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Universidad del Zulia
Facultad Experimental de Ciencias
Departamento de Ciencias Humanas
Maracaibo - Venezuela

The innovative activity development of higher educational institutions

Anzhela V. Romanova¹

¹Russian State Social University, Moscow, Russia
Angelina.rom@mail.ru

Marina V. Polevaya²

²Financial University under the Government of the Russian Federation
(Financial University), Moscow, Russia
[MVPolevaya@fa.ru](mailto:MVPOlevaya@fa.ru)

Rina S. Khammatova³

³Sechenov First Moscow State Medical University, Moscow, Russia
rinakham@mail.ru

Irina E. Sokolovskaya⁴

⁴The State University of Management, Moscow, Russia
i.e.sokol@yandex.ru

Elena V. Platonova⁵

⁵Ulyanovsk State University, Ulyanovsk, Russia
vikinginya@yahoo.co.uk

Valeria V. Kolosova⁶

⁶Moscow Aviation Institute (National Research University),
Moscow, Russia
Pole200707@yandex.ru

Abstract

The paper presents the results of a study of the problem of the innovative activity development carried out by higher educational institutions in the field of high technologies and commercialization of scientific developments via comparative qualitative research methods. As a result, the introduction of the Model of scientific and educational transfer of technology into the system of higher professional education will make it possible to develop the innovative activity of higher education institutions. In conclusion, the high quality of personnel

training is maintained by the use of a multi-level system of evaluating knowledge, skills; engaging highly-qualified Russian and foreign teachers.

Keywords: Higher education institution, Innovative activity.

El desarrollo de actividades innovadoras de las instituciones de educación superior

Resumen

El artículo presenta los resultados de un estudio sobre el problema del desarrollo de actividades innovadoras llevado a cabo por instituciones de educación superior en el campo de las altas tecnologías y la comercialización de desarrollos científicos a través de métodos comparativos de investigación cualitativa. Como resultado, la introducción del modelo de transferencia científica y educativa de tecnología en el sistema de educación profesional superior permitirá desarrollar la actividad innovadora de las instituciones de educación superior. En conclusión, la alta calidad de la capacitación del personal se mantiene mediante el uso de un sistema multinivel de evaluación de conocimientos, habilidades; involucrar a profesores rusos y extranjeros altamente calificados.

Palabras clave: Institución de educación superior, Actividad innovadora.

1. INTRODUCTION

The current situation in the development of the education system in the Russian Federation is characterized by modernization processes associated both with changes that take place in approaches to the system of education and its substantial component, as well as with the activities of universities. The activities directed towards the development of innovative projects and innovative research, in

general, are becoming increasingly significant. A modern higher educational institution that is capable of competing in the global market of educational services no longer stops only at pedagogical and research activities, it is actively introducing business processes into practice (AVDEEV, AVDEEVA, SHAGIEVA, SMIRNOVA, MASHKIN & TARADONOV, 2019).

The innovative activity of higher education institutions directed towards the commercialization of high technology and increasing the role of higher education in the innovative development of the country as a whole is an integral part of every higher educational institution today (BAK, KARDIS, VALCO, KALIMULLIN & GALUSHKIN, 2019). An analysis of the national experience, as well as the practice of the most developed countries, shows that to ensure the competitive ability of a higher education institution in the global market of educational services, it is not enough to have a high level of student contingent, highly qualified faculty, financial and capital resources today. It is necessary to expand the field of commercialization of scientific ideas and development.

The importance of the issue of commercialization of scientific developments of university scientists is also confirmed by the regulatory framework both at the federal and regional levels. For example, the Decree of the President of the Russian Federation dated May 7, 2018 No. 204 On National Goals and Strategic Objectives of the Development of the Russian Federation for the Period till 2024 states that in the face of modern technological challenges, the key task

of the Government of the Russian Federation is to accelerate the technological development of the country, in particular, an increase in the number of organizations engaged in technological innovation (CHERNILEVSKY, 1996).

