TRANSFORMATION OF SCIENTIFIC RATIONALITY IN THE AGE OF GLOBAL COMMUNICATIONS

[a]OLEH KUBALSKYI

[a]Dobrov Institute for Scientific and Technological Potential and Science History Studies of the NAS of Ukraine, 60, Taras Shevchenko Ave., 01032, Kyiv, Ukraine
e-mail: [a]o.kubalsky@nas.gov.ua

Abstract. The study substantiates the claim that the priority of scientific rationality in social life and the expansion of network communications, both in the scientific sphere and in society as a whole, intensify global communication processes between various agents – representatives of different disciplines and professional circles, science and society, science and government, etc. It is demonstrated that scientific rationality, as a reflection of basic cognitive, axiological, praxeological norms, rules of ideals of researchers' activities, is transforming from an isomorphic, exclusively epistemological phenomenon and methodological regulation into a polymorphic complex combination of communicative, social, moral, ethical or spiritual rationality and context-bound rationality. The new rationality is being formed in the practices of transdisciplinary research, the public sphere of science, and the moral and ethical discourse of our time. Along with cognitive, technical, and technological functions, it performs socio-cultural and humanitarian tasks.

Keywords: scientific rationality; global communications; communicative rationality; social rationality; contextual rationality.

1 Introduction

The distinct nature of modern social development is associated with the growing role of scientific knowledge, scientific information, and information and communication technologies. This is the reason why the current state has received a number of designations, such as "knowledge society" (Peter Drucker, Fritz Machlup), "information society" (Daniel Bell, Alvin Toffler), "network society" (Manuel Castells), and other. Without analyzing the differences between these views, it is worth noting the integral feature that is inherent in these conceptual approaches – namely, the priority of scientific rationality in social life and the expansion of the network communications space both in the scientific sphere and society as a whole. Science is becoming more complex and deeply embedded in society than ever before. At the same time, modern science is characterized by its interdisciplinary and transdisciplinary nature, which emphasizes epistemological uncertainty and the presence of risks regarding the ethical, legal, and social consequences of its developments. Therefore, global communication processes between various agents – representatives of different disciplines and professional circles, science and society, science and government, etc. – are intensifying, which in turn affects the change in the system of values, methods of justification and explanation of the most commonly used categorical apparatus, examples of successful career activities, i.e., everything that is part of the principles and norms of scientific rationality. Scientific rationality, like any phenomenon, has immutable, essential features, as well as those that are transforming and developing in accordance with the challenges of the times.

2 Materials and Methods

The purpose of the article is to reveal the specific features of the development of scientific rationality in the space of global communications of the transdisciplinary scientific sphere, the public sphere of science, and moral and ethical discourse.

The problem of rationality as a measure of reason in life and cognition is traditional for philosophy. In the Western philosophy of science, the issue of rationality occupies a prominent place; in particular, the following models of scientific rationality have been analyzed: inductivist (Rudolf Carnap), deductivist (Carl Gustav Hempel, Karl Raimund Popper), evolutionist (Stephen Edelston Toulmin), network (Larry Laudan), and realistic (Hilary Whitehall Putnam, William Herbert Newton-Smith). In Ukrainian philosophy, the problems of scientific rationality have been studied by Serhii Krymskyi [10; 11], Myroslav Popovych, Iryna Dobronravova, Mykhailo Boichenko [2, 23], Serhii Yahodzinskyi, and others.

