State Policy in the Sphere of Development of Scientific and Innovational Activities of the Youth in Russian Higher Education

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ABSTRACT
The present analysis of the research practices that offer methodological foundations for studying the problems and perspectives of state regulation in the sphere of formation of scientific and innovational potential of the youth. It is concluded that there is a clear dependence between students’ involvement in scientific activities and the emerging transformation of value orientations of future young scholars. Dynamics of the research showed stable significance of such values as freedom of creativity, competence, social significance of professional activities against the background of reduction of the values of career perspective, conditions and material components of labor, prestige in society, and group solidarity in a work group. Research and analysis of specifics of reproduction of potential of the youth as the main resource of development of innovational economy of the country allowed for the conclusion that formation of scientific and innovational potential of the youth requires systemic, well-planned, and effective state regulation.

Introduction

In the completely new socio-economic and geopolitical conditions of functioning of the modern Russian society, the role of science as a strategic resource of innovational development of a country grows. Functioning of science is closely interconnected to the real market economy and is a part of society’s innovational economy, which determines its progress.

In the recent decade, the Russian science has been associated with destructive processes and has been undergoing the period of systemic transformation of the institutional structure. Political, socio-economic, and administrative reforms, economic decline, destruction of production, and ethnopolitical conflicts caused a comprehensive and deep crisis of the Russian science. The modern model of the Russian science could be called ---
transitional and, thus, ineffective. Among many problems of the Russian science, discussed by the expert society, one of the main problems is urgent deficit of young scholars. A negative tendency has been observed recently during hiring of graduates of universities by the organizations that deal with R&D. Since 2005, the share of graduates in the number of hired persons has been decreasing (from 27.4% in 2005 to 18.4% in 2015); the share of graduates that deal with R&D decreased from 2.8% in 2005 to 2% in 2015 (Indicators of science, 2018). According to the statistical data, average age of a researcher is 47 (Indicators of science, 2018).

Absence of responsible and pragmatic state policy led to destructive processes in the scientific society, decline of prestige of science, and reduction of the level and quality of life of the scientific community, which stimulated mass emigration of scholars: they leave the sphere of science in favor of a more profitable sphere or try to find a job abroad.

Together with administrative transformations of the scientific community, the socio-cultural transformation of the unique scientific ethos – totality of the normative rules of behavior that dominates over the whole scientific community – takes place (Merton, 2006). It is the institutional environment for formation of professional ethos of young scholars in the process of professional socialization.

Professional socialization is a multi-level process aimed at person’s mastering special knowledge, socio-professional abilities and skills, values, and norms for achieving high professionalism as the basis for effectiveness of professional activities and oriented at development of innovational, adaptation, and integrative qualities of an individual that are necessary for his effective inclusion into the professional and labor society.

Successful process of professional socialization of young scholars is the main factor of strengthening of scientific personnel in the sphere of science and education. This process envisages successful inclusion into a profession and formation of a sense of professional identity and allows the subject of social activities to master professional skills, abilities, and models of behavior. The criterion of the result of professional socialization is correspondence of professional training of a young specialist to the requirements that are set by the specifics of scientific activities (Tastan et al., 2018).

The transformation processes that take place in the Russian society make a young scholar change his social trajectory and adapt to the market circumstances, refusing from the norms and values peculiar for the socio-cultural code, which leads to the loss of the reproduction mechanism in the scientific sphere.

Research Methodology

Due to constant socio-cultural transformation of scientific ethos as a totality of normative rules of behavior that dominate over the whole scientific community, which is the institutional environment for formation of professional ethos of young scholars in the process of professional socialization, we used the theory of science’s ethos of R.K. Merton (2006) as the main methodological principle.

The Russian and foreign research environment pays close attention to the problems of reproduction and specifics of professional socialization of scientific personnel. Thus, P. Bourdieu (2001) analyzed the theory of human capital and presents professional capital as a complex of abilities and skills of a person, which are used within implementation of the professional activities for obtaining income.

