TRANSFORMATIONS OF MORAL RESPONSIBILITY OF A SCIENTIST IN THE WORLD OF MODERNITY

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***Keywords*:** *ideal of a scientist, type of scientific rationality, classical science, non-classical science, post-non-classical science, personal responsibility, social responsibility, risks and hazards.*

Introduction

The idea of moral responsibility of a scientist is objectively built into the Western culture since the epoch of the Scientific Revolution of Modernity. The demand of personal scientific integrity of a scientist was called by the scientific community to prevent data fabrication and unfairness in research. Current impetuous transformations in the world were provoked and conditioned by contemporary scientific and technical progress. They compel to revise traditional value foundations of a scientist's activity by character and quality of transformations. Research fairness and honesty of scientists are not enough for research in the light of estimation of their activity in the creation of nuclear power plants and the checkout of nuclear weapons, genetically modifies organisms and chemical food additives.

The *object* of research is moral value of responsibility in the field of science of Modernity. The *purpose* of the article is to expose qualitative transformations of moral responsibility and changes in comprehension of the idea of responsibility by a scientist and a society during last centuries and especially in the 20th century, the second half of which is usually called Late Modernity (Giddens, 1995). The methodology, based on A. Giddens differentiations of Modernity and Late Modernity are used. The *objectives* of the paper are: (1) to expose contents of transformations of the idea of responsibility in the field of science in Modernity; (2) to show the qualitative changes in scope of moral responsibility in the risk society of the Late Modernity; (3) to outline a charge in responsibility and to differentiate value dimensions of its actualization in the contemporary world.

Methodology

Scientist's responsibility is conditioned by the development of scientific knowledge. That is why transformation of the idea of responsibility in the culture of Modernity has to be observed in the context of development of scientific knowledge. It is necessary to outline types of rationality and show general principles of scientist's activity within each of them.

There are three types of scientific rationality: classical, non-classical, and post-non-classical, according to the specific content of scientific activity within each of them. Changes of types occur in such a way that previous stages are neither destroyed nor disappear, but only loose their dominant status. Regulations of changes of scientific values were exposed by American historian of science Thomas Kuhn. His theory of scientific revolutions reveals logics of changes of paradigms (pictures of the science) and gives definite scheme of dynamics in value orientations of a scientist at different stages of development of scientific knowledge. The start of classical scientific rationality was given by discoveries of Isaac Newton, and marked by the foundations of classical science in the 17th century. The stage ended in the second half of the 19th century when the development of sciences exceeded resources of mechanical picture of the world. Ideology of the classical science was represented by Francis Bacon and Rene Descartes. Bacon by his revelation that knowledge is power declared that science and scientific knowledge are able to give the humankind many benefits and improve its life. Descartes introduced the theory, according to which the world is the mechanism operating at the base of causality. Thereafter, a scientist is a naturalist directed on observation and experiment. Believing in power of knowledge unconditionally, a scientist has to be directed on permanent search of truth and discovering the secrets of nature.

Results

A scientist as a truth hunter and a knowledge keeper is responsible for data reliability. His colleagues-scientists expect scientific fairness and integrity from him. Scientific objectivity and integrity as well as truth, authenticity, validity and probability were respected by the scientific community and constituted the principles of scientific activity. Such values as good and evil, justice, not causing harm were beyond science. Impartiability, "value (ethical)

neutrality" of the research and striving for purity and blemishedness of scientific search (scientific purism) became basic values of a scientist. Impartiability is a special social position which means that a scientist can be connected with the production of new knowledge, but not with results of its application. According to such position, attention of a scientist has to be concentrated only on scientific value of his activity. He has to avoid moral appraisals, exclude doubts about social responsibility to use knowledge received. American sociologist Robert Merton quoted typical statement of an indifferent scientist in his research of scientific knowledge: "It is not the business of a chemist who invents a high explosive to be influenced in his task by considerations as to where his product will be used to blow up cathedrals or to build tunnels through the mountains" (Merton, 1938: 329).

The rise of the non-classical type of rationality (1905-1930s) was connected with the quantum-relativistic revolution. Non-classical science came into being with the developing of the theory of relativity (A. Einstein) and quantum mechanics (N. Bohr, W. Heisenberg). Non-classical science accepted such value orientations, according to which responses of nature to questions put by scientists are defined by arrangement of nature: as well as by statement of a question, which depends on historical development of cognition activity. Such position allowed revisiting classical idea of the subject of cognition. Subject was no more distanced from the world he cognized but was within its substance, it was determined by the world cognized.

