

Research article

Ethical and Axiological Problems of Involving the Public in a Social and Humanitarian Assessment of the Risks and Consequences of Modern Science

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Abstract. This article focuses on the urgent philosophical and methodological issue of organizing effective social control over the development and implementation of modern technoscience. The relevance of the topic is caused by the fundamental transformation of science associated with the strengthening of its production and its technological and socio-administrative functions to the detriment of its humanistic components. The intensive expansion of technoscience into all spheres of human existence inevitably increases its risky nature, which necessitates a transdisciplinary understanding and orientation towards traditional human values: truth and good. An effective mechanism of social reflection on the achievements of technoscience is a socio-humanitarian examination, which attracts not only the elite scientific community but also social institutions, public organizations, and many volunteers — non-professional examiners who realize the ability of creative self-organization and insights in order to improve its adequacy. Various world practices of involving the public in the discussion of the ethical acceptability of research in modern technoscience were studied. Ethical and axiological problems associated with the participation of society in the development and humanization of modern science were thereby identified.

Keywords: philosophy of science and technology, modern science and society, socio-humanitarian examination

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1. Introduction

The relationship between society and science has been exposed to discursive and program shifts for many decades, which has been reflected in the commentaries of the philosophers of science and technology, and in the policy of building these relationships. Since the second half of the 20th century, in connection with the introduction of new technology into medical practice and the formation of a mechanism for ethical and legal reflection of these innovations — bioethics, there has been a tendency to change the model of relationships between science and society: from the paradigm of unconditional acceptance to scientific literacy; then to the paradigm of understanding science by


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the public; and finally to the idea of responsible research and innovation. In modern philosophy and sociology of science, the possibility of different interests and values of many actors, intersecting in the issue of using science and innovation, is allowed, which naturally requires expanding the space for society to participate in discussing socially significant problems [1].

2. Methodology and methods

Applying a comparative analysis of real experience, the relevance of the main provisions of the Russian socio-humanitarian examination to foreign approaches and programs (such as Responsible Research and Innovation, Social Assessment of Technology, etc.), determining the ethically acceptable outlines of modern technoscience, was established. To perform this task, research by American, Western European, and Russian philosophers of science and technology, empirical material of Russian and foreign sociology of science, which records the results of public reflection of the achievements of technoscience, analyzes opinion polls and expert interviews on the problems of socio-humanitarian expertise, was studied. Based on the analysis of the studies on the ethical aspects of modern technoscience, the gaps and shortcomings of the existing methods and techniques of socio-humanitarian examination were identified, and examples of successful communication between science and society were demonstrated in order to increase social trust in modern technoscience and reduce its riskogenics.

3. Results and Discussion

The sociology of science has long been studying the levels of public involvement in making any decisions about new technology. In 1969, Arnstein presented the “ladder of citizens’ participation” [2], in which she identified 8 steps: manipulation, therapy (when, in fact, there is no real public participation, only a slight increase in the level of literacy). By the way, in Russian medical practice, up to the end of the 20th century, the “paternalistic model” was also the most widespread. In it, on the one side, there was a physician — an expert in his field, an indisputable authority who took upon him/herself the solution of all the patient’s problems — patronizing, caring, responsible; on the other one, there was an ignorant passive patient, whose opinion was usually not asked. The next three steps Arnstein calls “levels of symbolic gestures”: information, consultation, appeasement. The purpose of informing is to unilaterally notify citizens of the experts’ decision. This approach is also called the “deficit model” in relations [3]; its meaning is

to inform society (the completeness of information is determined by decision-makers) in order for the latter could accept new achievements of science and technology. The issue of the amount of information has caused heated debates in the Russian medical environment, in connection with the formation of the rule of “informed consent” in bioethics, which was ultimately included in the Federal Law On the Fundamentals of Health Protection of Citizens in the Russian Federation (as amended effective of July 24, 2015).

At the stage of consultation, citizens can provide experts with the necessary information; at the stage of appeasement, they can advise experts on solutions without the ability to insist on what is preferable for them.

The three subsequent steps are partnership, delegation of power, and civil control; according to Arnstein, they are levels of civil power where the public has a decisive voice or completely controls the process, which contributes to the formation of a dialogical (or collegial) model of relationships.

In their conceptual idea of progressive levels of public involvement in decision-making, Rowe and Frewer distinguish communication with the public, consultations with the public, and public participation [4].