The significance of the development of high-tech areas is due to the possibility of obtaining results and the formation of competences required to implement new priorities of the scientific and technological development of the Russian Federation which meet great challenges. The most important areas of scientific and technological development of the state should take priority in the scientific and technological development of the country, in the framework of which technologies are created and used, solutions are realized that most effectively meet great challenges and which are provided, as a matter of priority, with human, infrastructural, information, financial and other resources. To develop the priority areas, the unity of science, technology, and innovation should be provided as a means of ensuring the sustainable development of society (BUHVALOV, 2016).

In particular, science, technology, and innovation should stimulate dynamic changes in the economy through an increase in labor productivity that affects economic growth. They allow jumping over intermediate stages of development and contribute to the spread of knowledge among countries, enterprises, and industries. Thus, the development of innovative activity in higher educational institutions in the field of high technologies and commercialization of scientific developments of scientists in the country is one of the fundamental

development areas of the socio-economic system of Russia (DEBERDEEVA, POLEVAYA, TARASOVA & TARASOV, 2017).

2. METHODOLOGY

The main objective of the system of higher professional education is to train highly qualified personnel. All the main activities of universities are aimed at solving this problem. While the activity directed at creating and developing the innovative potential of a higher education institution, the commercialization of scientific research and development does not often have the required resource for its implementation (BAYEV & DROZIN, 2015).

The analysis of domestic experience in organizing the system of higher professional education has shown that the main factors that impede the development of innovative activities of a higher education institution are the following:

- 1) A lack of demand for innovative research and development from businesses and manufacturing enterprises;
- 2) A lack of interest in the teaching staff in carrying out innovative activities;
- 3) A low level of financial and time resources.

However, the main problem on the way of developing innovative activity at a university is the lack of demand from business entities for advanced research and development, for the adoption and implementation of scientifically based management and strategic decisions. In this regard, higher education institutions are not able to bring their research and development to the market, which is the reason for the regression of innovation and, as a result, it leads to financial losses. Besides, it should be pointed out that a significant part of research and development carried out in higher education institutions focuses on expanding or creating new fundamental scientific knowledge and is not aimed at commercialization (AMOSOV, 2011).

The interaction of the system of higher professional education with business enterprises and production facilities in Russia today is implemented according to two main models: The involvement of the teaching staff of the university and representatives of the enterprise or organization in joint planning and development of curricula and programs; monitoring and control of the implementation of training;

- 1) Doing custom-made research and development under contracts. This model is a common model of interaction between universities and industry.

The analysis of the content of these models indicates that with such an organization of the educational process, there are several

problems in the field of development of innovative activity and commercialization of research and development:

1. Training provided by the specialized department is focused exclusively on the training of highly qualified personnel;
2. There is no system of motivational incentives to create and implement innovations in the educational process (start-ups/technologies/samples);
3. There is no organizational system of implementation created based on universities for knowledge-intensive research and development on the market.

In this regard, a logical question arises - how to combine the education system and the commercialization of technology? The search for an answer to this question led our team of authors to the conclusion that this problem can be solved by the transfer of technology as a way and opportunity for the innovative development of a higher education institution.

Technology transfer

The transfer of technology is the development process of the innovative activity of a higher educational institution. The process is made up of three blocks, three stages and three phases of activity development.

Content blocks:

- 1) Knowledge, skills;
- 2) Scientific and technological developments;
- 3) High-tech products.

Stage of activity:

- 1) Educational activity;
- 2) Scientific activity;
- 3) Innovative activity.

Stages of development:

- 1) Development of a prototype product (a sample);
- 2) The launch of a product (sample) on the market;
- 3) Self-sufficiency of the created prototype product (sample).

The implementation of the concept transfer of technology allows us to ensure the continuity of the stages and phases of the innovative activity development of a higher education institution (Fig. 1).