In this article, the authors use the foreign theoretical and methodological approaches to studying professional socialization, which are adapted to studying the scientific and innovational activities of the youth. Thus, the functionalist approach is based on sociology of French positivism (Wentworth, 1980; Hoy and Rees, 1977 etc.) and treats professional socialization as a structural component of a wider social context (Wentworth,
1980; Hoy & Rees, 1977). The interpretation approach is based on the German idealist tradition in the humanitarian and sociological thought (Lacey, 1985) and focuses on the subjective aspect of the process of socialization (Lacey, 1985). This approach is based on anti-positivism, nominalism, and voluntarism, which forms the understanding of professional socialization. The critical approach is based on the theoretical concept of Marxism and the Frankfurt School (Bolster, 1983; Wexler, 1987) and connects the change of the processes and the mechanism of professional socialization to the changes of the general social process (Bolster, 1983; Wexler, 1987).

This research is based on the ideas of such Russian authors as M.K. Gorshkov and F.E. Sheregi (2010), Y.A. Zubok, T.K. Rostovskaya and N.L. Smakotina (2016), who developed the theoretical and methodological approaches to studying youth as a socio-demographic group. Most researchers define youth as a special socio-demographic group, distinguished on the basis of age and socio-cultural characteristics: uncertainty of status in society, social marginality, etc. The youth that are involved in the sphere of science are one of the specific socio-professional groups, with specific features and qualities. On the one hand, it has the features and characteristics of the youth on the whole, and, on the other hand, it is included into the professional scientific community of scholars that is important in the knowledge society. It is necessary to note mismatch of the status elements – primarily, level of income and education – which is caused by the insufficient level of transfer of the cultural and educational capital into the economic capital. As a result, half of young people have the growing feeling of social marginality, which is expressed in dissatisfaction with social position, lack of confidence in future, insufficient identification with the scientific community, psychological discomfort, etc. A peculiarity of the socio-professional group of young scholars is significant dependence of its social position on the state policy in the sphere of science. That’s why reduction of the social status of the Russian scholars influences the reproduction of this professional group on the whole.

The problems of professional socialization are studied in this article in the conditions of the scientific and educational environment of a technical university, and the start of formation of professional competences of a young scholar takes place in the period of studying in a university. Technical universities, as a platform for the scientific and educational integration, have the applied and practice-oriented character and follow the modern tendency of competition, developing inter-disciplinary and inter-professional ties that are oriented at increasing the socio-adaptive and research culture of graduates. Focusing on human resources, university – as a special social organization – has to form such culture in which ability for scientific and innovational activities is a special value (Vodenko, Tikhonovskova & Ivanchenko, 2015; Vodenko et al., 2016; Vodenko et al., 2017).

The basis of scientific research of formation and reproduction of scientific and innovational potential of the youth is the complex of sources of empirical information, which includes the results of sociological research, performed by the authors in 2011 - 2017 via personal questionnaire survey of undergraduates and young scholars of the leading technical universities of South Russia. Representativeness of the performed research procedures is ensured by means of implementation of multi-level quota selection. The selection was calculated for two groups: 1st group – undergraduates of technical universities (total selection - 2,627 respondents); 2nd group – young scholars (total selection - 358 respondents). The main purpose of the research was to study the motivating factors of scientific activities and to determine the level of prestige of the profession of a scholar, career orientation of undergraduates at scientific and innovational activities, and the problem of state regulation in the sphere of formation of scientific and innovational potential of the youth.
Results

Transformation of internal goals and motives of young people, predetermined by adoption of the market model of behavior and growing commercialization of science, influences the attitude of undergraduates towards science and innovative activities.

Thus problem is especially important in the conditions of development of modern higher education. The system of modern higher education is integrated in subjective space of socio-economic relations, which present the set of its stakeholders. There’s a necessity for new approaches to managing higher education on the basis of regulation of interaction between its stakeholders and, accordingly, development of scientific substantiation of the theories and principles of managing socio-labor relations and scientific and innovative activities.

Undergraduates and postgraduates are not a closed self-developing system, so understanding and systemic analysis of the processes that take place in the youth community are conducted in direct causal connection with social changes in the Russian community and with state measures that are taken within the modern youth policy. Based on this, a complex analysis of socio-economic factors that influence the formation of career perspectives of college students in the sphere of science is performed; quantitative and qualitative indicators of statistical (objective) and estimate (subjective) data are studied (Vodenko & Ivanchenko, 2013).

