

08.00.00 Economic sciences

08.00.00 Экономические науки

UDC 33

**Role of Universities in Forming a Competence of Innovative Activity
as an Essential Factor of Successful Realization of a Strategy
of Innovative Development of the Russian Federation Until 2020**

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Abstract. World economic crisis of 2008-2009 slowed down a development of Russian innovative system. Dedicated federal target programs have been worked out in order to restore after-crisis situation in the country and speed up a transfer to an innovative development. These programs envisage a range of activities aimed at forming competences of innovative activity, improvement of forms and scale of personnel training and re-training programs in engineering and scientific specializations, enhancing a range of educational programs in innovative entrepreneurship and technological management.

The article describes mechanisms of attracting students, postgraduates and young researchers to solving tasks of Russia's innovative development until 2020.

Keywords: world crisis; world recession; post-crisis development; internal and external challenges; competences of innovative activity; innovative entrepreneurship; technological management; strategy of innovative development.

Introduction

Main tasks of Russia's long-term development for decades to come are in provision of a high level of welfare of society and fixing country's geo-political role as of one of the leaders determining modern geopolitics [2]. The only possible way to reach these aims is a transfer of economy to an innovative socially oriented development model. Unfortunately, world economic crisis of 2008–2009 has complicated a realization of these plans, has led to cutdown of expenses of state and private businesses on innovations and investments and has slowed down development of Russia's innovative system. Post-crisis restoration and speed-up of transfer to an innovative development will have to be accomplished taking internal and external challenges into consideration, those challenges Russia is facing.

Key external challenges include:

1. Speeding up technological development of the world economy. Technological revolution in resource-saving and alternative energy is sharply increasing uncertainty in Russia's development whose main specialty in world markets is export of conventional energy products.

2. Key anti-crisis measure of the world's leading countries – multi-billion investments in development of medicine, bio-technologies, nuclear industry and information technologies.

3. Strengthening of competitive struggle for highly qualified workforce, investments, new knowledge, technologies and competences. While efficiency of an innovative system in Russia is low, it prerequisites drain of competitive personnel, technologies, ideas and capital from the country.

4. Modern global climate change.

Main internal challenges include:

1. Highly-technological industries suffered mostly from the crisis: aircraft industry, shipbuilding, space engineering, electronics.
2. Climate change, food security [1, 6].
3. Lag behind of certain specific branches of scientific research and technological development, aging of scientific personnel.
4. Absence of competitive environment stimulating use of innovations.
5. Inactive integration of Russia's innovative system into the world system
6. Low level of interaction between science and business
7. Low demand for innovations in Russian economy (purchase of ready-made equipment abroad instead of implementation of new home-made products)
8. Neither private, nor state businesses are not interested enough in implementation of innovations.

It is clear that successful solving of a task of innovative development of the country is impossible without development of intellectual creativity of young people (students, postgraduates, school students), their involvement into scientific and innovative activities, exposure and support of gifted youth. From the standpoint of creation of a country's efficient innovative system particularly important is a high level of higher education in scientific and engineering profiles.

During recent years in the Russian Federation state budget financing of fundamental scientific programs and their applications has been improved, federal target programs have been implemented, state funds for financing of science have been founded. Differentiation of institutions of higher education is almost complete: national, federal, national research universities. About 8.42 bln rubles have been allocated to universities in 2009-2010 only for development of research activities and innovative infrastructure.

But the situation in education is characterized by a range of negative trends. Quality of education leaves much to be desired at all levels – from comprehensive, basic and secondary professional education to higher and postgraduate [4, 9]. According to international ratings, Russian universities are not listed in the top-100 of the world's best universities. There are structural problems including out-of-date models of management of work process, absence of staff, those including faculty and managers [4].

An issue of aging of the faculty is also quite complicated. For example, in 2008 a share of scientists younger than 29 was 17.6 %, 30–39 years – 14.2 %. At the same time a share of researchers aged 60 and older has grown during last 8 years from 20.8 % to 25.2 %.

It is important to note that there are federal target programs of support of school students, university students and postgraduates. Attracting students and postgraduates (not less than 40% of total of temporary faculty) is mandatory for implementing projects according to a federal target program “Scientific and education staff for innovative Russia” for 2009-2013 [3]. At least 50% of allocated funds are for financial support of young researchers, including students and postgraduates.