The principles of relativity (Einstein), complimentarity (Bohr), indeterminacy (Heisenberg) were enunciated within the non-classical science. These principles provided implementation of a scientist in the science itself. Importing of "human factor" to research gave scientists "anthropological prospects" and promoted formulation of the anthropic principle in non-classical science. It became a kind of the meta-principle, which included the subject to the structure of scientific knowledge.

The anthropic principle did not abolish scientist's orientations on values of classical rationality. It was actualized side by side with existed principles. Objectivity, fairness, scientific integrity forwarded nuclear physicists on laboratory experiments and later on industrial experiments. That is to say, quantum theory was transmitted from laboratory experiments to the world inhabited by people and turned into programs of nuclear weapon manufacturing. Thus, justification of nuclear weapons use was started with the support of ethically neutral

orientation of classical science on scientific curiosity and maintenance of validity of the experiment. British philosopher Stephen Toulmin defined spiritual climate of the epoch, the essence of the purism in science of that period: between the world wars, in the period of flourishing of non-classical science, professors and senior researchers tried to focus their attention at value free sector of science, where they could be free in their search from any moral obligations (Toulmin, 1979: 28).

Further events demonstrated the real price of ethically neutral science. Merton mentioned: “Precisely because scientific research is not conducted in a social vacuum, its effects ramify into other spheres of value and interest. Insofar as these effects are deemed socially undesirable, science is charged with responsibility” (Merton, 1938: 332)**.** That is, any scientific research is accomplished in the world inhabited by people. Under this circumstance the science proves to be responsible for the ways in which knowledge is applied and influences further on the life of a human being and society. Merton wrote these words in 1938 when the interest to nuclear fission was restrained only by insufficient technical capabilities to apply theory in practice. At further editions of this paper Merton stressed increasing concern of scientists over applications of their theoretical ideas to practice. It was the obviousness of responsibility for application of theories in the world of people that provoked social and political activity of scientists. Einstein and Bohr were involved in the struggle for peace and disarmament. In 1955 the world-known scientists initiated the movement for peace, disarmament, international safety and scientific partnership at the Conference in Pugwash (Canada), the so-called Pugwash Movement. Speaking as private persons and not as representatives of countries or state institutions, the leading scientists of contemporaneity carry out work to unite efforts for search of optimal solving of questions concerning arms control, reduction of nuclear, chemical and biological weapons, sustainable development and international collaboration.

Unavoidable shorting time of forthcoming disaster made scientists to comprehend their responsibility for its promotion by the only their ethically neutral curiosity. Exactly then the scientific community had to accept anthropic principle of non-classical science as the regulative idea of scientific search. The Pugwash Conference was initiated by the Russell-Einstein Manifesto (1955), the document, which articulated the urge of scientists towards responsibility for peace and disarmament. This component exceeds the limits of pure

ethically neutral science in theory as well as in practice. It actualizes human-measured ethical value of science and scientific search in the context of values of a human being and the society, their destiny and further development.

The society of Late Modernity is called information/ postindustrial/ postmodern one, depending on criterion, according to which it is defined. German sociologist Ulrich Beck calls it a "risk society". According to Beck, risks are not only inevitable part of our world, they also have been born by at the age of technology.

Risks are proper quality of industrial era; they were created in the process of its formation. "Risk is systematically caused, statistically describable and in this sense "predictable" types of events, which can therefore also be subjected to supra-individual and political rules of recognition, compensation and avoidance" (Beck, 1992: 99). Beck distinguishes risks and hazards. Primary hazards referred to pre-industrial *status quo* of human agency and in its turn cover the space of "tricks of fate" of humankind. In the pre-Modern world, they were "simply the dark side of progress" (Beck, 1992: 98). They occurred beyond the will of people and could not be predicted. As Beck mentions, unpredictability, inability to calculate and prevent hazards gave people reason to lay the responsibility for them upon the fortune, gods (or the God). By this quality hazards are distinguished from risks. Risks are forecasting side effects of development in era of technologies, while hazards are attributed unpredictable effects of human activity to fortune or the God.