In antiquity and the Middle Ages, rationalism was an alternative to mythology, mysticism, and religious worldview; in modern times, it was a counterweight to empiricism and sensualism, appealing to the mind capable of rigorous logical reasoning, as well as analytical and synthetic activity. Serhii Krymskyi emphasized that in the modern and contemporary era, rationality is not limited to only signs of logic, but includes, in addition to methodological guidelines, epistemological and worldview principles that are oriented towards the modern scientific picture of the world, recognizes truth as the highest scientific value and is optimistic about its search, provide for theoretical and practical verification, while not excluding Socratic irony and self-critical analysis of theses in a dialogue with an opponent, and also addresses issues of efficiency, balance, technological feasibility, and expediency of human activity [10; 11]. This diversity of approaches is due to the difficulty of substantiating the concept of "rationality". For example, Ukrainian researcher Larysa Ryzhko writes: "…rationality is understood as something that is identical to reason, or the reasonable. But "reason" or "the reasonable" does not exist as a certain substance or something independent, but is closely connected with other human qualities, in particular, feelings, as well as all human activity, or rather human being" [19].

The general methodological basis of the work was the categorical apparatus of concepts, ideas, and methods formed within the framework of the philosophy of science. In particular, the study uses logical and historical methods in the conceptual analysis of the phenomenon of scientific rationality. The ideas and principles of the systems approach are also applied to the understanding of rationality as a multifaceted form of cognition. The theoretical basis for the study is the research tradition of analytical philosophy.

3 Results and Discussion

In contemporary research, the search for new approaches to understanding rationality has become imperative - in particular, the rationality that would become an affirmation of spirituality and would contribute to the accession to the higher meanings of human existence. The new rationality concerns various kinds and types of human activity: scientific, artistic, and practical. It is important to expand the range of value characteristics of scientific knowledge. Thus, it is evaluated for truth and falsehood, good and evil, right and wrong, beauty and ugliness, etc. Serhii Krymskyi argued: "Generalized rationality today can be explained as being guided by the measures of reason, the ability to make motivated choices (decisions, opportunities, actions, alternatives) in accordance with certain threshold (dimensional) or normative (qualitative) constraints that can be formulated as a certain system of rationality principles" [10; 11]. Therefore, rationality also becomes a topic of moral and ethical discourse.

Scientific rationality, like science in general, is a historical phenomenon. At the same time, each historical stage of its development is characterized by a special type of scientific rationality. Scientific research, as well as its main goal – scientific truth – are no longer indifferent to human existence, they are embedded in it, multivariate in their totality, and the source of their development is the dialogue between subjects of cognition, between cultures, between representatives of different scientific fields, schools and networks [12; 13; 14]. Therefore, the basis of the development of science and culture in general is the principle aptly expressed by the famous German philosopher Hans-Georg Gadamer: "To support the dialogue in every possible way, to give the dissident a chance to speak, to be able to assimilate what he proclaims" [4].

The need to actualize cultural, historical, philosophical, and anthropological dimensions of rationality, as well as to overcome the limiting principle of eliminating personal and

instrumental factors from the process and results of cognition is noted by Ukrainian scientist Volodymyr Melnyk. At the same time, he emphasizes that "the purpose of philosophy is that it does not claim to be only a function of the scientific reason, but, giving rise to the philosophy of existentialism, should serve as a synthesis of rationalism and cognitive existence" [16]. Therefore, science, being a purely human activity, is one of the immanent possibilities of existence and at the same time a "free choice" of the way of being. The philosophical understanding of science is also a conceptualization of one of the possibilities of human existence, a person's interpretation of oneself and the outside world [16].

The philosophical analysis of science and scientific methodology should become a major factor in shaping social rationality. Such a consideration will be useful for understanding the transformations of scientific rationality in connection with its functioning in the age of global communications.