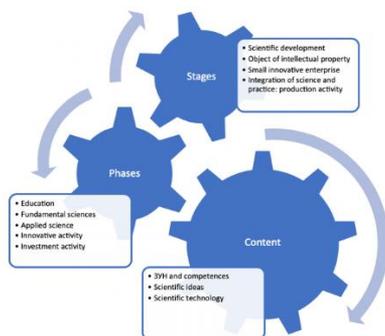


Figure 1: The process of innovative activity development in a higher educational institution

At the first stage of the process of technology transfer, knowledge, skills, and competences are accumulated in the field of innovative technologies. Then, through the mechanisms of internalization and exteriorization, the acquired knowledge is formed into ideas, ideas in technology. Technologies are formalized and registered as intellectual property objects, due to which a prototype product (sample) appears. In the second stage, the preparation of the existing product for launching into the market takes place. The third stage consists of self-sufficiency of the product and its ability to make a profit for investing in the development of the scientific and educational activities of the university (EVSTIGNEEVA & EVSTIGNEEV, 2007).

The analysis of the innovative activity development at the Ulyanovsk State University, Russian State Social University, Financial University under the Government of the Russian Federation (Financial University), Sechenov First Moscow State Medical University and The State University of Management showed that the main area for the

development of innovative technologies of the university is the field of information technology (IT). It is in the field of IT personnel training that the team of authors developed programs for the formation of IT competences which subsequently formed the basis for the development and implementation of the Model of scientific and educational technology transfer.

3. RESULTS AND DISCUSSION

The model of scientific and educational technology transfer in a higher education institution is an organizational component of the educational process aimed at increasing specialists' competences in the field of high technology; the continuity of the educational process, combined with the close integration of education, science, and production; development of the university's innovative activities in the field of high technologies and commercialization of scientific developments (Fig. 2).

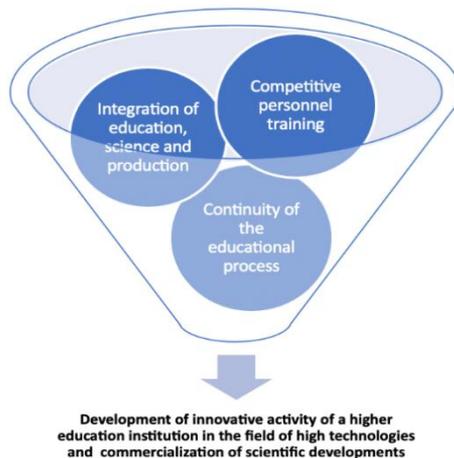


Figure 2: Model of scientific and educational transfer of technologies and innovative training of personnel at a higher education institution

Training of competitive personnel

The success and sustainability of the economic growth of any state are determined by the level of its competitiveness in the world market of products and technologies. Competitiveness, in its turn, directly depends on the human potential which determines the advantages of a highly developed country. Education is called for ensuring the availability of highly qualified and competent human resources to develop the competitiveness of the state. It is education that is the basis for the formation of such a professional person who can resolve socio-economic problems in a dynamically developing society. A professional's personality under current conditions of the country's development should be a complex of socio-psychological characteristics that provide the individual with the opportunity to carry out competitive activities. A factor in the development of a person's competitiveness is its internal environment, activity and the need for self-realization. Competitiveness is a complex of socio-psychological characteristics of an individual which enables an individual to successfully and efficiently carry out professional activities in constantly changing living conditions.

The modernization of the socio-economic sphere of contemporary Russian society led to the development of market relations which also affected the sphere of higher professional education. The development of market relations inevitably led to the expansion of the scope and field of activity of a university graduate. At present, a university graduate is no longer enough to possess the

necessary professional knowledge, skills, and competences. A university graduate should have a set of integral personality characteristics that provide him with the opportunity to successfully adapt to the socio-economic conditions of development in the framework of professional activity. The objective of education in this regard is to form and develop the professional mobility of students (BODRUNOV, NIKITINA & GLUMOVA, 2010).

The development of professional mobility of a student in the system of higher professional education is the formation of professional and qualifying qualities of a person, ensuring the development of free and responsible personality; a person's personality striving for self-development, self-determination, and self-realization; a person capable of quickly adapting to changing living conditions based on his professional education and competency. Thus, one can state that in current conditions of socio-economic development of society, the primary objective of the system of higher professional education, along with the training of highly qualified personnel, is to shape up a competitive and professionally mobile person.

