

Concept of “Image” in Scientific Cognition: Explicative Analysis

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Abstract – The article studies the essence of the concept of “image”, especially, in reflections on mechanisms of scientific cognition. The authors conducted the explicative analysis of interdisciplinary scientific works that introduce this concept with a view to developing scientific knowledge. The emphasis was laid not only on polyvariance and on transdisciplinarity of the concept of “image”, but also on its specificity, which is directly linked to the views and experience of a researcher and presents either their understanding of science or the opinion of the scientific community.

Keywords – *image, science image, construct, image creation, theoretical image*

I. INTRODUCTION

In all directions of philosophical and methodological thought, there is an understanding that social phenomena as elements of social reality are known in science through their construction (according to N. Luman). The construction of social phenomena is carried out at the theoretical scientific level, which is characterized by the operation of theoretical constructs, reduced to the ideal-typical. The array of knowledge about the object under study is always heterogeneous, diverse and multi-format. Philosophical activity of scientists in the process of analysis of reflexive practices inevitably leads them to the search for a sample, a structure that would allow to build the boundaries of knowledge of the phenomenon, or in other words, to approach the “homogenization” of theoretical knowledge, to make a departure from the “heterogenization” of scientific reflections, ideas, facts. Sample or other abstract figure acts as a kind of thinking tool. The emergence of each time a new “thinking tool” usually “bares” new horizons, draws other perspectives.

The use of historical ideology, which declares that the knowledge of science can be presented in different images, has become a starting point of our research. In the scientific discourse, it is stated that, philosophically, a long-standing *science image* does not exist, because any philosophical school or a group of philosophers speaks in terms of their own philosophy and creates the science image complying with their views. Nevertheless, the scientific discourse tries defining the science image as follows. The *science image* covers a form, a method, a model, the knowledge and understanding of science reflecting the socio-cultural being. Of no less importance is the fact that the specificity of science images is directly linked to the views and experience of a researcher and presents either his/her understanding of science or the opinion of the scientific

community. Therefore, the content, methods, sources, and contexts of their development (i.e. the development of science images) differ.

II. METHODS AND MATERIALS

The interpretation of theoretical knowledge concerning this social phenomenon is poly-variant depending on the science subject within which it is viewed through the methodological approach attributed to it. The scientific research of a social phenomenon has always been in close relationship with the theoretical and methodological basis on which the study is conducted. The scientists doing research including P. Berger, T. Luckman proved that the society as an objective social reality is formed in the process of its cognition and elements included into it [1]. Social reality and its polyvariance and instability to be exact makes the researchers look for the ways of its solution in its studying and developing through theorization. The theorization of social phenomena by creating their theoretical images and models allow scientists to study them subjectively, with defining “the paradigm foci” according to “the scientific and spiritual” atmosphere of the epoch in which they live. Resorting to cognition theorization and development of theoretical images (models, schemes) for theoretical understanding of diversity of methods applied to research and the interpretation of its results is an objective need and a real tool. This approach permits not only studying the genesis of elements of social reality but also understanding the essential theoretical fundamentals for studying social phenomena. It does not claim to be the only true and ultimate way of theorization as it is primarily related to the competition between theoretical scientific approaches. It is clear that social reality is a dynamically developed category, and urgent needs concerning the theoretical lenses for researching the object of cognition arise in front of researchers. Due to the assumption that changes in the society as a social reality and its elements is a dynamic process closely correlated to social sciences which study this process, the search for new ways of studying theoretical issues is inevitable and infallibly correct as it reflects social reality.