Starting from 2011-2012 institutions of higher education implement a program of targeted support of young researchers at an expense of additional scholarships. Gifted students deeply involved in research activities get a monthly scholarship up to 25-30 thousand rubles. One of the criteria which is taken into consideration when confirming an extra scholarship is publishing articles in magazines approved by State Commission for Academic Degrees and Titles, taking part (as speakers) in international and national conferences, as well as results of intellectual activities.

Besides targeted support of young researchers in order to develop a system of student self-management and increase of role of students in modernizing higher professional education in February 2012 Ministry of Education and Science of Russia has announced a contest of programs for development of activities of university students. The contest is aimed at development of self-government of students, creation of conditions for their professional adaptation and enhancement of their professional competences, social-cultural development and integration into civil society. The winners of this contest were 94 universities. Project term is 2 years (2012-2013) with budget subsidies up to 40 mln rubles per year.

Thus a priority trend in development of the country are human resources, training of personnel of a new formation, improvement of education level: from general secondary, higher and secondary professional to training scientific staff [4, 9, 8].

Besides issues with personnel training able to create new knowledge and use them for innovations it is essential to create culture of borrowing and adaptation of technological innovations. For example, according to data of the World Economic Forum 2009 Russia in 2009 was ranked 41 out of 133 in “Ability of companies to borrowing and technology adaptation” (similar to Cyprus, Costa-Rica and UAE).

A share of expenses for research and developments in GDP of Russia is 1.25 %, in Germany it is 2.82 %, in Sweden – 3.92 %, in Finland – 3.96 %, in Israel – 4.27 %. A share of companies involved in working out and implementation of technological innovations in Russia is 9.4 %, while in Germany – 71.8 % (Fig. 1). On the average, around 50 % of companies in Belgium, Estonia, Finland and Sweden annually develop technological innovations. This figure in Russia at the moment is 5-8 times lower than in EU countries.

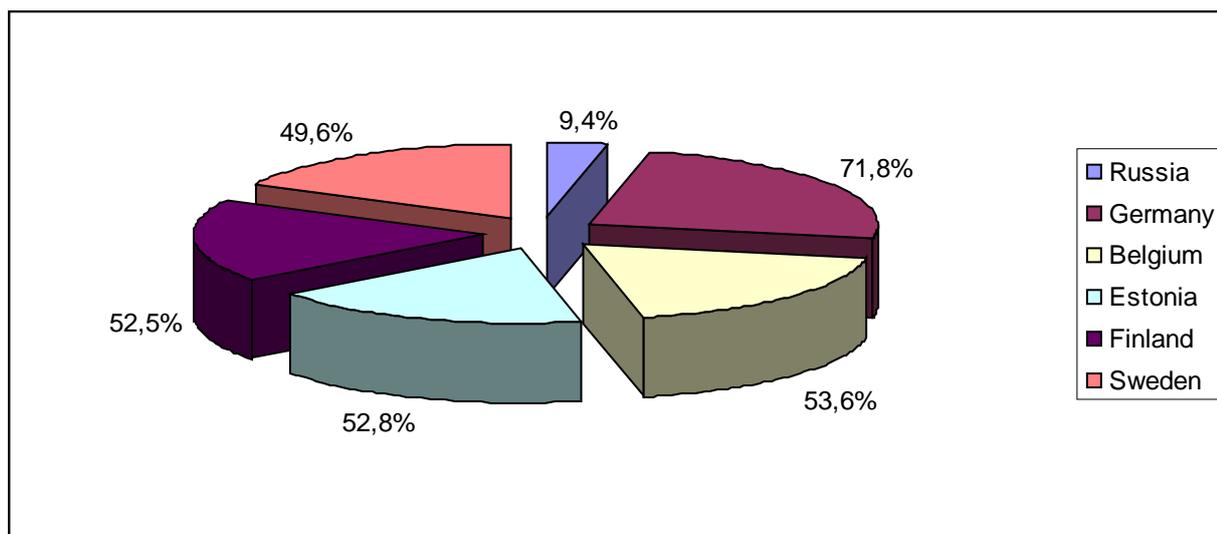


Fig. 1: Share of companies involved in working out and implementation of technological innovations. Data is used from [12].

A share of expenses for technological innovations, in the overall volume of expenses for production of shipped goods, provided services in Russia is 1.9 %, in Sweden – 5.4 %, in Finland – 3.9 %. A share of produced goods and provided services in the global volumes of export of highly-technological produce (civil purpose) in Russia is 0.25 %, in china – 16.3 %, in the USA – 13.5 %, in Germany – 7.6% (Fig. 2).