Organization of research work in university is the main platform in training of future scientific personnel. Organization of the research work in university determines formation of research competences with undergraduates and their acquaintance with peculiarities and specifics of the scientific community. However, undergraduates’ treatment of science is peculiar for the pragmatic emphasis: for most of them science is not a mandatory condition of professional education, but science, including student conferences and forums, contains the resource of career growth and allows strengthening the motivation for achievements.

Scientific work attracts 47.2% of the respondents, creative character of work and possibility of self-implementation attract 40% of the respondents, and the possibility of studying that which is interesting attracts 26.2% of the respondents. 34.8% of the respondents want to be involved with science upon graduation (answers “yes” and “rather yes than no”). Low prestige of scientific activities is indirectly confirmed by the fact that the share of those inclined for scientific work constitutes 6-8%, but only 0.5% of graduates do devote themselves to science. It should be noted that the “yes” and “no” answers prevail. 33% of the respondents are ready to choose a scientific career (Table 1).

Table 1. Readiness of undergraduates of technical universities to be involved with research activities (% of the respondents).

<table>
<thead>
<tr>
<th>Variants of answer</th>
<th>Respondents</th>
<th>Yes</th>
<th>Rather yes than no</th>
<th>No</th>
<th>Rather no than yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bachelors</td>
<td></td>
<td>12.5</td>
<td>12.3</td>
<td>23.4</td>
<td>33.6</td>
</tr>
<tr>
<td>Masters</td>
<td></td>
<td>25.7</td>
<td>28.1</td>
<td>27.4</td>
<td>17.4</td>
</tr>
<tr>
<td>General for the selection</td>
<td></td>
<td>15.3</td>
<td>19.5</td>
<td>24.2</td>
<td>30.2</td>
</tr>
</tbody>
</table>

Analysis of the scientific and innovational environment of a higher educational establishment allows evaluating the form of organization and complexities of implementing scientific and innovative activities in a university. Very often, university environment is a place of “acquaintance” of students with the scientific & innovational and technological creativity. Thus, answering the question “What was the start of your technological
creativity?”, students say that it started in the university environment and give a specific event: 27.7% of the respondents started with participation in a conference, forum, etc.; 24.1% of the respondents were influenced by the lecturers; 20.2% of the respondents were attracted to the work in a laboratory. It should be noted that 10% of the respondents said that they were always interested in scientific and innovational activities.

Organization of scientific and innovational activities of students was evaluated with analysis of difficulties faced by the respondents in the process of scientific and innovational work. Analysis of difficulties was performed at the stage of scientific research and at the stage of promotion of results and innovations, as scientific and innovational activities envisage scientific inventions and promotion of the obtained innovations (their commercialization). The first place belongs to the financial component at the stages of research and implementation (46.5% and 47.2%, accordingly); also, undergraduates note the deficit of scientific communication (38.3%) and regional closeness (27.9% and 23.4%) (Table 2).

Table 2. Difficulties faced by the students in the process of scientific and innovational activities in a university.

<table>
<thead>
<tr>
<th>Difficulties</th>
<th>At the stage of scientific research</th>
<th>At the stage of promotion of result and innovations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absence of financing (investments)</td>
<td>46.5</td>
<td>47.2</td>
</tr>
<tr>
<td>Deficit of scientific communication</td>
<td>38.3</td>
<td>37.1</td>
</tr>
<tr>
<td>Absence of interest to new ideas in business</td>
<td>28</td>
<td>26.3</td>
</tr>
<tr>
<td>Lack of scientific literature</td>
<td>23</td>
<td>20.8</td>
</tr>
<tr>
<td>Insufficient knowledge of foreign language</td>
<td>22.9</td>
<td>23.4</td>
</tr>
<tr>
<td>Regional closeness</td>
<td>22.9</td>
<td>23.4</td>
</tr>
<tr>
<td>Weak material and technical base</td>
<td>22.8</td>
<td>30.5</td>
</tr>
<tr>
<td>Personal qualities</td>
<td>20.8</td>
<td>18.6</td>
</tr>
<tr>
<td>Difficulties with publication of results</td>
<td>15.9</td>
<td>15.1</td>
</tr>
<tr>
<td>Doubts in significance of results</td>
<td>14.6</td>
<td>6.6</td>
</tr>
<tr>
<td>Weak scientific management</td>
<td>12.4</td>
<td>12.6</td>
</tr>
<tr>
<td>Lack of organization</td>
<td>11.7</td>
<td>6.9</td>
</tr>
<tr>
<td>Absence of knowledge in the specialty</td>
<td>7.7</td>
<td>4.5</td>
</tr>
</tbody>
</table>