Felt presents the development of models of “science-society” relationships since the end of the 20th century: Information politics and monitoring of citizens (1989) → Raising awareness of science and technology (late 1990s) → Dialogue, participation and governance — Science and society (from early 2000s) → From science *and* society to science *in* society (2007-2013) → Innovation union 2020: Responsible research and innovation (horizon 2020) [5; 6]. Science and technology studies criticism of these models helped drive the shift in both scientific discourse and public consciousness from rather simplified models of public understanding of science to more integrated models of public participation or joint management that focus more on the factual relevance of science and technology for a wide range of participants in this interaction [7; 8] and for the reflective and proactive management of technoscience in society [9; 10; 11]. In 2010, the Forum on the relationship between science and society of the European Science Foundation (ESF) member organizations was organized. A platform for the exchange of information on practices, experience, and policies was created, which, according to the organizers, should lead to joint activities, to acquaint with the methods, techniques, and tools used by ESF member organizations to develop and manage the relationship between science and society. Forum results are presented in the ESF report of 2012 [12].

Let us pay attention to a detailed analytical review of 235 articles selected by the authors in EBSCO and Google Scholar, which reflects the definitions and conceptual dimensions of the approach of “responsible research and innovation” (RRI), which has become widespread in recent years [13]. The authors note that back in the 1970s, the foundations of RRI were laid in bioethics, which was initially focused on attracting laypeople to solving ethical dilemmas, and then was institutionalized through the development of the institution of ethical committees. The specific character of the RRI approach is determined by the following features: inclusion, anticipation, responsiveness, reflexivity, sustainability, and care. “Inclusion aims at engaging different stakeholders in the early stages of research and innovation”, <...> “anticipation is a conceptual dimension that aims at envisioning the future of research and innovation and understanding how current dynamics help design the future”, <...> “responsiveness is linked to risks: the probability of the occurrence of an event multiplied by the magnitude of the cost of that event that new technologies may bring about”, <...> “reflexivity has been linked to public dialogue, science and public collaboration”, <...> “sustainability often refers to the so-called resource-efficiency of new products”, <...> “care is the dimension that belongs to the public domain so that citizens by themselves are responsible for the decisions and actions carried out on their behalf” [13, p. 9-13].

At the end of the 20th century, the direction of technology assessment emerged [14; 15]. Guston and Sarewitz substantiated the collaboration of natural and engineering research with social sciences and political research, which is called “real-time technology assessment”. Technology assessment can be broadly characterized as a type of participation that discusses problems and issues regarding the relationship between technology and society [16]. Citing a number of authors, the review provides options for understanding and defining technology assessment and discusses other programs that study the ethical, legal, and social aspects of science and technology development in Europe and the United States (ELSA and ELSI) [17; 18; 19], as well as argues that practical implementation of the concept of “responsible innovation” turned out to be very problematic [20].

Involving the public in scientific research is now becoming one of the most pressing and controversial issues in scientific communication and policy. According to Bauer, editor-in-chief of the scientific journal *Public Understanding of Science*, which has become an authoritative platform for discussing this topic, the main goal of such social participation in science is to avoid the constant technocratic temptation when decisions are made by narrow groups of experts.

Attention should be paid to the fact that in academic texts and political documents, two closely related terms “public participation” and “public engagement” are used. The Norwegian scientists Delgado, Kjolberg, and Wickson note that from a linguistic point of view, the word “engagement” implies something closer to generating interest, and the word “participation” means active participation; however, it is not clear if in the literature there is such a distinction. It can be assumed that today the term “public engagement” is more preferable, and this is due to the emergence of such a term as “upstream engagement”, which is increasingly used in connection with nanotechnology. Therefore, public engagement can be attributed both to the need to generate interest in the early stages and to more intense forms of participation [3]. At the same time, it is appropriate to distinguish these concepts according to the degree of emotional interest in the results of the process of interaction between science and society. In this sense, “participation” of citizens can be organized “downwards” in formal consensus conferences, focus groups, citizen juries, and public consultations while “engagement” is characterized by deeper immersion in the problem and can manifest itself in the form of protests, lobbying, or mass campaigns.

The journal *Public Understanding of Science* Volume 23, No. 1 for 2014 published a selection of articles devoted to a consistent and not yet completed shift in the relationship between science and society from a “deficit model” to “understanding” and then to “engagement” of the public in science, policy analysis in this direction, discussion of new forms of involving society in science, in particular, the “hard way” of engaging the public in China [21; 22; 23; 24; 25].

Another issue requiring discussion is who should be involved in decision-making in the field of new technologies. There is an opinion that the public will wish to participate in decision-making whenever the opportunity arises. However, research by sociologists of science shows that this is not entirely true, and addressing the public is controversial. Since Jeff Howe named the phenomenon of attracting non-professionals to solve interesting problems, to make interesting observations, or to make predictions “crowdsourcing” (Eng. “crowd” plus “sourcing” — resource use) [26] in June 2006, this social technology is often used to achieve various goals in science and politics [27]; however, crowdsourcing projects are not without drawbacks. As noted by Kretov and Tegin, such projects are poorly controlled; in danger of being directed not by the most intelligent, but by the most active; “noisy” and “littered” with completely useless information. In addition, the energy of people who trust each other within the community can easily be redirected to destructive goals, such as fueling “color” revolutions, controlled chaos, organizing terrorist attacks, or the collapse of the financial

market. Further, conducting a constructive scientific discussion within the framework of the crowdsourcing community is quite problematic; it is possible with a limited number of participants who are able to hear each other and respond “online”. That is, there must be a person or a group carefully filtering ideas, which is also very difficult.