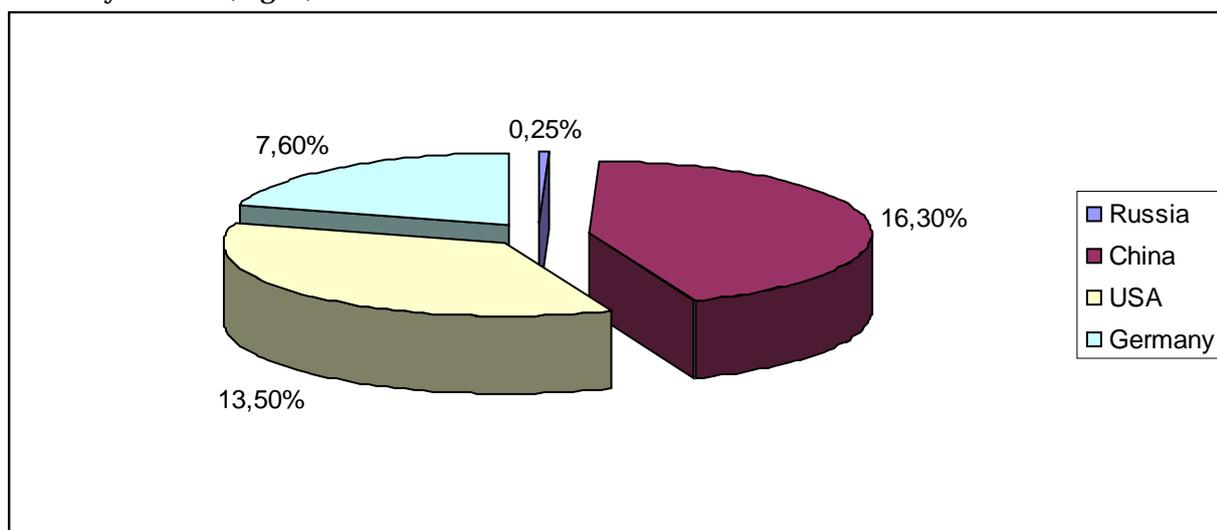


Fig. 2: Share of produced goods and provided services in the global volumes of export of highly-technological produce (civil purpose) (according to data listed in [12]).

It is important to note that if a share of costs for research and development in GDP of Russia is 2-4 time lower than in other countries, then a share of produced goods and provided services in the global volumes of export in Russia is 30-60 times lower than in Germany, USA and China (see Fig. 2).

A system of public-private partnership (PPP) is not developed in a sufficient way in our country in terms of innovative projects. A share of companies receiving subsidies from federal budget for these purposes in Russia is 0.8%, in Germany – 8.8%, in Belgium – 12.7%. Amount of programs of scientific research for innovations in small and middle-scale businesses and in technology transfer is: in the USA – 2 bln US dollars, in Russia – 67 mln US dollars (support of farming). A fund of support of development of small scientific businesses is just 113 mln US dollars. Efficiency of venture capital funds is extremely low. Federal law FZ-94 also negatively influences purchases of innovative products. According to an international rating “Business 2011” Russia is ranked 120 out of 183 [12]. The only examples of successful public-private partnership in Earth satellite monitoring programs are listed in [5, 7, 10].

In order to overcome challenges and threats Russia is facing on the way of innovative development, to define goals, set priorities and tools a “Strategy of innovative development of the Russian Federation until 2020” was created [2, 12].

The main aim of the Strategy is a transfer of Russia’s economy to an innovative way of development by 2020, which is characterized by the following features:

1. Increase of share of industrial companies implementing technological innovations up to 40-50% by 2020 (2009 – 9.4%);
2. Increase of share of highly technological products and services in the global market (nuclear industry, aviation, space engineering and services, special shipbuilding etc.) up to 5-10% in 5-7 and more branches of economy by 2020;
3. Increase of share of innovative products in the overall volume of industrial produce up to 17-20% by 2020;
4. Increase of share of publications of Russian researchers in the overall amount of publications in the world’s scientific magazines up to 3% by 2020;
5. Increase the number of patents annually registered by Russian companies and individuals in patent agencies of the European Union, USA and Japan up to 2.5-3 thousand patents by 2020 (2009 – 63 patents);
6. Increase of share of funds received thanks to research and scientific works in a structure of financing allocated for Russia’s leading universities up to 25%.

