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Тогба Стефани Сарах

ОБЗОР МАЛЫХ ИННОВАЦИОННЫХ ПРЕДПРИЯТИЙ ВУЗОВ – ЛИДЕРОВ МОСКОВСКОГО МЕЖДУНАРОДНОГО РЕЙТИНГА «ТРИ МИССИИ УНИВЕРСИТЕТА» ЗА 2021 ГОД

Белгородский государственный технологический университет им. В.Г. Шухова
ул. Костюкова 46, г. Белгород, 308012, Россия

e-mail: stephanietogba@gmail.com

Аннотация.
В статье представлены сущностные характеристики малого инновационного предприятия, цель его формирования. Представлен обзор деятельности трех российских университетов, которые являются лидерами в рейтинге трех университетских миссий Москвы (MosIUR). Этими университетами являются Московский государственный университет имени М.В. Ломоносова (19-е место), Санкт-Петербургский университет (36-е место) и Московский физико-технический институт (44-е место). Для сравнения, проводится обзор малых инновационных компаний Белгородского государственного технологического университета (БГТУ) имени В.Г. Шухова и Белгородского государственного национального исследовательского университета (НИУ «БелГУ») проводится. Автор приходит к выводу, что, несмотря на то, что эти региональные вузы не входят в число лидеров рейтинга, они характеризуются высоким уровнем инновационной активности.

Ключевые слова: инновация, малое инновационное предприятие, университет, рейтинг

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Togba Stephanie Sarah

OVERVIEW OF SMALL INNOVATIVE BUSINESSES OF UNIVERSITIES –LEADERS OF THE MOSCOW INTERNATIONAL RANKING “THREE UNIVERSITY MISSIONS” FOR 2021

Shukhov Belgorod State Technological University
46 Kostyukov St., Belgorod, 308012, Russia

e-mail: stephanietogba@gmail.com

Abstract.
The article presents the essential characteristics of a small innovative enterprise, the purpose of its formation. An overview of the activities of three Russian universities, which are leaders in Moscow Three University Missions Ranking (MosIUR), is provided. These universities are Lomonosov Moscow State University (19th place),

St. Petersburg University (36th place), and Moscow Institute of Physics and Technology (44th place). For comparison, a review of small innovative companies of Shukhov Belgorod State Technological University (BSTU) and Belgorod State National Research University (NRU BelSU) is conducted. The author concludes that despite the fact that these regional universities are not included in the ranking leaders, they are characterized by a high level of innovation activity.

Key words: innovation; small innovative enterprise; university; rating

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Introduction

Modern educational institutions actively implement innovation activities, one of the directions of which is the formation of small innovative enterprises (SIEs).

The objectives of creating SIE in higher education are:

− additional profit;

− implementation of the applied aspect of scientific research and the possibility of direct application of the practice-oriented approach in educational activities. Moreover, the presence of SIE in educational institutions allows universities to be active participants in government programs related to investment and financing the activities of the university.

A SIE, in which university is a co-founder, is a "business entity, created for the purpose of introducing the result of intellectual activity (transfer of technology), exclusive rights to which belong to the university" [Do-It-Yourself…, 2022].

Small innovative enterprises are "one of the ways to commercialize the university developments, which provide additional jobs for academia, students and graduate students at the university" [Who Needs Small Innovative…, 2022].

The United States is the leader in the formation and development of small innovative enterprises. At the same time, researchers (Mills, 2019; Delgado and Mills, 2020) note that approximately 4 of the 6 million small businesses in the USA operate in the local business-to-consumer (B2C) economy. These are restaurants, coffee shops, dry cleaners, and other local businesses, which are the backbone of our communities. Another 1.1 million small businesses are supplier enterprises, those that operate within the supply chain and traditionally sell to other businesses (B2B). And only a small fraction of America's small enterprises (about 200,000) are fast-growing start-ups that are commonly seen as the entrepreneurial source of transformative innovation [Creating "Smart" Policy to…, 2020].