For a long time, industrial society of Modernity was able to produce a definite procedure of counteraction to hazards through special taxation and insurance systems in such a way evolving them in its calculations and transforming hazards to risks. But, as Beck has mentioned, since the mid-20th century, society has been clashed with historically unprecedented possibility of the destruction through decision-making of all life on the planet" (Beck, 1992: 101). It happened because of impossibility to calculate consequences of industrial hazards, critical mass of which surpassed the justifiable threshold of "tricks of fate". Hazards of contemporary world are connected with uncontrollable consequences of anthropogenic risks. That is why they can be called "anthropogenic hazards". Actually, Back does not use this term, although his descriptions of hazards in contemporary world are relevant to such use of the words. Permanent uncontrollable threats of hazards are the effect of the most evident risks, such as nuclear power, chemical and biotechnical

production. Anthropogenic hazards define special human experience in the contemporary world. First of all, it is connected with dramatic consequences for humans and nature.

Examples of experience are of dramatic shade, which is conditioned by anthropogenic hazards in contemporary world. They demand professionals to be involved for their overcoming. However, the cycling starts there. First of all, to diagnose the hazards, professionals (scientists and engineers) are invited. They have to make a conclusion concerning the hazard they have produced. It means that the only competent professionals are invited to expertise, in fact those scientists and engineers who provoked the appearance of anthropogenic hazards. Secondly, research and application of its results are often occur in reverse succession. For Beck the Chernobyl case is a bright example. Breakdown of nuclear pile at nuclear plant demonstrated in 1986 that "theories of nuclear reactor safety are testable after they are built, not beforehand… Testing comes after application, and production precedes research" (Beck, 1992: 108).

Now the borders between research, experiment, and implementation are erasing. Moreover, the border between a "society" and a "laboratory" is erasing. It should be mentioned, that value orientations of scientists are not changed automatically with the change of types of rationality. Moral consciousness is very ponderous structure. It is transformed slowly; its changes pass hardly. Value orientations of the previous types of rationality do not loose dominant status, while remaining active. Values of free search of truth and impartiability were raised to the ideal of classical scientific research, but they are still actual for moral consciousness of the risk society. Beck mentions that "conditions of freedom of research have shifted. Freedom of research implies freedom of application" (Beck, 1992: 108). Such circumstances open wide space for uncontrollable for public development of science, application of technologies in a society and subsequent uncontrollable anthropogenic hazards.

The degree of anthropogenic hazards and intensity of their appearance and manifestations force a scientific community to take into consideration the problem of a scientist's responsibility with a glance of challenges of contemoraneity. The necessity to clarify personal and social responsibility of a scientist is distinctly apparent. The question about the possibility of collective responsibility of a community has already appeared. All these challenges constitute

issues of responsibility of a scientist in the contemporary world. Calls to revisit value content of responsibility and reconstruction of the dynamics of its transformations allow to clarify the content of the responsibility of a scientist.

Personal responsibility of a scientist covers traditional issues of scientific honesty. Academic fairness, data reliability and its objective esteem, intolerance to juggling with facts, plagiarism, intellectual cheating and free riding in science are in the space of personal competence. A scientist is able to achieve the scientific aim with the help of means which are localized in the space of individual conduct where he can act freely and responsibility for which he can and has to take on himself. Considering challenges of contemporaneity, issues of personal responsibility of an academician are fixed in the *Uppsala Code of Ethics for Scientists* (Gustafsson et al., 1984). It intentionally stresses the individual responsibility of scientists. Integrity of the motive and the content of a scientist's activity constitutes personal responsibility of a scientist. To quality the action as the moral one it is necessary to certify all its constitutive parts as morally irreproachable, and the morality of the motive especially. It is very difficult procedure to define moral quality of a motive. Difficulties appear when we only try to qualify any incentive as a motive, and moreover, when we intend to define the measure of its morality. Inflexibility of the framework of a scientist's act and wider – of his/ her activity shape the sphere of one's personal responsibility that prevents the possibility to avoid a response for one's act, first of all in front of one's conscience.

Social responsibility is challenged in other way. The design of the responsible conduct is milder, without strict linkage to the motive of the act. Publically meaningful content and effect are expected from socially directed action, whereas purity of a motive, this inevitable condition of moral act in space of personal responsibility, can be neglected. Rejection of the moral purity of the motive means that the field of a scientist's action overcomes the limits of the narrow personal space where one is free to make decision and take personal responsibility. Social responsibility covers more problematic issues, and it is its difficulty per se. A scientist takes on oneself the responsibility for considering direct and indirect results of its application. Moreover, scholars come to need to supplement value orientations of scientific search with such principles as of precautionary, self-preservation, not causing harm, sustainability, social justice and growth of public wealth.