III. RESULTS

Theoretical knowledge is linked with the setting of a problem, which is considered to be its beginning. There is no denying that the problem is enhanced by social significance and difficulty in finding a quick solution. Putting forward a hypothesis to be supported or rejected in the course of time is the beginning of solving a problem. With the help of the

processes mentioned above, any self-sustained science subject points out the object of cognition, separates one of its aspects and then project the system of idealized constructs. The image, which is artificially created by science and presents a collective image of ideal objects and experimentally-measuring procedures is perceived as the empirically obtained data. The scientists take this image as a theoretical model of the investigated reality, which changes as the cognition and practice evolve. In other words, in studying theoretical issues the emphasis is placed on “the idealized object, i.e. a theoretical model of significant links existing in reality in the form of hypothetical assumptions and idealizations.” Scientists usually stick to existing theories, make use of proven methods for obtaining scientific results. However, there are situations in which special scientific theories cannot be logically obtained from more general theories as they describe a significantly different type of objects than the special theories do. In order to overcome this barrier in scientific theories, such concepts as images, which are called “theoretical models” and “theoretical schemes”, appeared. The content of science images refers to its subjective explications which are the reflection of researchers’ experience.

For example, Y.A. Elkana [2] sees the science image as formed from “the constituents such as the ideas of scientists and the whole community about the nature and goals of science, its social role, its place among other cultural forms as well as their attitude towards the normative value complex of the science itself.” According to A.P. Ogurtsov, the science image is defined as “an integrative, synthetic idea about the structure and development of scientific knowledge existing in two forms: pre-reflective and post-reflective” [3]. This implies that the science images in spite of their evident fragmentation and dissimilarity can be imagined as something “synthetic and integrative”. Philosophy creates the science image by integrating different ideas and concepts, which presuppose some vagueness, multilevel and multilayer character of the science image obtained against the socio-cultural background.

M.V. Shmatko [4] presents the science image as a concept with “the most general form of cognition and perception of the world but, at the same time, it is a very important prerequisite for a person to move from passive understanding of his /her involvement in reality to its active transformation”. The researcher claims that “due to the specificity of the object reflected, the science image is of conceptual character”.

The science image explicated by A.N. Sokolov and Yu.N. Solonin [5] appears as an object “used by a theoretician, and a bearer of general and scientific ideas, and a common-minded member of the society” the development of which is influenced by the spheres of human activities. Moreover, it is found out that “due to the fact that the image of anything manifests itself in the abilities of a living being to perform definite actions in relation to the outside world, especially when relying on human actions, we can evaluate the science image which was formed in his mind. In our opinion, it would be better to give the initiative on creating the science image to the scientists not to the common people who lack value orientations, theoretical and methodological basis, its elements, structures and their interrelations. This allows for “a

comprehensive and well structured science image”, which will be created by a philosopher for the general public.

S.B. Kulikov offers to define the science images as “symbols of transforming the essence of an idea in science” [6]. The author states that the modern stage of science development is characterized by a gap between the commitment of philosophical reflection to merge the diversity of science images into one image and multiple science images within the science itself”. The reason for this, according to Kulikov, is “the intention of humanities and social sciences community to follow other standards rather than those adopted in natural sciences”. In order to find the way out, “it is required to perform a special procedure on relating the philosophical reflection of science to other types of reflection and scientific self-reflection, in particular”. In other words, the main task of philosophy in this situation is to draw the perimeters around scientific self-reflection and prevent it from reaching the level of something daily, esthetic or some other way of understanding the essence of scientific process”.

If V.A. Lektorsky and his “core meaning” [7] are mentioned in relation to rationality as a cultural value to be retained in creating the integrated science image, we can state that science “as a cultural value” and its image are tightly related with the type of scientific rationality dominating not only in public culture but also at various stages of its development. This will become one of the leitmotifs of our investigation.

As E.I. Silnova writes: “Acquiring knowledge in the form of an image is the most accessible and optimal way of understanding, thanks to which the social world views is formed. The “message” of an image includes all socio-cultural and cultural-historical surrounding, involves inner experience and has the capacity to concisely show the essence of the world as immeasurable entity of different orders. Thus, the “image” shows social being from different perspectives” [8].

Social image due to its obvious engagement in different social processes can be described with the help of various basic socio-philosophical categories. Thus, one of the most important characteristics of the historical life of community is space as a universal context for being. V.B. Ust’antsev remarks in his work that “Social space is one of the basic parameters for creating a social world performing the form-creating function and facilitating the discovery of diverse links between various spatial forms” [9].