The problems in scientific and innovational activities consist primarily in absence of proper financing of student science from government structure and from business structures – which, due to different reasons, are not interested in investments into university science. Besides, students distinguish such problem as deficit of scientific communication. Apart from free access to scientific information at the stage of research, the respondents need the opportunity to visit scientific events, at which they would approbate their scientific results, learn the experience of other scholars, and obtain new knowledge. Due to absence of communication, future scholars feel regional closeness (22.9 %). In the course of promotion of results and innovations, an important problem is weak material
and technical base of a university (according to 33% of the respondents). Personal qualities and lack of organization are the last positions in the rating of difficulties.

**Discussion**

The research results show that in the conditions of liberalization of economy, when activities in the scientific sphere are positioned as one of the types of professional activities, which requires high qualification, there’s a necessity for smart state policy in the sphere of attraction of scientific personnel. Turning science into a competitive sphere of activities, which includes high professionalism and decent payment for scientific labor, allows a young scholar to implement his moral and ethical system with value priorities and ideas on ideal science and scholar.

The research showed that 47.2% of undergraduates are attracted by scientific activities, and 34.8% are ready to conduct scientific activities. Students’ refusal from science is predetermined rather by objective, not subjective, reasons, of which the financial problem is the main one. The material component is very important, especially in case of the young generation. Young people value the possibility of career growth, material well-being, possibility of self-implementation, stability, and social importance. The leading position belongs to the variant “work has to be interesting and well-paid”. However, if the respondents are to make a choice, 40% of them choose a boring job with high wages, while 34% are ready to accept interesting job with low wages. Almost all respondents (98.2 %) are ready to continue scientific career if the university’s management helps with the accommodation. This problem, which is the most important for young scholars, may lie in the basis of development of the programs of support and motivation of young scholars at all levels. The main directions of state policy that are aimed at development of scientific innovational potential (according to young scholars) are given in Table 3.

**Table 3.** The main directions of state policy in the sphere of formation and reproduction of scientific and innovational potential of the youth.

<table>
<thead>
<tr>
<th>Main directions</th>
<th>% of the number of the respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual competitions for young scholars, financed from the budgets of different levels</td>
<td>69.4</td>
</tr>
<tr>
<td>Long-term cooperation between scientific centers in Russia and abroad</td>
<td>58.4</td>
</tr>
<tr>
<td>Support for entrepreneurial initiatives of youth: creation of small companies</td>
<td>48.8</td>
</tr>
<tr>
<td>Stimulation for additional education, advanced training of young scholars</td>
<td>46.4</td>
</tr>
<tr>
<td>Support for innovational and entrepreneurial initiatives of the youth: legal, accounting, information</td>
<td>40.2</td>
</tr>
<tr>
<td>Provision with necessary scientific equipment</td>
<td>36.6</td>
</tr>
<tr>
<td>Older colleagues’ attracting young scholars for research by the grants and economic contracts</td>
<td>31.8</td>
</tr>
<tr>
<td>Creation of small innovational companies on the basis of departments</td>
<td>28.3</td>
</tr>
</tbody>
</table>

As to assessment of career perspectives in the scientific sphere, young scholars see their main advantage in science, as compared to older colleagues, the ability for effective adoption of foreign experience and achievements (55.4 %); ability to work intensively (48.1 %); mobility in the scientific environment (46.8 %).

Career growth of young scholars is an important factor in the process of formation of creative and professional qualities and their further adaptation and establishment in the scientific environment. Career growth, according to the respondents, is acquisition of scientific degree (55.6 %) and increase of the number of scientific works (20.2 %) (Table 4).
Table 4. Career growth according to young scholars.

