheres, along with inventory, machinery, and raw materials. Its instrumental or resource potential permits information to appear in the form of an “instrument” in the system of relationships between the spiritual, material, and production elements, or any other activities [6, p. 4].

Before proposing the essential definition of the *information resource* phenomenon, we note that the adjective *information* indicates the generic links of the studied phenomenon, while the term *resource*, i.e., *instrument*, expresses the destination of this phenomenon very well and shows its place in the system of different activities. Thus, the *instrument* concept can subsequently be used not only as a specific characteristic, but also as a principle for the delimitation of this phenomenon from kindred phenomena.

We propose the following definition: “**An information resource** is purposefully created information that has an instrumental function and is used as an instrument for a specific type of activity.” The *information* and *information resource* phenomena have common generic bases; thus, they have common generic properties (these were partially mentioned above), but the creation of the essential definition made it very important that we ascertain **not their community**, but their distinction. This distinction is indicated in the proposed definition by designating the specific characteristic of *information resources*, namely, through the concept and term *instrumentality*: instrumentality explains the causes of the origin of information resources, is their major function, and ensures their further use.

To define the *information resource* concept we can avoid using the polysemantic and debatable term *information* and propose the following definition: “**An information resource** is a form of long-term storage; it is a way of replicating and conveying meanings expressed in human-readable and machine-readable characters that is purposefully designed for use as a

resource/instrument for a certain activity and thus has strongly pronounced consumer values, which often permit this product to be regarded as a commodity in the information market.” The inclusion of the characteristics such as an instrumental function or consumer and commodity properties in the definition distinguishes the information resource from other information phenomena; this makes it stand out as a new type among information phenomena.

Now, let us sum up the **results of the development** of the theoretical field of information-resource science. We recognize that we have as yet presented only one concept, the essence of which is described in this article. Most of the elements have been considered within this concept. These elements have been revealed mainly by using systemic and activity methodology. The use of the cognitive potential of these approaches makes it possible to determine the metasystem of the functioning of *information resources* and the principle of distinguishing them from other information phenomena, as well as to reveal the essence of the new phenomenon and give its definition by naming its essential function and specifying its properties. We have already noted that information-resource science has been developing up until now according to the rules of classical science. However, the transition to the non-classical stage of development and strengthening of the theoretical potential improve the explanatory potential of this scientific field [24, 25]; this in turn lays the foundation for the future transition to post-classical science with the ability to carry out the predictive function of science.

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