Competitiveness and professional mobility of an individual are those integral and basic characteristics that include a set of abilities, traits and personality traits, as well as forms of behavior patterns that determine a person's potential for success in professional activities, quick adaptability to changing socio-economic conditions, to the ability to effectively master new techniques and technologies in the production process.

The educational process continuity

To achieve the guaranteed quality of innovative training at a higher education institution, the educational process must be carried out continuously from production activity. That is, the educational process should be organized in such a way that the specialist could have all the needed resources to introduce high technology in production. Besides, training programs ready for the commercialization of high technology should ensure the hierarchy of development of students' competences:

Level 1 (basic) - the development of basic competences,

Level 2 - subject-specific competences,

Level 3 - development of practice-oriented competences

Level 4 - development of problem-oriented competences.

An example of the development of students' competences in the process of training is presented in Fig. 3.

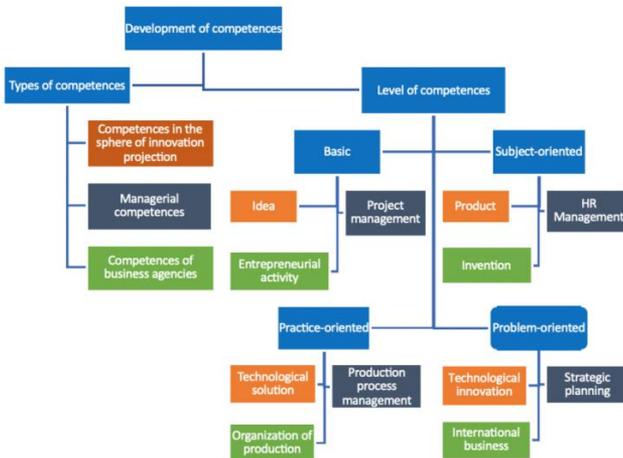


Figure 3: Developing students' competences in the process of training personnel for the commercialization of high technology

Besides, the continuity of training for the commercialization of high technology to develop innovative activities at a higher education institution should include:

- Organization and implementation of professional retraining and advanced training of university staff;
- Organization and implementation of the training of highly qualified personnel, taking account of priority areas of innovative development;
- Organization of interdepartmental cooperation between universities and enterprises/industries/businesses;
- Ensuring international cooperation;
- Implementation of academic mobility;
- Orientation to world educational standards and development strategies;
- Focus on integration into the global educational space;
- Export of educational services, including distance learning.

All components presented in the Model are inextricably linked. Each component includes the previous one and is intended to provide

qualitative changes and development of the subject included in the technology transfer process. Each previous component is a preparatory stage for the next.

4. CONCLUSION

The practice of introducing the model of scientific and educational technology transfer into the system of higher professional education will make it possible to develop innovative activities in the system of higher professional education; to achieve the formation and development of a competitive and professionally mobile personality of a university graduate; to enhance innovative competences of the faculty of a higher educational institution.

Competitiveness and professional mobility of university students are ensured by training, taking account of the conformity with the strategy of socio-economic development of society; the focus of the educational process on innovation and commercialization of research ideas and developments; focus on modern high-tech and resource-saving solutions; practical and industrial orientation of training, orientation to the training of innovation-oriented personnel.

The high quality of personnel training, given the innovative component, is maintained by the use of a multi-level system of evaluating knowledge, skills; engaging highly-qualified Russian and foreign teachers in training; joint activities of representatives of

production facilities/enterprises/businesses and university staff in the development of curricula and training programs; providing the opportunity to choose an individual learning path (individual plan); the use of modern interactive and distance technologies in training; the use of active teaching methods, taking account of the socio-psychological characteristics of the contingent; many options for multidisciplinary training.

Interdisciplinary training comprises the unity of the conceptual and operator-based learning models that provide an appropriate combination of training in general subjects and field-specific ones, using computer information and communication technologies, which act as a powerful tool in solving the problems of professional activity. Interdisciplinary training provides an opportunity to implement training in several disciplinary areas at the same time, the integration of disciplines with the project work of students, the organization of work in the framework of interdepartmental interaction between the departments of a higher education institution (departments, laboratories, faculties, institutes).

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