Sociocultural determiners of scientific activity transformation

Vitaliy Rubanov[1,a], Elena Rubanova[1], Yuliya Zeremskaya[1] , Cheng Xinhan[1] , Aleksey Shcherbinin[2]

[1]Tomsk polytechnic university, 634050 Lenina str., 30, Tomsk, Russia
[2]Tomsk state university, 634050 Lenina str., 36, Tomsk, Russia

Abstract. Transformation of modern society affects all fields. The goals and objectives of social development as well as the means to achieve them require science-based mechanisms, methodological support for studying social phenomena and their philosophical and sociological analysis. Both integrative and differential processes characterize modern scientific activity. The key reason for science institutionalization as a sociocultural phenomenon is its social inclusion. In this process science integrates with such social institutions as education, management and etc.The paper deals with research activities in higher education institutions. The importance of this study is determined by the increasing role of research activities in social, economic, political, legal and cultural development of society. In a modern society the process of institutionalization requires its dynamic development. Science has issues that should be examined. The socio-cultural basis of scientific activity changes is a key one for studying. The goal of this study is to analyze the historical validity of the characteristics of research activities in terms of sociocultural determinants. The authors carried out system and comparative analyses and a logical-historical study of the transformation of research activity phenomenon. In conclusion, sociocultural determinants of research activity formation and development are revealed in today's changing conditions of social factors; the definitions to such concepts as "research interest" and "research needs" are given.

Introduction

The complexity of modern research activity, accompanied by the differentiation and integration involves a comprehensive study of research activity subject from the point of view of social qualities, ideological and value systems. Thus, a scientist should be considered not only as a result or a product of social development, but also as a person who is constantly developing and improving him/herself.

The growing role of science in social development requires a detailed study of its principles. Humanities as well as natural and technical sciences participate in the transformation of social reality. The integration process of scientific knowledge and practical activity should be strengthened with theory. At every stage of its development the science changes its content, functions, goals and tasks.

The development of research activity can be extensive and intensive. Gradual storage of substantive, structural and functional elements providing continuity in development is connected with a leap (interruption of continuity). In the course of revolutionary transformations there are an activization of continuity subjects, "compression" of a space-time factor, quick mastering of previous scientific methods, forms. Thus, the unity of quantitative and qualitative changes in successive scientific processes is carried out.

New tasks require that scientist should be competent, responsible, civic-minded and politically mature. Moreover, qualitative changes in science can happen if a continuous academic staff training comes with financial support.

Scientist's work at different stages of social development has specific features. Nowadays Russian scientists as well as foreign ones deal with determination problems of scientific knowledge. Thus, a number of western philosophers and sociologists such as J. Agassi, J. Bernal, A. Goldman, L. Laudan, M. Mulkey, R. Merton, determining indirectness of scientific knowledge by the sociocultural environment, underline the continued importance of environment and emphasize the most important factors [1, 2, 3, 4].

Discussion

Some scientists, such as D. Bloor, A. Koyre, W. Quine, T. Kuhn, L. Lakatos, and L. Laudan distinguish cognitive factors that influence on science development [5, 6, 7, 8, 3]. D. Bloor explains the concept of any knowledge by social conditions that generate the knowledge. L. Laudan, studying the problem of

[a] Corresponding author: rubanw@tpu.ru

scientific rationality that is understood by him as the ability of the theory to solve problems, highlights its special role in the progress of science. Developing the idea about the internal determinants of science, he considers that the reconstruction of scientific knowledge requires methodological study of science purposes and values.

In contrast to the cognitive concept, M. Mulkay formulates his problem understanding of science conditionality. He opposes the science knowledge autonomy from social environment. His understanding of the problem is based on the idea of the social construction of knowledge. If the knowledge of physical world does not help in drawing scientist's conclusions, it means that scientific knowledge does not have an epistemological status and it is a part of the culture. Social factors affect the development of scientific ideas and these factors are studied in Russian and foreign research works [9, 10, 4].

It is natural that the process of forming a new system of scientific knowledge is determined by social factors that are also undergoing significant changes. Together with the changes in the social atmosphere where sciences is developing, the style and character of scientific work and the attitudes to the science and relations in the science are also changing [11].