In order to realize all listed indicators in education it is proposed to fulfill the following activities of the Strategy of Russia’s innovative development until 2020:

1. Forming competences of innovative activities

- 1.1. Enhancement of forms and scale of training and re-training programs in engineering;
- 1.2. Enhancement of scale of training programs in innovative entrepreneurship and technological management in higher and extended education;
- 1.3. Support of continuous education in companies, realization of training and internship programs for the personnel of companies, of development of corporate and branch centers of professional training of personnel, companies involved in standardization and certification;
- 1.4. Launch of program of popularization of scientific and innovative activity;
- 1.5. Target financing of higher and postgraduate education abroad;
- 1.6. Allocating state grants and scholarships to the most prominent researchers;
- 1.7. Enhancement of mechanisms of support of technical and scientific creativity of children;
- 1.8. Implementation of a set of measures on modernizing general education in regions of Russia.

It is planned to introduce significant amendments into Russian educational legislation which will be aimed at:

- Introduction of norms allowing building efficient management models in educational institutions, among them – mechanisms of state-public management, supervisory and steering boards;
- Definition of state-public management bodies formation rules, their functions, authority, also in terms of relations with heads of educational institutions;

- Improvement of a regulation model of activities of educational and scientific institutions (also in terms of reports and control), certain research teams and scientists in order to enhance capabilities for innovative development and distribution of best practices.

A level of expenses on science, education and innovations in economy should reach a level of countries of OECD by 2020.

Regarding higher educational institutions characterized by a presence of internationally competitive science schools, in the framework of science and technology development priority spheres in the Russian Federation an increase of estimate norms will be done to develop educational programs.

One of priorities is an expansion of state subsidizing of interest rates and provision of state guarantees for educational loans granted for education in country's leading universities and abroad.

Amounts of budget financing of activities will grow in the framework of support of small and medium-size businesses, implementation of State plan of training management personnel for Russia's economy, activity of the Fund of support of small businesses in technological sphere. The financing will also be provided to an innovative activity of companies which is implemented in the framework of priorities oriented towards modernization and technological development of Russia's economy and was approved by a Presidential Modernization and Russia's Economy Technological Development Commission. Financing will be provided by a Federal state autonomous enterprise "Russian fund of technological development".

In order to develop innovative infrastructure to a sufficient extent a financing of setting up an innovative center "Skolkovo" will be provided alongside with financing an infrastructure of technically-specific economic zones and technical parks.

But even existing higher education institutions have broad capabilities for active participation in certain activities of the Strategy of innovative development of Russia until 2020.

Federal state budget-funded educational institution of higher professional education "Sochi State University" (FSBFEI HPE "SSU") is providing professional training and education in engineering and scientific profiles as well as in higher education and also provides postgraduate education (for students and PhDs).

Engineering profiles include: "Traffic safety and management", "Civil construction and economy", "Real estate management and appraisal", "Engineering geology, permafrost studies and soil studies", "Construction structures, buildings and facilities", "Hydraulics and engineering hydrology", "Alternative energy sources", "Technical aesthetics and design". Scientific profiles include: "Geography", "Mathematics", "IT studies", "Physiology" (physical culture and sport, physical culture for people with disabilities), "Reprocessing and recycling of wood (landscape construction)" and others. University graduates work in companies of the Southern and North-Caucasian Federal districts as well as in other regions of Russia and abroad.

In recent years (2009–2012) Sochi State University has created new scientific and innovative infrastructure which includes: Science and Technical council, Young Researchers' Council, Student scientific communities in faculties, science department, patent and R&D department, information support and scholarship department, 3 scientific educational centers, 5 small-scale innovative companies (set up in accordance with the Federal law FZ-217).

Scientific educational centers "Systematic research of environment and geo-ecological safety of recreational areas", "Engineering-environmental research, mathematic modeling and information technologies" and "Institute for research of tourism and hospitality developing markets" carry out research work in scientific, engineering and humanitarian profiles. Their personnel participate in various federal target programs. For example, scientific educational center "Systematic research of environment and geo-ecological safety of recreational areas" was awarded a grant of a Federal target program "Scientific and educational human resources of the innovative Russia" to carry out R&D work in "Scientific research made by staff of scientific and educational centers participating in the 7th EU Framework Program in technical and natural sciences" (code 2010-1.1-234-069) on a topic "Comprehensive research of the Black sea coastal areas environment in global climate change for elaboration of recommendations in sustainable development of tourist destinations based on EU expertise" (bid code 2010-1.1-234-069-066, state contract

No.02.740.11.0856 of June 28, 2010). Chief project researcher – Geography ScD, Professor, corresponding member of the Russian Academy of Natural Sciences N.M. Pestereva.