The interactions of scientific and social rationality are primarily necessary in addressing the global challenges of our time, such as climate change. Japanese researcher Yuko Fujigaki recommends to distinguish two meanings of such interaction: "one is interaction between researchers and citizens (science and society), and the other is interaction between natural scientists and social scientists (among disciplines)" [3]. He focuses attention on the risks of global climate changes (GCC) and the necessity to manage these risks. Fujigaki proposes to classify "three types of understanding on GCC: (A) understanding of the mechanism of GCC, (B) understanding of the effect of GCC, and (C) understanding of the countermeasures" [3, p. 369]. As a conclusion oh his research Fujigaki states that "GCC risks are characterized as distant threats, and they cannot be perceived as urgent problems by citizens when compared to other risks. In designing citizen deliberation processes to empower social rationality, it is necessary to consider these points" [3, p. 374]. Deliberation process, according to Fujigaki, should involve three groups of participants in relevance to three types of understanding on GCC: natural scientists, social scientists, and citizens: first "tend to divide value-free statements and value-laden statements, whereas social scientists tend to consider that every statement includes value judgements… while citizens think that experts are not neutral, because they see natural scientists as putting more value on GCC risks than other risks" [3, p. 369]. We can see that such dividing is not perfect: natural scientists are looking for not only reasons, but consequences too, social scientists are specialists only in social effects of GCC, and citizens are most concerned with consequences, but do not clearly understand the connection between causes and consequences. In order to overcome the one-sidedness and incompleteness of the approach of each of the groups, Fujigaki considers to turn to an open rational discourse between them. It is indeed rational proposition, but it should be taken into account that here we trespass to the communicative rationality as quite different type of rationality [3].

The philosophical interpretation of the possibility of communicative space is presented in the concepts of communicative rationality by German philosopher Jürgen Habermas. Habermas considers rationality as an element of social rather than cognitive theory, in which communicative reason or communicative rationality arises through interpersonal language communications [6; 7]. The main goal of language communication is determined by universal pragmatics – mastering language competencies to achieve mutual understanding.

Habermas' theory of communicative action is based on the concept of social system (Nicklas Luhmann), developmental psychology (Jean Piaget, Lawrence Kohlberg), and social theory (Max Weber, Emile Durkheim, Talcott Parsons, George Herbert Mead, etc.). However, as British philosopher Adrian Blau emphasizes, his predecessors focused on criticizing rationality as a search for the best means to achieve goals.

Instead, Habermas developed a broader typology of rationality, distinguishing instrumental, strategic, and communicative rationality. Instrumental rationality is aimed at finding the best means to achieve goals that will lead to success. Communicative rationality is aimed at understanding and agreement. Instrumental rationality is egocentric, in contrast to communicative rationality, which is sociocentric and becomes the basis of moral discourse. Habermas also distinguishes between real and strategic discussion. In a genuine discussion, participants strive for mutual understanding and agreement and use communicative rationality. In a strategic discussion, at least one participant tries to win, even by resorting to manipulation or threats, and uses strategic rationality. Strategic rationality is the search for ways to win over the interlocutor rather than to achieve true understanding and agreement. Thus, communicative rationality, as interpreted by Habermas, can become a tool for the development of modern science, which is focused on solving complex problems of our time and responds to the challenges facing humanity.

In contrast to Habermas, Blau insists that "Habermas and many critical theorists caricature means-ends rationality (the ability to pick good means to ends), e.g. by wrongly depicting it as egocentric… I suggest that sincerity and autonomy, rather than non-egocentrism, are the key distinguishing features of communicative rationality. This shows that communicative rationality actually overlaps with means-ends rationality" [1, p. 321].

Contemporary scientific rationality serves the research conducted in response to requests from the economic, social, and political spheres, i.e., with practical goals and specific requirements for results. Such research combines interdisciplinary theoretical knowledge with engineering knowledge and even with the practical knowledge of scientific products consumers [2]. This creates a transdisciplinary field of interaction and communication between different agents. The range of knowledge production institutions and carriers of scientific rationality is also expanding. Whereas traditionally scientific knowledge was produced in universities and research centers, now industrial laboratories, government agencies, think tanks, and consulting agencies are also involved. This creates transgressive institutions that interact and communicate with each other. An important aspect of their activities is reflexivity, which means social responsibility for the consequences of their professional activities. The latter implies expanding the range of expert assessments and developing new forms of quality control. In particular, disciplinary review criteria are supplemented by social, cultural, economic, and political criteria [17]. Thus, the disciplinary criteria for evaluating research are expanded to include transdisciplinary criteria that are necessary for the practical use of knowledge. This is also due to the fact that such research is usually organized in the form of projects [8].