Modern universities actively implement policies to create small innovative entrepreneurship, focused on the "development of innovative ecosystems, which allows to create the necessary environment for their functioning and increase their competitiveness" [1]Sukhinov A. I., Ugnich E.A., 2017.

The objective of this study is to review the activities of three Russian universities which are leaders in Moscow Three University Missions Ranking (MosIUR) in the development of innovative entrepreneurship.

Main part

The Moscow Three University Missions Ranking under study is a fairly new academic ranking that evaluates three strategic areas of higher education (key missions of the university), which are education, science and interaction with society. "The number of universities represented in the global ranking increased in 2021 to 1650 from 1500 a year earlier. According to this parameter, the ranking

is the most representative in the world, the rating list includes universities from 97 countries of the world" [Moscow "Three University Missions", 2021].

Harvard University (USA) is the leader of the 2021 ranking and can be described as a special territory dedicated to excellence in teaching, learning and research, as well as to the development of leaders who change the world for the better. As an active part of the American national innovation system, Harvard University is actively promoting research in fundamental and applied science.

As for Russian universities, Russia retained its position in the TOP-3 world leaders in terms of representation in the ranking (112 universities), yielding only to the USA and China (239 and 144 universities, respectively). There are three Russian participants in the TOP-100 of the MosIUR. They are Lomonosov Moscow State University (19th place), St. Petersburg State University (36th place) and Moscow Institute of Physics and Technology (44th place) [Organization of Innovation, 2011].

Таблица 1

ТОП-5 российских университетов в рейтинге трех университетских миссий Москвы (MosIUR)

Table 1

TOP-5 Russian universities in the Moscow Three University Missions Ranking (MosIUR)

	Place in the ranking	University
1	19	Lomonosov Moscow State University
2	36	Saint Petersburg State University
3	44	Moscow Institute of Physics and Technology
4	120	National Research University Higher School of Economics (HSE)
5	145	National Research Nuclear University MEPhI

Next, we analyze the features of the development of small innovative entrepreneurship in the three Russian leaders of the MosIUR, which are Lomonosov Moscow State University, St. Petersburg State University, and Moscow Institute of Physics and Technology (MIPT).

Lomonosov Moscow State University. The university occupies a leading position in the innovation sphere and has an effective innovation infrastructure, including Research and Development Computer Center, Medical Research and Education Center, International Research and Science Biotechnology Center, Scientific and Educational Center "Hydrocarbon Prospecting, Exploration and Development" (Oil and Gas Center), Scientific and Educational Center of Applied Medicine and Food Safety, Scientific and Educational Center of Nanotechnology, Engineering Center for Industrial Risk Assessment "Technorisk", Center for Analysis of Natural and Anthropogenic Processes, etc.

Department of Science Policy (Department of Scientific Expertise, Department of Innovation and Technology Transfer, Department of Statistics and Research Analysis), Department for the Organization of Research and Training of Scientific Personnel (Department of Organization of Research, Department of Postgraduate Studies, Doctoral Studies and Dissertation Councils) coordinates research and innovation activities of Moscow State University.

This infrastructure allows generation of innovative projects, their support throughout the entire innovation cycle, including transfer, commercialization of scientific developments and technologies at enterprises of the real sector of the Russian economy.

The main activities of companies in the innovation zone of Moscow State University are "chemistry and new materials; biotech-

nology and pharmaceuticals; production of scientific equipment; ecology; information technology, while the volume of production by all companies of the innovation zone of Moscow State University is about 5 billion rubles" [Department of Innovation, 2022].