There were several ethically important documents, in which social responsibility was progressively developed. First of all, the Nurnberg Code (1946–1947) was directed to clarify principles for conducting medical research involving human subjects. Secondly, there were Declaration of Geneva (1948) and the Declaration of Helsinki (1964), accepted by the World Medical Association. These Declarations are regularly revisited and updated. They are directed on ethical regulation of complicated socially meaningful issues, which are connected with the development of science and its application in practice. Thirdly, the International Human Genome Project (in the late 1980s) was the marker in the development of ethical sensitivity to scientific issues related to the study of recombinant DNA molecules in 1970s. Scientific activity was accompanied by the work of ethical commissions, academic conferences on ethical justice and social effects of genetic and genomic researches. The list of international (global) incentives on developing and keeping ethical principles in research is possible to continue, although the main tendency is evident. The necessity of control from professional and social organizations over content and direction of research is the contemporary demand. Ipso facto the question about correlation of local and global aspects in social responsibility of a scientist has to be put. Thus, the image of a scientist, a member of a scientific community is shaped within the framework, which was outlined in the *UNESCO Recommendation on the status of Scientific Researcher* (1974). While giving the recommendations to the state members, UNESCO called them to provide scientists (and wider – researchers) to consider their work was the vocation to their compatriots and humankind in general. Here some conflicts of compatriots (and wider – of a state) and humankind in general (an international community) become evident. Discussions of the Pugwash Conferences among others put on the question concerning national safety in the context of ethical reputation of the scientific activity.

Issues of collective responsibility are no less problematical. However, there are such vulnerable fields of public life where the idea of responsibility of an organization allows moral regulation to penetrate into the spheres of social life which are not opened for estimation from the side of individual morality. However, is it possible to judge scientific community in the prospects of collective responsibility? There is a strict counterargument in ethics: while accepting collective responsibility of scientists and scientific community at all as a moral subject, the society opens the gate to

individual irresponsibility of every scientist. As Hannah Arendt emphasized in her famous statement: “Where all, or most all, are guilty, nobody is”(Arendt, 1965: 279).

Scientific community and research institute are teams of different order. Only the latter can be formally introduced as an integral unity. Only such team of scientists can be the subject of joint collective responsibility because collective intentionality is at the base of such form of responsibility. Collective intentionality allows to consider definite teams as independent subjects of imputation which are responsible for decision making. However, *UNESCO Recommendations* mentioned above promote the idea that UNESCO member states should seek to encourage conditions in which scientific researchers, with the support of the public authorities, have the responsibility and the right to work in a spirit of intellectual freedom to pursue, expound and defend the scientific truth as they see it” (Recommendations… 1974). Such kind of freedom in a team can provide collective decision making subject to position of its independent members. Such state of affairs is an argument for collective responsibility per se. Angelo J. Corlett, who goes into the enquiry of collective responsibility, argues that if corporations are moral persons, it does not follow that they are justifiably punishable. He calls to analyze the conditions under which corporations as teams are justifiably punished. Decision can be considered as collectively accepted if every member of the team influences it or at least possesses the real right to influence it. The second, additional condition of corporate collective responsibility is the atmosphere of publicity, which do not allow democratic procedures to be reduced to mere formality (Corlett, 2009). Democratic social institutions of free society are the facility of collective responsibility.

Conclusion

Current type of scientific rationality is the historical stage of development of human rationality in the risk society. Value orientations of human-measureness, social responsibility as well as academic fairness, data reliability and its objective esteem are developed. Moreover, social responsibility of a scientist is actualized today in the world flooded by foreseen risks of anthropogenic hazards, i.e., unforeseen effects of scientific and technological development. It is shaped by ethically meaningful principles of self-preservation, not causing harm, sustainability, social justice and

growth of public wealth. Key questions of collective responsibility are formulated. Ethical component of the scientific search is actualized for a scientist in the risk society. It consists of three dimensions of responsibility. Modi of personal, social, and collective responsibility, their permanent challenges in the contexts of new risks and hazards condemn a scientist to permanent moral choice and oblige one to correlate his professional activity with ethical values.

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