Turning to the science image, M.R. Vasileva writes that “these are intersubjective knowledge phenomena” [10]. The author suggests the science images should be created through ontological and value filters referring to one context of social practice and functioning simultaneously in social knowledge developing. The ontological filter is understood as a complex of objectified ontological concepts in the knowledge content, and the value filter is defined by the ontological one and is created by the values regulating the activity in separate social institutions. The function of the above-mentioned filters indirectly influence the concrete socio-cultural context of meanings in local discursive practices.”

The interpretation of “his own” science image was found in the work by V.V. Mironov, he considered it an interpenetration of three phenomena: science, philosophy and culture. The “contradictory relations” existing between elements of culture are inevitably observed; their characteristic feature is the emphasis on rational understanding of the world and its elements aimed at value and emotional perception of being” [11].

The ideas concerning the science images which were discussed above make it possible to conclude that the bases for distinguishing these or those science images are mainly of socio-cultural character and reflect different aspects of its existence: social, value, functional, historical, general cultural, and national. The use is made of real and ideal, conceptual and visual interpretation of science images. The images themselves have different contents and volumes.

It should be noted that the analysis of reflections showed the difference between the created science images not only within the framework of multidisciplinary research but also in one discipline.

A large body of interdisciplinary reflections contains the mention of the concept of “image”: starting from philological interpretations to psychological intentions, from social to pedagogical, and from geographic to philosophical representations. Let us discuss the main ones in brief, without immersing in the meaningful content of these works which are not directly related to this research.

The concept of “image” “as a constituent component of public communication” was mentioned in the work by R.V. Patyukova who studied it “in their synchronic and diachronic consistency” [12]. This coincides with our logics of historical genesis of creating a theoretical image of the object under study.

The address to creating the image takes place in the works of such authors as D.N. Zamjatin [13] and his followers (N.Yu. Zamjatin and I.I. Il'in) as well as in modeling geographical images of synthetic and interdisciplinary character in culture within the framework of humanitarian geography. By ‘geographical images’ the researcher meant “images of space developed by the culture under consideration”. Zamjatin wrote that “...any culture identifies itself through the series of various images (or images –archetypes. ... definite geographical images are the significant component of the culture under consideration, and the culture in general (taken in its highest abstract meaning) ... modeled and reconstructed geographical images are the part of the phenomenology of culture, and geography as a whole is the phenomenon of culture.” The researcher postulates “... geographical images are viewed as self-organized, quite an autonomous whole developing in contexts with different socio-cultural orientation”.

Within the socio-cultural perspective, V.G. Pantelev studied the regions through the concepts of “image” which are the reflections of socio-cultural values. Of particular interest is the work written by such researchers as N.A. Lukjanova, E.V. Fell and J.I. Siberce within the context of creating the future by means of images and models. In line with this work, the images “are understood as a premonition taking shape of some visual symbolic forms” and presented as synthesis of

“three models: the first is a functional model which allows the description of creating the future in a definite order. The second model can be presented as interrelation and inter conditionality of symbolic and cognitive elements dominating in the images of the future. The object of the third reflexive model is the cognitive processes creating the reality of subjects in the images of the future.” The intention of these authors to create the images of the future is highly appreciated. Of no less importance is their task to analyze the semiotic processes of creating the images of the future. Of particular interest is the work of A.P. Ogurtsov and V.V. Platonov in which the philosophical concepts of education are based on ‘images of education’. They reflect on the genesis of education images developed in philosophy of education in the 20th century. By ‘images of education’ the authors mean ‘initial images-intuitions’ which depict the educational process in a specific way and are a starting point in analyzing the processes and acts of education.” In analyzing the works devoted to this problem, we can note that there are many other explications of the concept of ‘image’. According to the dictionary by S.I. Ozhegov, the word ‘image’ is explained as a visual representation of someone or something” [14].