The expanded quality criteria do not allow for rigorous and unambiguous assessments, which were possible with disciplinary standards. However, this does not mean that the standards are lowered, but the emphasis is shifted to the criteria necessary for the use of knowledge in the practical sphere. The departure from disciplinary evaluation criteria does not simply indicate the politicization of research, but is due to the specifics of the organization of project-based research [5, 419]. For all their practical usefulness, such studies are contextual in nature, intended to be used in very specific situations, for example, for decision-making. This suggests that scientific rationality may depend on a particular context, in other words, rationality may be context-dependent, similar to the concept of bounded rationality [21].

The basic idea of the concept of bounded rationality is that human rationality is somehow limited by factors such as incomplete knowledge and data, time for decision-making, etc. If we do not take into account all these limitations, actions and decisions can be considered rational, but if we resort to abstract, idealized rationality, they may seem not fully rational or even irrational. However, from the perspective of a specific context, such as a project, they will be the best or rational knowledge.

Ukrainian philosophers Olha Ruptash and Tetiana Radzyniak observe that transdisciplinary research differs from disciplinary research in that it emphasizes the significance of communicative rationality as the foundation for effective communication and collaboration among scientists and stakeholders who are interested in the outcomes [18]. At the same time, Habermas's theory is considered fruitful for normalizing the practice of transdisciplinary research, which is mainly organized as the implementation of interdisciplinary projects in which non-scientific agents – business, society, government, etc. – are directly interested. Therefore, the communicative actions of all participants in the scientific process and those interested in their results determine the distinctive nature of transdisciplinarity in science. Communicative rationality implies the universal human ability to make common decisions and adhere to common norms [23]. Communicative rationality allows explaining the methodology of transdisciplinary research and its intersubjectivity much better than teleological or instrumental rationality. At the same time, it requires understanding, searching for forms of meaning transfer between communicators. Another problem is the equality of communication subjects, the recognition of their freedom and responsibility. At the same time, transdisciplinarity requires special approaches to communication processes. In particular, cooperation does not imply a prior search for common ground, because research outside the disciplines can open up a new understanding of the object. Instead, “active speaking” and “active listening” of research participants are crucial. These are the foundations of transdisciplinary dialog that form the space of new meanings [18].

One of the manifestations of communicative rationality, which is related to the transformations of scientific rationality, is attention to scientific communication in society. This phenomenon is commonly referred to as “popularization of science” in the research literature. Scientific communication has important social functions.

In modern democratic societies, one of the factors of successful development of science is public understanding of the importance of the scientific sphere, which is manifested in the existence of consensus on priority areas of socially important scientific research (such as climate change, energy, security issues, etc.), the existence of a sufficient level of scientific literacy, the prestige of scientists' work, and the value of education. These important aspects of social development can be shaped by a network of scientific communication. There are several main goals of science communication: informing, enjoyment, interest, formation of beliefs and understanding of science. But it is some problem for researchers: “While scientists are trained to be rational thinkers who emphasize knowledge acquisition and empirical evidence, they are usually not trained in skills required to be effective communicators” [20, 403].

Historically, science communication has been based on the assumption that there is a knowledge deficit in society and the need to overcome ignorance. Nevertheless, scientists performing the function of communicators with society face a number of challenges, primarily related to their professional training, since courses on public science communication are usually not included in training programs. It is considered expedient to focus directly on professional subjects. However, there is evidence of the positive impact of having a broad outlook and communication competencies on researchers' careers. In particular, “media coverage of journal publications, for example, has been linked to increased citation numbers, and the number of Twitter mentions is correlated with higher h-index scores, a measure of research productivity” [15, 779]. Thus, the expansion of a scientist's publicity has a positive impact on professional performance.