According to the official website of the Accounting and Monitoring of Small Innovative Enterprises in the Scientific and Educational Sphere of the Ministry of Education and Science of the Russian Federation [Accounting and Monitoring, 2022] (the website is intended for informational-analytical support of functions and powers of the Ministry of Education and Science of Russia in terms of working with small innovative enterprises), the Moscow State University registered the following companies engaged in the development and commercialization of innovations (Table 2):

Таблица 2

Компании, занимающиеся разработкой и коммерциализацией инноваций и результатов интеллектуальной деятельности (созданы в МГУ)

Table 2

Companies engaged in the development and commercialization of innovations and results of intellectual activity (created at MSU)

	Name of the company	Address
1	Center for Advanced Technologies, LLC	12, Leninskadskaya Str., Dubna, 141980
2	Management Company of the Biotechnological Business Incubator of Lomonosov Moscow State University, LLC	1-77, Leninskie Gory Str., Moscow, 119992
3	Geological Scientific and Methodological Center of Lomonosov Moscow State University, LLC	1-77, Leninskie Gory Str., Moscow, 119992
4	Soil and Ecological Center of Lomonosov Moscow State University, LLC	MSU Science Park, 1-75B, Leninskie Gory Str., Moscow, 119992
5	Seismic Data Analysis Center of Lomonosov Moscow State University, LLC	1-77, Leninskie Gory Str., Moscow, 119992
6	Science Festival Directorate, LLC	1-77, Leninskie Gory Str., Moscow, 119992
7	Research and Education Center of Lomonosov Moscow State University "Law and Business", LLC	1-77, Leninskie Gory Str., Moscow, 119991
8	Marine Research Center of Lomonosov Moscow State University, LLC	1-77, Leninskie Gory Str., Moscow, 119992
9	Certification Research Center "Thermal Insulation", LLC	1-77, Leninskie Gory Str., Moscow, 119234

St. Petersburg State University. Striking examples of the formation and development of innovative entrepreneurship at St. Petersburg State University are:

− St. Petersburg State University Center for Geology (LLC), which provides services in the field of geological study of the subsoil of various profile;

− St. Petersburg State University Center for Information and Diagnostic Systems (LLC), engaged in the development of software for nuclear medicine, which has no analogues in the country, therefore others are also popular.

Таблица 3

Компании, занимающиеся разработкой и коммерциализацией инноваций и результатов интеллектуальной деятельности (созданы в Санкт-Петербургском государственном университете)

Table 3

Companies engaged in the development and commercialization of innovations and results of intellectual activity (created at St. Petersburg State University)

	Name of the company	Address
1	St. Petersburg State University Center for Geology, LLC	1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
2	Research Center for Information Technologies of St. Petersburg State University, LLC	1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
3	Non-Local Plasma Technologies, LLC	1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
4	Law Enforcement Monitoring Center of St. Petersburg State University, LLC	7-9-11-B, Universitetskaya Emb., St. Petersburg, 199034
5	North-Western Gemological Center of Expertise and Certification, LLC	7-9-11-B, Universitetskaya Emb., St. Petersburg, 199034
6	ISTIOFORUS, LLC	1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
7	Laser Chemistry, LLC	1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
8	SPbU Chem Tech, LLC	8H Rm., 37-A, Yuri Gagarin Ave., St. Petersburg, 196135
9	PHARMATITAN SPbU, LLC	7-9-11-B, Universitetskaya Emb., St. Petersburg, 199034
10	St. Petersburg State University Innovative Center of Environmental and Industrial Technologies, LLC	242 Rm., 1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
11	St. Petersburg State University Integrated Marine Research Center, LLC	235 Rm., 1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
12	SPbU Bio Tech, LLC	228 Rm., 1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
13	St. Petersburg State University Research Center for National Economy, JSC	163 Rm., 7-9-11-B, Universitetskaya Emb., St. Petersburg, 199034
14	SPbU Dynamics, LLC	30 Rm., 8, Road to the Turukhtan Islands Str., St. Petersburg, 198096
15	Water Center of St. Petersburg State University, LLC	32 Off., 15-H, 24-1-A, Odoevsky Str., St. Petersburg, 199155
16	Magnetic Resonance Research Centre “Spinus” of St. Petersburg State University, LLC	935, 1-H Rm., 1-A, Ulyanovskaya Str., Peterhof, St. Petersburg, 198504
17	Center for Urbanism and Urban Planning of St. Petersburg State University, LLC	
18	Center for Scientific and Applied Developments of St. Petersburg State University “Method”, LLC	
19	Center for Comprehensive Biomedical Research of St. Petersburg State University, LLC	236, 235, 1-H, 1-A, Ulyanovskaya Str., Peterhof, St. Petersburg,