Among the works on humanities, we can find the ones which deal with the concept of “image”, “theoretical image”, “theoretical representation” or semantically close concepts referring to as central and basic categories of research: in pedagogy it is “a theoretical image of social education” (M.V. Romm and T.A. Romm), and “any social phenomenon manifests itself as a complex social and cultural historically conditioned phenomenon, i.e., the phenomenon, the true essence of which can be found by refusing to superficially state and define the objective theoretical and methodological grounds for creating its different theoretical images” [15]. In works on social culture, it is an “image of international terrorism” (S.N. Bulgakov) [16], in works on psychology – an “artistic consciousness” (S.A. An) [17], in works on social philosophy – a “theoretical image of personality socialization” (S.E. Il'in) [18], a “theoretical image of education” (V.V. Vihman) [19].

Further, we will discuss the theoretical images and various aspects of their modeling in the process of education phenomenon cognition. On the one hand, we will separate our research from other studies of images conducted in humanities and natural sciences, and on the other hand, we will emphasize the integrity, some wholeness of our methodological approach to this problem. In our opinion, the concept of “*theoretical image*” of the social phenomenon (education) studied in this paper is filled with the necessary essential aspects which allows touching all the scientific knowledge concerning the subject of cognition. In order to optimize the collection and processing of the data obtained, the procedure of theorization, namely “*the theoretical image*” itself, must be structured, possess strictly recorded indicators, characteristics, clearly outlined theoretical and methodological basis, special tools, mechanisms, etc.

Now we seize the overview of different explanations for the concept of “theoretical image” as an ideology to represent elements of social reality and give reasons why it was necessary to use this construct. We are supposed to provide the following arguments:

1. The social reality phenomenon possesses features and links which were formed through the historical genesis of its development, and each type of society has its own theoretical representation of this object of cognition.
2. The scientific approach has its own research lenses, concepts and categories as well as epistemological potential.
3. The social reality changes, develops and is learnt in the process of its understanding.

On this basis, the concept of “*theoretical image of education*” applied in this article is a generalized result of constructing its theoretical explications concerning its typical features and the potential of the scientific approach which are applied as a system unity. As a result of the fact that the concept of “theoretical image” is supposed to be examined in the research system of coordinates “diachronic of the way of theorization – synchrony of the scientific approach”, only the representation of the object under study built in the plane of these research “axes” will claim to be a whole construction.

The research axis “*diachrony of the way of theorization (theoretical images)*” allows us to follow the outline of the theoretical image of education when the changes of social reality in the continuum of society take place (historical genesis of cognition), and “*the synchrony of the scientific approach*” turn us to conceptual essential characteristics of this or that scientific approach, their methodological optics (value and essential basis of cognition).

In our case, the diachronic trajectory of theoretical objects of education is a way for a theoretical object to go in time changing due to the historical epoch. It should be noted that the features of all objects are inter-compatible and agree in such a way that any alteration or elimination of any of the components inside it causes the alteration or elimination of the whole system of abstract objects.

We can see two stages in the genesis of the theoretical image: offering a theoretical scheme (image) as a hypothesis and hypothesis verification. The development of a special theoretical scheme (image) is directly designed for solving a certain class of problems, whereas the general theory is based on the synthesis of already-existing special theoretical schemes. Being placed in a new net of links, taken from another field, the abstract object acquires new features. In this case, it is necessary to make the object fit a new system. Thus, the use of abstract objects from other fields for making new hypothetical schemes plays a very important role in the genesis of the theoretical image.

On the basis of the statements mentioned above, in the course of our investigation, by the theoretical image we will understand a special form of existence of a research object which differs from its real existence. In research methodology, this form of presenting an object (in the form of a certain theoretical scheme or image) was called an “abstract” or “ideal” object as opposed to a really existing and measured object which is called empirical or operational.

It also should be noted that in the research, the main purpose of an abstract object is to be used as an object according to

which special tasks are set and hypotheses concerning its elements and links between them are offered.

