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**MULTIFUNCTION TECHNOLOGICAL COMPLEXES - THE BASIS OF INNOVATIVE DEVELOPMENT
AND PERSONNEL TRAINING OF RUSSIAN HIGHER SCHOOL***

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Abstract

The development of innovative activity on the basis of universities is very urgent task for the Russian innovation system. Due to the nature of its activities universities, on the one hand, are an important part of the processing line of creation of competitive products in certain sectors, and on the other - serve as direct agents of modernization, eliminating the existing infrastructure "gaps" in the innovation cycle. In this paper the authors focused special attention on examination of innovation activity's questions on the basis of Russian universities. The authors analyzed the positive experience of the Belgorod State Technological University n.a. V.G. Shukhov in this field by an example of multifunctional technological complexes as the basis of innovative development and personnel training of Russian higher school and formulated recommendations aimed at improving the mechanism for stimulating innovative activity and personnel training of the higher school.

Keywords: Multifunction technological complexes, innovations, small innovative enterprises.

Introduction.

Achieving sustainable economic growth and increasing national competitiveness is a complex task, which is determined by the success of the development of economic institutions and the creation of new competitive advantages. In the future sustainable economic growth will depend on the development and implementation of strategies for the active use of knowledge as the basis of the development process. The economy becomes a maximum competitive where knowledge and innovation are created, distributed and used effectively [1,2].

Transition the economy to the innovative socially-oriented model of development is one of the priority directions of further improvement of the economy, science and industry of our country[3]. Today, Russia is at an important stage of its economic, political and social development. The main participant in this process should be and, in fact, is already becoming a Russian youth. Exactly it is the most active part of civil society: the young are better adapted to the implementation of innovative projects and technologies in various fields, they are concentrating fundamentally new knowledge and ideas, they are mobile and full of energy for the building of his life. According to self-esteem, the younger generation considers itself a major factor of stability of development of Russia, and for the most part the driving force of fundamental changes in society. Russian youth is the main customer of a decent future, the main strategic resource of the country [4].

At the present time the country's higher school more interested in acting as a link with the development of public-private partnership in the field of science, education, innovation, and the creation of the expanded structure of the small innovative enterprises (SIE), flexibility in responding to market demands of high technology products [5].

University's assets of infrastructural support of innovation activities perform a wide range of functions, the most important of which are the development of various forms of cooperation between universities, research laboratories, industry and business, as well as assistance to firms in bringing new ideas to commercialization.

In Russia, the company's early stage at the basis of universities, tend to occur in order to commercialize innovative technologies developed in universities. Universities are the right holders of intellectual activity results (IAR). For educational institutions conducting researches largely due to the state budget the legal environment of IAR's commercialization is critically important. It should be noted that the Federal Law № 209-FL dated July 24 2007. "On the development of small and medium entrepreneurship in the Russian Federation" and № 217-FL dated August 2, 2009. "On Amendments to Certain Legislative Acts of the Russian Federation on the establishment by budget scientific and educational institutions of economic entities for practical application (implementation) results of intellectual activity" contributed to the dynamic growth of small innovative enterprises. The main purpose of these laws is to promote the real implementation of created IAR at the production, the exclusive rights on which belong to budgetary institutions of science and education.

At present in Russia it operates a number of universities, successfully developing innovation and implementing modern mechanisms for promoting innovation. Among them - the Belgorod State Technological University n.a. V.G. Shukhov (BSTU n.a.V.G. Shukhov), a leader in the field of innovation activities of young scientists.

The University actively participates in the formation on its basis of innovative infrastructure. The purpose of the implementation of this concept is the creation of a unified educational, scientific and innovation space, which aims to involve young people in innovation [6]. So formed and dynamically develops an effective model of educational, scientific and innovation complex, as a result of which in recent years significantly intensified an activity of students, graduate students, doctoral students and researchers [7].

As a result, the main basic element of the university are scientific and educational innovation platforms, which include the department, research laboratories and small innovative enterprises established with the participation of researchers, and also graduate students and doctoral candidates [8]. As a result, scientific and educational innovative platform provides a complete cycle of training of highly skilled experts, generates new knowledge, innovation developments, output of innovative production [9].