Thus, we find it reasonable to state that science has a social entity. As we see, science is included in the sphere of public life and ultimately it follows the laws of social development formed with times. If science is determined by historical conditions, it means that the subject of scientific work is also a result of these conditions. In their activities, scientists first should learn the existing knowledge and then they should break down all barriers of existed possibilities of theories and practices. In other words, there is a unity of opposites: to be in the frames of existed knowledge and at the same time to be beyond it.

In scientific work, the scientist is guided not only by his/her goals but also by needs. Directly or indirectly, s/he performs a social order for scientific production. Therefore, the development is determined by the needs of society. Society makes a social order for a certain type of a scholar [12].

Subject formation and development of scientific work should be studied as a special social activity with its subject, object, scientific goals, and ways of study, findings and its conclusion.

Nowadays, having a professional education is not enough for scientists to know and understand the complication of the world. He needs to develop his/her own worldviews. Scientist's views always have an impact on his attitudes to environment, and in current times they have acquired a special importance. The scientists should have research interests and needs. What are the research interests and needs? This question is thought to be answered by finding the place of research interests and needs in the structure of social interests and needs.

Formation and development process of research needs of the individual is carried out in the general system of social needs, such as professional, political, moral, environmental needs and others.

From our point of view, "research needs" can be defined as a sociological category expressing the historically formed objective necessity of the social individual in scientific knowledge.

Research needs are requirements for improving scientist's professional skills; they also are a starting point in the formation process of scientist personality.

When speaking of a scientific interest as a specific form of social interest, it should be noted that this is an expression form of research needs. It is a conscious; actualize research need which is a real reason for active participation of the social individual in research activities.

Thus, "research interest" is regarded as a sociological category that expresses a real reason, basic stimuli of the social individual in the acquisition and development of a complex scientific product.

Research interest of the person is aimed not only at the scientific values of consumption but also at the expanded reproduction of these values.

Research interests and needs are associated with research activity, in other words, with the state of individual readiness, individual aptitude to be active in the process of acquisition and development of a scientific product in a particular historical situation.

The formation and development of research professional needs and interests have continuity in it various forms: between the individuals of the process, in the content of research activity and its forms, in the methods and ways of results implementation and so on. Changes of scientific labour character in scientific and technical progress require scientist mobility, his ability of dialectical combination of traditions and innovation in his activities and his constant self-improvement.

We have noted that scientific work is both individual and collective. *The previous knowledge* is used in the modern research processes both by an individual scientist and by a group of scientists. Individual scientific work does not exclude teamwork. The key scientific principle is based both on individual scientific results and on scientific results obtained by a group of scientists. The use of previous scientific results obtained by other scientists allows a scientist to optimize the contribution to scientific progress and it gives other scientists possibility to continue their studies. However, the directions of scientific investigations should not be coordinated.

The direction of scientific research does not depend only on a scientist's energy and actions; that is why it is necessary to take into account dialectical unity of the individual and the collective, the logical and the historical, the subjective and the objective.

Thus, the analysis of different viewpoints enables us to conclude the following:

- Under certain conditions paradigms of scientific thinking are formed and operated in society.

- Paradigms are divided into "core paradigms" (paradigms of the thirst order) that present the leading concept in society and "peripheral paradigms" (paradigms of the second order). Core paradigms fuel the

peripheral ones and they in turn fuel the paradigms of the third order. There are "wandering paradigms" that are far from the paradigms of the first order. The existence of these paradigms does not depend directly on the core paradigms.

Thus, there is a core of scientific thinking and its surroundings. Science has not only one functioning paradigm but the whole system. Core, peripheral, wandering paradigms have their own surroundings that give temporal and timing existence for each paradigm.

Paradigms interact and their relations may be of an antagonistic character (character of coexistence and indifference).

Paradigmatic intolerance and antagonism exist between mutually exclusive paradigms, for example the ideology of materialism and idealism.

The coexistence of paradigms can be observed in alternative solution of the definite problem when various methodologies, technologies and methods are used.

Paradigm indifference is typical for the scientific knowledge when two paradigms or a number of paradigms do not contact with each other and are paralleled while solving scientific tasks.