Five small-scale innovative companies (as limited liability companies) were set up on a basis of expertise of the university faculty. These include: “Service technologies” LLC, “Geo-informika” LLC, “Alva-Sochi” LLC, “Aqua-service-tour” LLC and “Geo-kurort” LLC.

Fundamental and applicable research as well as consulting activities are carried out in the university in 23 academic profiles (natural, technical, economic, humanitarian, education and other sciences). Research in tourism and hospitality are one of the top priority ones.

Training of academic and education staff is provided by the university’s postgraduate department in 17 profiles and by center for doctoral training in 1 profile (university’s website – www.sutr.ru).

In connection with Sochi’s hosting XXII Olympic and XI Paralympic Winter Games in 2014 research work is, to a large extent, oriented towards theoretical and application-oriented tasks for the Games preparation and hosting. For instance, “Scientific methods of justifying coast protection in no-tide seas” (research advisor, ScD in engineering, professor K.N. Makarov), “Traffic intensity in Sochi” (ScD in engineering, associate professor A.I. Tkachev), “Research of regional peculiarities and creation of a model of Black sea coastal forests eco-system monitoring in climate change and human-caused influence conditions” (ScD in biology, professor N.A. Bityukov), “Scientific methods and research in tourism” (ScD in economy, professor G.M. Romanova); “Scientific methods for development of health education as an extra profile for physical culture discipline at the university” (PhD in education, associate professor I.L. Udoenko, assistant G.A. Abramishvili) and others.

For example, in 2011 Sochi State University has done 50 scientific researches at an expense of federal budget and off-budget funds (grants, state contracts, private contracts, municipal contracts) totaling in 26 600 000 rubles.

Intellectual property rights protection has been significantly strengthened in recent years. Every year the university obtains more than 10 certificates of intellectual property rights registration in the Federal Intellectual Property Rights Service. In April 2012 Sochi State University set up an “International center of technologies and innovations” together with the Federal Institute of Industrial Property Rights (Moscow) and World Intellectual Property Organization (Geneva, Switzerland). Main tasks of this center are attracting students, postgraduates and young researchers to innovative activities and intellectual property rights protection.

In April 2012 Sochi State University was awarded a winner of the program of Ministry of Education and Science of Russia “Program of support and development of self-government and self-organization of students”. Project’s main objectives are:

- Development of student self-government system;
- Increase of role of students in modernizing higher education;
- Involvement of students in educational, scientific and innovative management of the university;
- Support of students’ scientific communities, research bureaus and laboratories, youth innovative centers and think tanks.

In the framework of this project new students’ research societies are created at the university as an integral part of existing scientific and innovative infrastructure of the university. These are: students’ think-tank “Energy saving and energy audit”, students’ engineering bureau “Hydraulics and engineering hydrology”, students’ “Center for support of technology and innovations development”. Besides the creation of new structures, existing ones (scientific societies) will be supported: students’ laboratory “Historical regional studies” and students’ academic economic community “YES”. The faculty of Sochi State University, students and postgraduates will take an active part in this and will contribute to the innovative development of Russia until 2020.

Conclusion

Thus we hope that state mechanisms of support and involvement of students, postgraduates and young researchers to creation of highly-technological industries and innovations via Federal target programs will help to reach some of the objectives of the Strategy of innovative development of Russia until 2020 quite successfully.

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УДК 33

Роль университетов в формировании компетенции разработки новых технологий как необходимый фактор успешной реализации стратегии инновационного развития Российской Федерации до 2020 года

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Аннотация. Мировой экономический кризис 2008–2009 гг. замедлил развитие инновационной системы России. Специальные федеральные целевые программы были разработаны с целью возрождения послекризисной ситуации в стране и ускорения перехода к инновационному развитию. Данные программы предусматривают ряд действий, направленных на формирование компетенций разработки новых технологий, улучшение видов и масштабов программ подготовки и переподготовки кадров инженерных и научных специальностей, увеличение количества образовательных программ инновационной предпринимательской деятельности и технического менеджмента.

В статье описываются механизмы привлечения студентов, аспирантов и молодых ученых к решению задач инновационного развития России до 2020г.

Ключевые слова: мировой кризис; мировой регресс; пост-кризисное развитие; внешние и внутренние проблемы; компетенции разработки новых технологий; инновационное предпринимательство; технический менеджмент; стратегия инновационного развития.