Moscow Institute of Physics and Technology. Research at MIPT covers a wide range of areas of theoretical and experimental physics, energy and biomedicine, chemistry, and applied mathematics.

Таблица 4

Компании, занимающиеся разработкой и коммерциализацией инноваций и результатов интеллектуальной деятельности (созданы в Московском физико-техническом институте)

Table 4

Companies engaged in the development and commercialization of innovations and results of intellectual activity (created at Moscow Institute of Physics and Technology)

	Name of the company	Address
1	PhysTech-Aviation, LLC	125 Apt., 16, Gagarin Str., Zhukovsky, 140180
2	NordLab, LLC	MIPT Bio Business Incubator, 9, Institutsky Ln., Dolgoprudny, 141700
3	Small Innovative Enterprise “FALT-ENGINEERING”, LLC	110 Rm., 16, Gagarin Str., Zhukovsky, 140180
4	MIPT Oil and Gas Center, LLC	3 Off., 6, Angarskaya Str., Moscow, 125635
5	PhystechBiomed, LLC	32 Rm., 4-1, Likhachevsky Dr., Dolgoprudny, 141700
6	1C-MIPT, LLC	3, Pervomayskaya Str., Dolgoprudny, 141700
7	MIPT Engineering Center for Minerals, LLC	212 Rm., 9-3, Institutsky Ln., Dolgoprudny, 141700
8	MIPT Business Accelerator, LLC	35 Rm., 7-2-I, Derbenevskaya Emb., Moscow, 115114
9	Biophysical Technologies, LLC	2-44 Rm., 9-2, Institutsky Ln., Dolgoprudny, 141707

Special attention should be paid to universities, which are leaders of innovation activity in Belgorod Region:

− Shukhov Belgorod State Technological University (BSTU) V.G. is one of 33 supporting universities of the Russian Federation. Author is the graduate student of BSTU;

− Belgorod State National Research University (NRU BelSU) is a university on the basis of which the partnership of participants of the World-class Scientific and Educational Center “Innovative Solutions in the Agro-Industrial Complex” is integrated. NRU BelSU is an integrator of network interaction of participants of the Belgorod Regional Scientific and Educational Center.

Innovation activity of Shukhov Belgorod State Technological University (BSTU) is aimed at:

− “development of effective mechanisms for the formation and development of innovation (entrepreneurial) infrastructure of the university, including in the scientific, industrial, educational and social spheres;

− creation of favorable conditions for the practical implementation of the results of intellectual activities, the right holder of which is Shukhov BSTU, as well as for the practical application of the knowledge received by students as part of their training on university educational programs;

− formation and maintenance of the image of the university as an innovative and entrepreneurial higher educational institution of Russia by positioning it not only as an educational and scientific center, but also as a center of commercialization of knowledge (inno-

vation and business center)" [Official website of BSTU, 2022].

Innovation infrastructure of Shukhov BSTU is quite extensive and includes Innovation and Technology Center, Business Incubator, Technopark, Project Office, Regional Center of the Central Federal District.