We think that the changes in paradigmatic state of scientist's activity are interesting. In our study this is a coexistence of the old and the new in steady and dynamic processes of changing paradigmatic content. We consider that paradigm is binary; it is both conservative and revolutionary. Its conservatism can be seen in its effort to be a system without any state changes. Moreover, its revolutionary spirit can be seen in the changes of its state. If a paradigm is vital, it always has a paradigm of another order.

The destruction of paradigm orthodoxy and conservatism happens during the development of scientific knowledge, scientific activity. We think that wandering and peripheral paradigms are changeable and they are predisposed to novation. The growth of scientific facts makes the paradigm to extend its influence and under certain conditions it interacts with wandering and peripheral orbits of the coexisting paradigms. It leads to the contradiction between paradigms and its resolution enriches every interacting paradigm but at the same time the priority (the order of paradigms) is determined. We agree with I. Lakatos that "protective belt of the research program" is stretching to a certain point without changing its core. The same happens with a paradigm. The protective belt of a core paradigm is stretching and it does not change the essence of a core paradigm up to a certain development level of its wandering and peripheral paradigms. However, protective belt can break down because of scientist's research activity. The internal logic of science development can also help to break the belt. When a paradigm extends the spheres of its influence, its wandering and peripheral paradigms interfere with other paradigms. This is an objective process.

The effectiveness of the formation of research interests and needs depends on firstly on the following points:

- Social conditions for scientist existence;
- Determination of priority scientific research directions;
- Logistical support of research activities;
- Level of methodological and methodical support;
- Social and psychological atmosphere during research activities.

Science is a customer of research activities. At a definite stage of its development, there is a need to widen the scope of a research field. This occurs during the changes in the social structure or changes of scientific paradigm. Thus, the questions of overcoming the inertia of scientific thinking, conservatism and corruption in research structures that hinder science development are raised. These conditions create supposition for the formation and preparation of a definite type of a scientist.

The scientific work is closely connected with the process of positive content preservation and development, functional and structural elements of science previous stages. Creativity appears when there are objective and subjective conditions; it means that there are social and personal needs, the level of knowledge development, scientist's intellectual abilities.

Depending on the historical conditions of a social system where creative process should be carried out we get corresponding results. Scientist's motivation, investigation methods make it possible to get positive results of any study. Spontaneity is the worst companion of creativity in science. The organization of scientific work should include a planning stage that consists of finding ways for transferring accumulated knowledge, organizing scientist's work, providing necessary conditions for getting fundamentally new scientific data, etc.

Scientific culture changes along with scientific progress. The individual work is replaced by teamwork and it leads to changes in the psychology and technology of creative work. The scientist is responsible not only for the results of his/her study, but also for practical implementation of these results. He/she is included in the relations "Science – Production" and it makes scientist's work a part of complex scientific world. The scientist makes the results available to society members. All these create conditions for forming a new type of scientist.

These conditions have led to the formation and preparation of a new type of a scientist. A.I. Herzen in his work "Dilettantism in Science" distinguishes different types of scientists [12]. The basis of his conceptual approach was past and present relations in scientific activity.

In his work Alexander Herzen presents the following types of scientists: amateur, romantic scholar, clan scholar and scientist-Buddhist. Amateur scholar denies the continuity of previous scientific experience. He is not interested in the truth. However, scientific knowledge cannot be formed without realizing the past. A. Herzen says that having understood the past we can understand he present and see the future more clearly; and looking back we can go forward [12]. He considers that amateur scholar does not understand that science is not a collection of fact obtained by chance, it is the result of continuous mind and consciousness development.

Amateur scientist likes science but s/he does not devote himself to it. Thus, he considers that an amateur scientist is "the most useless" and "the most harmless" one among all mortals.

Clan scientist is another type of scientist. He is a keeper of scientific traditions. He has both positive and negative traits. Positive ones are big working capacity, devotion to science. He is a developer of theoretical knowledge. The negative traits are his narrow specialization and that he has only theoretical but not practical knowledge. This leads to the situations when clan scientists are not able to use theirs knowledge in practice. These scientists can only study scientific processes but not invent them. Thus, the key task of clan scientists is to maintain a certain scientific knowledge, as they are unable to make revolutionary changes in science.