The most important role in the implementation of the model of scientific and innovation activities at the university performed 2 innovative belts, actively interact with each other, allowing to successfully implement the goals and objectives. The first innovative belt - is scientific and educational innovative platforms (the university created 20 of such platforms) and the object of infrastructural support of small innovative enterprises at early stages of their development –The innovation and technology center (figure 1). The last performs a complex of projects: "Innovative Business Incubator", "Business Center", "School of entrepreneurship education in the field of high technologies", etc.

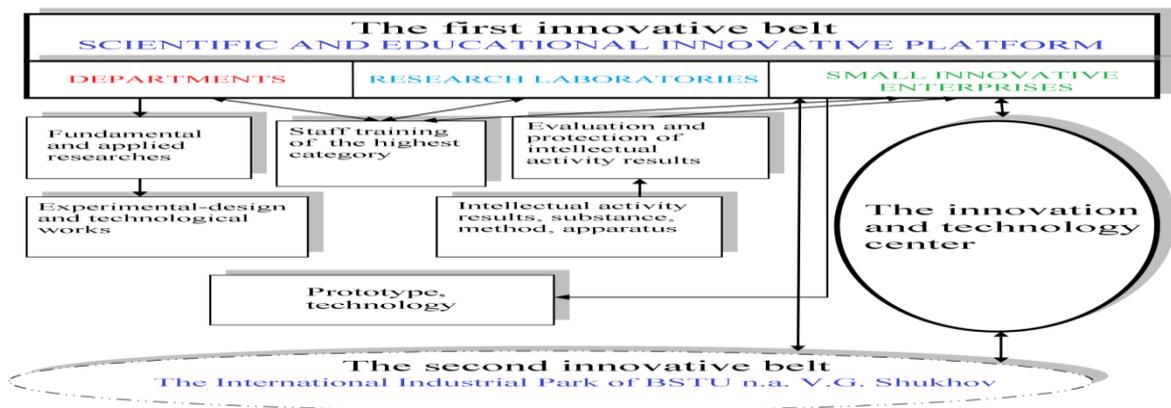


Fig. 1 The mechanism of realization of scientific and innovative activities at BSTU n.a. V.G. Shukhov

As of 01.01.2016 the services of the "Innovative business incubator" are used by 120 small innovative enterprises (SIE), including 98 enterprises organized with the participation of the University. In the authorized capital of these enterprises introduced the right to use intellectual property of the University: inventions, useful models, computer programs. These enterprises operate in the field of energy saving, development of new materials and equipment for

Maxim Vladimirovich Sevostyanov**et al.* /*International Journal of Pharmacy & Technology*
road building and building industries, information technology. An example of an innovative scientific and educational platform that provides a full cycle of training of qualified personnel, is an innovative platform of "Retsikl", generates new knowledge and output of innovative products for road building as part of multifunctional technological complexes (figure 2) [9-12].

The structure of the innovation platform includes the department of "Technological complexes, machines and mechanisms," teaching and research laboratory of "Technological complexes and equipment" and small innovative enterprise "Retsikl-Inteh" [10,11].

Small innovative enterprises get also scientific and consulting support within the "Business Center" project and learn the basics of innovative entrepreneurship in the "School of entrepreneurship education in the field of high technologies". The second innovative belt is The International Industrial Park of BSTU n.a. V.G. Shukhov, it unites about 200 leading industrial enterprises and business of Russia and foreign countries. Provides support for scientists in the implementation of innovations to the industry, promotes the transfer of technology from the university research sector to the industrial sector. As a result of the active implementation of the mechanism of development of teaching, research and innovation complex at the university in 2015, 517 students took part in innovative projects (in 2008 - 130), concluded 103 licensing agreements with enterprises (as of 2008 - 6).