According to the database of the Accounting and Monitoring of Small Innovative Enterprises in the Scientific and Educational Sphere of the Ministry of Education and Science of the Russian Federation, Shukhov BSTU has registered 41 enterprises engaged in the development and implementation of intellectual property results in various areas (construction industry, software, educational process, and managerial competencies). Some of them are TechCeram, LLC (main inventions of the company are the method for manufacturing ceramic products, and the method for preparing ceramic barbotine), Innovative Technologies and Machine Building Equipment (LLC), Scientific and Technical Center "Modern Integrated Automation Methods" (LLC), Development of Process Equipment and Complexes (LLC), Intellect Factory of Information Technology (LLC), Industrial Intellect (LLC), ECO-TECH (LLC), Belgorod Technical Expertise and Diagnostics (LLC), Modifier (LLC), Composite (LLC), Scientific and Technical Center "Modern Corporate Systems" (LLC), Business Project of BSTU (LLC), Energy Management (LLC), Center for Management Innovation (LLC), Shukhov Motors (LLC), etc.

As part of the strategic development program, Shukhov BSTU has developed methodical recommendations "Small Innovative Enterprise Step by Step", where organizational-economic and regulatory framework for the creation of a small innovative enterprise at university is algorithmically presented.

Belgorod State National Research University (NRU BelSU) is the oldest university in Belgorod Region and has a huge research and educational potential.

The key results of NRU BelSU in 2021 were: "the university has entered another prestigious world institutional ranking of the British company QS (Quacquarelli Symonds), taking a place in the 1001-1200 group. The university has the highest scores in terms of the number of foreign students (303rd in the world) and in terms of reputation scores based on feedback from academics and employers (group 501+). In terms of the "teacher-student" ratio the university has taken 524th place in the world, in terms of the number of foreign teachers and the citation index per 1 scientific and pedagogical worker the university is in group 601+. According to the International Global Ranking of Scientific Institutions SCimago, NRU BelSU occupies 590th position out of 4,156 universities in the world, and 37th position out of 155 universities in Russia. In the ranking of innovative universities, based on their impact on the socio-economic development of regions, NRU BelSU is in 70th position [Official website of Belgorod State, 2022].

The main directions of innovation activity of NRU BelSU within Scientific and Educational Center are "biotechnology, breeding and genetic research, cellular technologies and genetic engineering (animal and plant genetics), digital transformation of agro-industrial complex and resource-saving technologies, technologies for functional, healthy food products, storage and processing of agricultural products" [Research and Education Center, 2022].

There are 22 small innovative enterprises (SIE) with the participation of the university in NRU BelSU. These SIEs are BelSU Electronic Systems (LLC), Armalit31 (LLC), ZirconiumPro (LLC), "Chernozemye" Geocenter (LLC), Vacuum Technology Systems (LLC), Research and Production Enterprise "Diagnostic Systems" (LLC), Engineering Center of NRU BelSU (LLC), BelSU Center for Analytical Research (LLC), BelSU Control and Measuring Devices (LLC), BelSU "GeoStroyMonitoring" (LLC), Research and Production Enterprise "BelSU Biotech" (LLC), BelSU Geomonitor (LLC), etc.

The results of the operation of these small innovative enterprises are actively and successfully passing the stage of commercial-

ization in the real sector of the economy of both Belgorod Region and Russia as a whole.

Comparing the results of the conducted overview of innovation activities of universities, it is possible to note that Russian universities regardless of the position in the ratings are actively implementing innovation policy, while creating and developing small innovative businesses.

Conclusion

According to many experts, the main barriers to the creation and development of small innovative enterprises at universities are bureaucratic mechanism and a significant amount of documentation, mistrust between the administration of universities and academia, determining the university's share in the company, difficulties in providing space for project work, and the complexity of closing down nonoperating companies.

To solve these problems, it is necessary to improve the regulation system in universities, to simplify lease and access to business incubators, to form an effective stimulating policy and reward system for the creation and successful development of a small innovative enterprise at educational institutions.

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Тогба Стефани Сарах, аспирант, Белгородский государственный технологический университет им. В.Г. Шухова, (г. Белгород, Россия)

Togba Stefani Sarah, Graduate Student, Shukhov Belgorod State Technological University, (Belgorod, Russia)