With the spread of digital technologies, another type of citizen participation in scientific research is emerging. Such projects are called “citizen science”, “citizen-initiated”, “participant-initiated”, “collaborative”, or “participant-focused” projects, that is, “participant-led research” [28]. The term “citizen science” encompasses a variety of projects in which members of the public are involved in scientific activities, ranging from minimal participation, such as observation or data recording, to more radical forms that free biomedical research in part or in whole from its traditional associations. Let us note that in different countries, such a “folk science” arose at the beginning of the 20th century in the mass movements of radio amateurs, who made a significant contribution to understanding the mechanism of propagation of radio waves in the Earth’s atmosphere. An equally important role in science was played by the communities of amateur astronomers, who discovered a huge number of small bodies in the Universe. The researchers Fiske, Del Savio, Prainsack, and Buyx, analyzing the organization and results of the participation of non-professionals in biomedical research, draw attention to the benefits of such research for the health care system, and the possibility of circumventing traditional ethical and legal requirements for conducting scientific research testing (obtaining informed consent, maintaining confidentiality, protection from undue risk and harm, etc.). Rasmussen defined the problem of the ambiguous incorporation of ethical norms of traditional medical research into citizen science as an “ethics gap” [29].

The article by Vayena and Tasioulas gives examples of numerous experiments that people carry out on themselves, record the results, and publish in professional journals. In ethical terms, the problem is that these studies have not previously undergone ethical examination and can be dangerous for the participants themselves, not to mention the quality of self-observation and interpretations of their conditions [30].

At the same time, the German researchers Scharrer, Rupieper, Stadtler, and Bromme, on the basis of their own research, show that an expert decision on serious scientific issues cannot be adequately substituted by the opinion of laypeople. Moreover, ordinary consciousness, as a rule, is limited, prone to simplification and distortion of information, which must be adapted to one’s own understanding, values, and personal interests, with unlimited confidence in the correctness of one’s own judgments and assessments. The researchers warn that due to the inability of laypeople to realize the incorrectness

of their knowledge, it is possible to make wrong decisions with negative consequences [31].

Sociologists of science, having interviewed several social groups, found out the degree of public awareness of the success of new technologies and the level of willingness to participate in decision-making regarding their application. In 2006–2007, a Dutch professional marketing agency asked 1,056 people aged 18–65 (ordinary citizens, celiac patients (gluten intolerance), and experts) to describe their involvement in genomic research in terms such as “reading about them”, “talking about them”, “searching for information about them”, “attending public events”, and “actively participating in discussions on genomics”. The results of the study showed that the general public was more passive compared to experts and patients. Therefore, the authors of the study recommended that the government focus on pluralistic models of public relations with science and take into account the diversity of groups and interests when organizing public participation actions. Similar studies are being conducted to study public opinion on the use of stem cells, GMOs, nanotechnology, artificial intelligence, unmanned vehicles, and many other topics [32; 33; 34; 35; 36]. A similar study was conducted in 2014 at the Department of Philosophy and Sociology of Southwest State University (Kursk, Russia). The survey involved students from Kursk universities and a group of leading Russian experts-scientists. The sociologists have identified a high level of awareness and interest in relation to the convergence of nanotechnology, biotechnology, information technology, and cognitive science (NBIC). At the same time, the overwhelming majority of the respondents (90%) believe that the development of NBIC technologies should be preceded by socio-humanitarian understanding [37].

At the same time, it should be emphasized that the rapid development of technology through information collection technologies is often accompanied by an invasion in the private life of any person and can cause total control of citizens [38]. The private data collected in a semi-legal way through banking and marketing screening increasingly become a commodity, which cannot but cause a sense of protest and necessity for legal and ethical assessment and development of social and state regulators for the harmonious development of digital marketing.

4. Conclusions

Modern science, armed with the fantastic possibilities of converging technologies, has reached a risky line, beyond which there is an irreversible change in the nature, body, and psyche of humans. If at the beginning of the 20th century, the period from a

fundamental discovery to its real implementation could take decades, making it possible to repeatedly check, slowly ponder its possible consequences, and, as in the case of nuclear energy, to have time to put it under the control of society, now understanding a discovery may lag behind, or not take into consideration some latent, delayed effects. This situation, with a previously unprecedented urgency, raises the problem of the need for public ethical control over scientific and technological progress.

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