Scientific one-sidedness is typical for another type (scientist-Buddhist). Their activity can be characterized by formalism. Science is a living sociocultural organism that is constantly developing and one-sidedness "kills" science. Neither an amateur scientist nor a scientist-Buddhist has true knowledge. Due to A. Herzen, science that is not based on nature and facts is only shadow of science.

Scientist's activity has his/her own constraints of time and possibilities. The great scientists are able to dip into the future. They head for wisdom. The greatest scientific discoveries of the previous generations are the ground for future scientific discoveries. Describing the continuity and progressiveness in the formation of scientist's personality G. Hegel offers the concept of "interceptive personality". This is a personality that considers that every next scientific level is higher than the previous one.

Science is demanding, in scientific activity not only the problems of the present and past but the future are solved. Due to science continuity, the past "brings up" the present and underpins the future in science, and this continuity can predict the future science state.

It is believed that one of the characteristics of modern science is migration of scientists from one country to another. From our point of view, this process has both positive and negative sides. The positive sides are the presence of continuity actualization, acceleration of advances implementation in methodology, technology, research programs and so on. The scientific knowledge, that was not in demand under certain conditions, become important. The negative side is that insufficient attention to research results leads to the reduction of country scientific potential. Scientists' migration impoverishes scientific achievements of the country where scientific ideas have not found a good use. This disturbs the continuity between the scientists who stay in the country and the scientists who migrate. In some cases, national science loses its scientific manpower. Ultimately, it is reflected on the training process of scientific personnel.

The key indicator of subject maturity of research activities is concepts creation, research area, research school and new rationality. However, scientist improvement is not completed at this stage, it continues throughout his creative life. It is important to identify the reasons for scientist creative activity.

Thus, the subject of scientific activity is historically formed agent of scientific production who actively consumes, transforms and develops the values of the total scientific work and uses them in his research activity. Ultimately, scientist activity is focused on reality change.

Means of scientific information, culture based on the results of material and intellectual production influence on the training of the individual of research activity. The influence of these socio-cultural formations is indirect and centralized, so it does not have a definite addressee. At the stage of scientist personality formation the reverse influence of personality on the content of the scientific information is possible.

The process of scientist individuality and research team formation and development has two levels of testing research results: rational and practical ways. Rational as a primary level includes examination, verification of scientific knowledge, and development of fundamental research work, new research systems. Due to the rational level, the science subject chooses the necessary material, correlates it with the requirements of the time, and compares it with the existed scientific concepts, theories, and paradigms and so on.

However, it is not enough to have only this level of testing. The current level of production and science development requires the implementation of theoretical insights.

The development of research areas, contemporary goals setting need an extension of philosophical and sociological studies of scientific activity. The results of scientific activity as a sociocultural phenomenon depend greatly on the level of scientist's competence. In the transformation of society the system of social factors influences on the formation of thinking style, research interests, scientist's research needs and on social-psychological orientation.

The complexity of scientific work requires multifaceted approach to scientific activity with special emphasis placed on social characteristics.

Thus, we have attempted to give a general process characteristic of science subject formation and development as a main productive force of modern society. It should be noted that due to the socio-historical, socio-cultural and socio-psychological conditions this process has its specifics and continuity that create conditions for science personal fulfilment as well as his personal degradation. The subject of scientific activity can be not only an agent of advanced and progressive ideas but also conservative ones.

Conclusion

The current level of science subject formation and development is characterized by its multidimensionality and multitask. Scientist training depends on the objective as well as subjective factors. The depth and completeness of understanding scientific values and their involvement degree in innovative processes are

determined not by transcendental apperception but by subjective and objective readiness for innovation, that is, necessary social conditions for scientific work and high professional, ideological level of scientist's position. The knowledge of scientific wealth and its implementation make it possible to plan scientific activity, focused on fundamentally new challenges, better and predict it. Innovation inclusion in scientific activity and its combination with scientific traditions are a complex issue and require a special philosophical and sociological understanding.

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