<table>
<thead>
<tr>
<th>Variant of answer</th>
<th>% of the number of the respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquisition of scientific degree</td>
<td>55.6</td>
</tr>
<tr>
<td>Increase of the number of scientific works</td>
<td>20.2</td>
</tr>
<tr>
<td>Career growth</td>
<td>12.2</td>
</tr>
<tr>
<td>Increase of wages</td>
<td>10.2</td>
</tr>
<tr>
<td>Acknowledgement of scientific works in Russia / abroad</td>
<td>1.8</td>
</tr>
</tbody>
</table>

The image of modern science seems to be complex and ambiguous to young scholars. The basic characteristics have the following priorities: making money and commercialization (20%) and technologies (18.4%). At the same time, progress achieved with modern science is emphasized – 19.2%; new characteristics of the world science in the modern society is formed – scientific symposia and conferences, activities of international scientific groups, and creation of a system that can ensure joint creativity of representatives of science from various countries – 15.1%.

Young scholars’ image of ideal science does not coincide with its classical images. Thus, its cognitive characteristics, which are the basic ideas of the respondents on ideal science, are absent. Active negativism appears due to one of the specific features of the world science – commercialization – which is doubtful and imposed from outside for the respondents.

The main reasons of such state of affairs in the Russian science, according to young scholars, lie in decrease of financing (89%), absence of smart and systemic policy of the state (50.8%), which leads to lack of demand for science and scholars (35 %), and “brain drain” (24.9%).

In their turn, respondents pay attention to the role of other factors, e.g., socio-cultural: they note decrease of the quality of education and such factors and lack of skilled specialists, decrease of prestige of scientific work and transformation of values, which leads to change of morality in the scientific environment and thus stimulates the disappearance of such moral type as “unselfish scholar”.

Young scholars show understanding of domestic science as the most powerful intellectual component of the world science and as a brain factory for developed Western countries. The scholars also show concerns regarding future possibility for the West to subdue the Russian science and perform influence through provision of orders to Russian scholars or through turning Russian establishments into a platform for development of the Western scientific thought, which achievements will be implemented in Western countries.

The optimistic future of the Russian science, according to young scholars, depends on domestic factors: increase of its prestige (27.9%), financing (73.8%), and state support (17.9%). Only 0.8% of the respondents count on commercialization of science. Domination of the formula “if… then” with the respondents should be noted. According to the, if the state supports and finances science, the Russian science will have a future. 33% of the respondents show optimism in this regard, and 30.2% of the respondents show pessimism regarding the future of the Russian science.
Conclusions

When considering socio-cultural changes of the scientific community, it is necessary to note different dimensions of their manifestations. It is possible to distinguish two directions of the changes. Firstly, differentiation of the scientific community is expressed in differentiation of government structures, which allows speaking of the complex character of this process, which takes place at the individual and institutional levels, which covers separate scholars and scientific institutions. The second direction of socio-structural changes of the modern scientific community is differentiation as to the level of incomes. Low level of wages is the main factor of dissatisfaction with work of most scholars. Also, there is no opportunity to conduct full-scale research, which negatively influences the number of scientific personnel (Vodenko, Tikhonovskova & Ivanchenko, 2015).

The perspective directions of state regulation of formation and reproduction of scientific and innovational potential of the youth include the following:

- integration of applied science with production. Stimulation of this direction will allow increasing innovational potential of universities and developing sectorial science and scientific schools;
- development of the scientific infrastructure of universities;
- development of scientific and production connections of universities;
- development of the system of management in the scientific environment;
- increase of the level of provision with resources and of laboratory and technical equipment;
- increase of the level of financing of young scholars;
- development of the system of social provision and social guarantees for young scholars;
- creation of a positive image of scientific image and profession of scholar in society;
- involvement of academic staff in research activities.

There is a clear dependence between involvement of students in scientific activities and the emerging transformation of value orientations of future young scholars. Dynamics of research showed stable significance of such values and freedom of creativity, competence, social significance of professional activities against the background of reduction of the values of career perspective, conditions and material component of labor, and prestige in society and group solidarity in the work group. Loss of the large share of potential scholars has external character, determined by the economic, organizational, and socio-cultural conditions of research activities in a specific moment of time in the country, establishment, and work group. The measures that could raise the effectiveness of implementation of measures of state policy in the sphere of formation of scientific and innovational potential should include organizational, motivational, material, and social aspects.

References