It is important to note that scientific communication is complicated by the presence of a superior attitude among researchers towards the public, the scientists perception of general public as representatives of “others”, who are often perceived neutrally and sometimes even negatively: “Outside of views toward social sciences, the extent to which scientists view a knowledge deficit in non-scientific audiences is inextricably connected to their perception of who “the public” is” [20, 405]. These attitudes separate scientists from other members of the public, creating an “us-them” dichotomy. The latter means the formation of elitist tendencies and contributes to an unequal hierarchy of power, in which scientists view themselves as special and somehow superior to other members of society. This can result in limited meaningful interaction and communication between scientists and the public or even in its cessation. On the contrary to this, Simis and co-authors suggest that “A comprehensive normative reflection on the goals of science communication would serve scientists, science communicators, and science communication scholars well” [20, p. 411].

However, the competitive environment of modern science, as well as the requirement for the practical implementation of scientific results, lead scientists to expand their own public space and develop scientific communication channels. In accordance with the already familiar patterns of scientific communication, which were intended to promote public understanding of science and public involvement in science, a new one is emerging – aimed at developing strategic science communications. Strategic science communications pursue instrumental goals, such as building reputation or creating an image, rather than disseminating scientific knowledge. The need for strategic science communications is driven by the requirements of scientific institutions and individual scientists, who, in a situation of growing demand for resources, need more public communication to attract external funding, obtain positions, and promote their scientific results. It is some advantage of social and humanitarian sciences over natural sciences: “With regard to the work situation, the results suggest that those who perceive intense competition and high pressure to obtain external funding are more likely to have internalized the Strategic Science Communication model. Moreover, the greater the discrepancy between the desired time for research and the time actually available for research (due to teaching commitments and administration), the less they have internalized the need to communicate strategically. Finally, humanities, social sciences, life sciences, engineering scholars and scientists from other fields are more inclined to the Strategic Science Communication model than natural scientists” [9].

With the development of practices of public engagement in science, which involves public participation in scientific discussions, formulation of science policy, science governance and dissemination of public science projects, the range of science in which the public can participate is constantly expanding. The public is also actively involved in science communication, not as an “active audience” but as an active “communicator” in the digital environment. However, there may be problems related to the traditions that have emerged and are based on the principles of classical science. For example, in China, there is a tension between public science communicators who want to be actively involved in science communication and professional scientists who do not want to give up this role. Although China has a tradition of involving professional researchers in science popularization, this has changed with the proliferation of digital platforms. Thus, it is necessary to reassess the understanding of the role of science communicators and the relationship between scientists and the public in the process of science communication in the digital media world. Recent research shows that in China, the public is not only enthusiastic and motivated to communicate with science, but also successfully participates in the digital media environment. The Chinese researcher Zheng Yang resumes: “At present, in the context of China’s rapidly developing digital media environment and the growth of citizens’ scientific literacy, although Chinese scientists still try to maintain their exclusive legitimacy as science communicators, the Chinese public has been challenging the position held by traditional scientists. Therefore, a struggle has formed between Chinese scientists and the public over the legitimate role of science communicators in the Chinese online field” [22, 360]. Such processes generally reflect current trends towards openness, inclusiveness, and participatory nature of

science. This is manifested in the spread of the ideals and practices of Open Science and Citizen Science. This also indicates further deepening and intensification of communication processes between science, the public, government, etc.

4 Conclusions

It has been revealed that scientific rationality, as a reflection of the basic cognitive, axiological, praxeological norms, rules of ideals of researchers' activities, is transforming from an isomorphic, exclusively epistemological phenomenon and methodological regulative into a polymorphic complex combination of communicative, social, moral, ethical or spiritual rationality and context-bound rationality. The new rationality is being formed within the practices of transdisciplinary research, the public sphere of science, and the moral and ethical discourse of our time. In addition to performing cognitive, technical, and technological functions, it also fulfills socio-cultural and humanitarian tasks.

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