An important part of the innovation development of the university is a state-private partnership with different educational institutions, enterprises (companies, holding companies), business structures of various professional orientation corresponding to the profile of the university. This makes it possible to successfully solve a number of urgent innovative tasks:

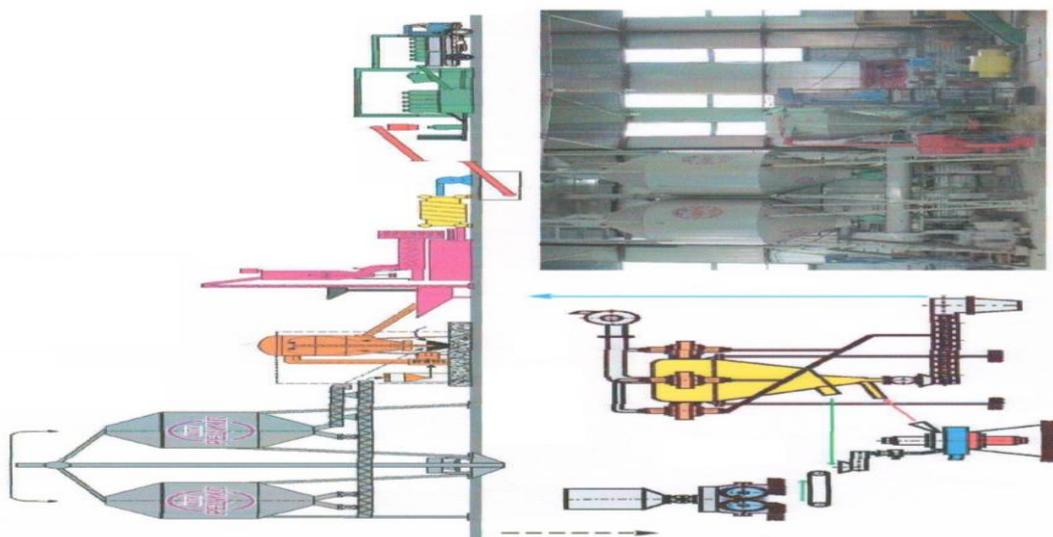


Fig.2 Multipurpose technological complex for the production of mechanically activated composite mixtures and compacted materials.

- to perform a number of innovative projects in the field of continuing professional education (schools, colleges, private institutions of higher professional education, additional professional education, etc.);
- to strengthen professional training by implementing the educational process in the field of real production (creation of basic department sat the enterprises, the organization of bachelors' training at them, ESRWS and diploma's designing on problematic tasks, etc.);
- to expand the range of SIE activities on promising directions of business structures developing (creation of resource and energy saving technological complexes for the production of high-tech building materials and products, including those for individual housing construction, complex processing of techno genic materials and products and the creation of environmentally friendly industries, innovative information technology, etc.);
- to improve the competitiveness of university's graduates into the labor market by expanding the scope of cooperation with employers and providing a feedback with them (the implementation of automated system of employment of graduates developed at the University - the project "Scilbook" with the creation of "competence portfolio" of graduates), etc.

Conclusion. The implementation of only one of the directions of innovation development - is the creation of multifunctional active technological complexes with participation of SIEs it provides to the university a number of advantages:

- accelerated implementation of scientific ideas from conception, competitive assessment till the implementation;
- interdepartmental interaction of scientists on the prospective studies with the involvement of students, graduate students and young scientists;
- temporary employment of students during the period of industrial and diploma practice and employment of graduates of the University on the basis of experimental-industrial productions;
- organization of training, retraining and advanced training of specialists in various areas of research and production and business activities;
- replicating the results of scientific and technical developments, protected by security documents (design documentation, projects, model and experimental-industrial equipment designs) in the production of small and medium business, etc.

At present BSTU n.a. V.G. Shukhov is an active participant in the development of innovative systems of the higher school at the regional and federal level. According to the rating of Federal Agency of Education over the years BSTU n.a. V.G. Shukhov is the first among architectural and engineering universities of Russia. According to the results of

*Maxim Vladimirovich Sevostyanov*et al. /International Journal of Pharmacy & Technology*
independent monitoring of universities by public organizations the University is among the sixteen best Russian higher educational institutions on the quality of training, demand for graduates and their career development activities.

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