The abstract element plays a role of an “accumulator” of new knowledge as the newly-obtained data make it possible to enrich the initial theoretical scheme giving a proper depth and adequacy to the empirical object. In this case, a certain phenomenon, mechanism or relations serve as a theoretical scheme (research object). When studying theoretical issues concerning the phenomenon of education and developing its image, we view the cognition as “active thinking the basis of which is in operating with ideal objects”. These objects represent in mentality the objects of the investigated reality, their features and relations.

Echoing the researcher V.S. Stepin, we can state that, if one starts to think about knowledge theorization as the process of creating the system of the developed theoretical knowledge which is able to describe the object of cognition, then the theorization can be seen as logical correlation between different groups of elements and creation of the theory content from a set of statements and concepts, i.e., the primitive basis of the theory”.

IV. CONCLUSION

The explication analysis performed showed the following. The image as a representation of scientific reflections has a long historical content.

Based on our explication discourse, we note that the search for ways and samples of representation of theoretical knowledge is very heterogeneous. Nevertheless, despite this diversity, there is clearly a fundamental, unification of the concepts used: “image”, “theoretical image”.

As part of our further research, the concept of “theoretical image” becomes the main topic. We resort to it in order to set ourselves the task of forming a unified “representative” of theoretical knowledge and using it to reflect on the theoretical knowledge of the phenomenon of education. Unified “representative”, which in our case is the concept of “theoretical image of education” in our opinion, is a format that can be applied to the studied phenomenon of education to display its entire essence in a holistic projection. So what is the “theoretical image of education” for us?

Leading our discourse in the future, we will focus our research attention on the “theoretical image of education” in various aspects of its construction in the context of knowledge of the phenomenon of education — in order, on the one hand, to distinguish our research from the study of images in other branches of humanities and natural sciences, and, on the other — to emphasize the integrity, some “holism” of our methodological approach to the problem itself.

The given construct has not only the diachronic but also the synchronic background, i.e. “time characteristics”. The use of this construct makes it possible for the researchers of different scientific communities to interpret the peculiarities of socio-cultural being specific to the epoch and research field. Of no less importance is the fact that each image is subject –

interpretative from the position of both the researcher and the optics used in the course of image creating.

In our opinion, the concept of "theoretical image of education" is filled with all the necessary essential aspects, allowing a holistic coverage of scientific knowledge about the subject of knowledge. To optimize the work on the collection and processing of the data obtained, the procedure of scientific theorization, namely the theoretical image of education, should be structured, have clearly fixed indicators, characteristics, a dedicated theoretical and methodological basis, hardware and instrumental mechanisms, etc. We will make a convolution of the above statements about the concept of "theoretical image" as the ideology of representation of elements of social reality, in the context of the argument why there was a need to use this construct. As arguments for referring to the "theoretical image", we highlight the following:

1. The phenomenon of social reality has properties, connections, formed in the historical genesis of its development and each type of society has its own theoretical understanding of this object of knowledge.
2. The scientific approach has its own inherent research optics, conceptual and categorical apparatus, epistemological potential.
3. Social reality changes, is constructed and is known in the process of its cognition.

As a digression, but significant in fact in the context of this study will pay attention. The important role of imagery in the practice of teaching theoretical thinking is noted by L. Infeld, who in his work described the scientists, or rather the style of physical thinking of Faraday and Bohr "both Faraday and Bohr had a rich imagination and were endowed with brilliant insight. Faraday saw the lines of force of electric and magnetic fields, while for the rest there was emptiness... it is enough to hear Bohr once, to see the movement of his hands, the images and models that he reproduces, to understand that Bohr really sees how the atom is built, that he thinks images continuously appearing before his eyes.

Thus, on the basis of socio-philosophical analysis, in the general approach, *the theoretical image of a social phenomenon* is a representation of theoretical knowledge of the phenomenon under study which is expressed through considering its essential characteristics, contents, interrelations between abstract objects of ideal-typical character, semantically and graphically built, methodologically based in the process of its scientific cognition.

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