

Analysis of the Russian Experience in Formation of Entrepreneurial Universities within the Context of the Triple Helix Model as a Factor of Economy Endogenous Growth

Análisis de la experiencia rusa en la formación de universidades emprendedoras en el contexto del modelo de triple hélice como factor de crecimiento económico endógeno

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ABSTRACT:

The present research is dedicated to the Russian experience in formation of entrepreneurial universities within the Triple Helix Model (TH Model). The work describes theoretical foundations of the TH Model, as well as basic approaches to development of the concept of entrepreneurial universities (EUs) as the main actors in creating innovations. They have been based on various applications of the scientific abstraction, namely comparisons and classifications that define a systematic approach to the study of economic processes. The analysis made it possible to identify the specifics of the EUs formation in Russia in view of specific internal

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socio-economic factors. Despite the fact that formation of such universities is still at the initial stage, this work presents irrefutable evidence of its success. Special attention is paid to the study of the role played by the EUs in the endogenous regional development. The work identifies the problems that prevent transition of EUs in Russia in a self-developing state, and suggests certain methods to overcome them.

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1. Introduction

The modern state of the global economy is determined by acceleration of those processes that change the main vector of development. It is possible to say with confidence that the beginning of the 21st century is the time when a new type of economy is being formed, and the knowledge sector plays a decisive role. Its development has become the dominant source of endogenous economic growth. Innovations have turned into a strategic factor that influences the structure of social production.

Based on the world's richest experience, the modern innovation theory has formed a new scientific approach to studying the processes taking place in national innovation systems (NIS). The biological analogy applied to the institutional views of economists made it possible to present a complex multi-level partnership: universities, business and government in the form of a social construct. Similar to the structure of the spiral DNA molecule, this design has an increased adaptability to constantly changing external influences.

The Triple Helix Model (TH Model), named after the hydraulic screw (triple helix water screw), has generated a considerable interest (Etzkowitz 2008). This is confirmed by numerous scientific studies dedicated to both the problems of the NIS formation in general and the development of their individual elements, in particular, universities (science). These are the universities that, within the TH Model, are transformed into entrepreneurial universities (EUs) or industrial universities (IU) and become the main actors of the innovation process (Etzkowitz and Leydesdurff 1995).

Traditionally it is believed that the TH Model may be realized only in advanced economies (USA, Norway and European Community). However, the uncertainty in the development of the global economy, aggravated by global political instability, has made some adjustments. In order not to lag behind the impetuous innovative race, Russia must develop a strategy for implementing a model of self-developing NIS, which will become the main factor in the endogenous growth of its economy. As never before, the Russian government is clearly aware of the need to transform the economy from the resource-based to the highly innovative type. It plans to build an effective self-developing NIS, which will become the main endogenous factor in the growth of the national economy in the perspective. Since 2008, the Russian Government has consistently implemented the state programs to accelerate innovation development. The results of these programs are certain transformations, primarily in the scientific sector, namely in higher education. The process of transformation of the traditional Russian universities into EUs is just at the initial stage. However, it is already possible to identify both the achievements of this process and certain blocking problems. At the same time, no comprehensive analysis of the development of EUs at a modern historical stage has been made in Russia yet.

The aim of this study is to carry out a comprehensive analysis of the Russian experience in forming EUs within the context of the Triple Helix Model as a factor in the endogenous growth of its economy.

The third and fourth sections hereof consider theoretical foundations and basic concepts of the development of EUs in order to understand the basic principles to create the TH Model. The fifth

section refers to the analysis of the appropriate Russian experience. The sixth refers to discussion hereof, the main positive and negative aspects of the process, and suggests methods to overcome difficulties.

2. Theoretical Background and Methodology of the Study

The methodological framework of this study includes fundamental works of certain foreign and Russian scientists and practitioners dedicated to the problems of the global economy development, the theory of economic modernization, economic growth and innovative economy. The author has applied dialectical and systematic approaches to study economic processes and phenomena, within whose framework various manifestations of the scientific abstraction have been used, namely the methods of comparison and classification. The author has conducted an empirical study, the information base of which comprises the normative acts on economic and social development of the Russian Federation, disclosed statistical data of international organizations, annual reports issued by the Russian agencies and authorities, as well as web resources of the Russian universities, articles and monographs of Russian and western economists.

3. Theoretical Basis of the Triple Helix Model

The world economy stands at the threshold of global changes in the innovation system. First, the complicating factor is the logic of the science development, which forms an increasing number of synthetic trends that unite research of an interdisciplinary nature. The key to overcome uncertainty in the development of the world economy is to develop the NBIC (nano-, bio-, info- and cognitive) technologies. The result will be a significant increase in the number of participants in innovation and the complication of relationships between them.

Against this background, the role of the government undergoes special changes within the framework of the existing innovation paradigm. Our times set the need for systemic reforms the goal of which is to transform the government strategy towards the development of an equal partnership between the government and other players in the innovation field, primarily with science and business (Etzkowitz 2011).

There are already examples of such transformations in the world practice, namely, in the NIS of economically developed countries and, partially, China. They became the centers for formation of a new model of innovative activity based on interaction of the government, science and business. This model took the form of the concept of strategic innovation networks or the concept of triple partnership (Triple Helix Model) in modern innovation theory.

The concept of such triple partnership (the "triple helix") was formulated at the beginning of the 21st century in the works of Henry Etzkowitz (Stanford University) and Loet Leydesdorff (University of Amsterdam) (Reshetnikova 2012). It is based on a certain synthesis of a number of sociological theories using analogies from the biological and physical sciences. As applied to innovative development, the "triple helix" model describes the inter-organizational partnership of three actors (Science (or University) — Government — Business) at each stage of creating an innovative product. This partnership is presented in the form of a hybrid social structure, similar to the DNA molecule (cohesion of spiral structures) (Dezhina and Kiseleva 2008). The TH Model is based on the principle of collaboration, which provides formation of an integral effect of continuous updates due to the advantage of all network organizations.

The TH Model radically differs from the linear model of partnership between science, business and the government of the industrial era. The difference is observed not so much in the nature of the interaction of actors, but in their functional role in the economic process. First, leadership in determining the direction of innovative development is passed to science (universities). At the same time, actors do not just interact and interlace their connections, but adopt (interlace) the inherent functions, thereby forming hybrid network organizations, which is an additional source of economic growth (Kiyaschenko, N. D.). In practice, it means that

universities acting as educators and researchers contribute to the development of economy through the creation of new companies in university incubators, and business partially provides educational services, and the government acts as a public entrepreneur and venture investor in addition to its traditional legislative and regulatory role.

4. The Concept of Entrepreneurial University – Fundamentals

Obviously, the leading innovative role is given to universities according to the TH Model. They start to convert into EUs or IU (Etzkowitz 2008; Kiyaschenko, N. D.).

In addition to traditional teaching and research activities, EUs should also increase the entrepreneurial, monetized ones, in contrast to classical universities. The success of such activities directly depends on the availability in the university's structure of a modern innovative industrial base.

B. Clark introduced the term “*entrepreneurial university*” in 1998. An EU should be regarded as an organization that has adopted an *entrepreneurial* method of management and formed external and internal links, taking into account its internal resources used to continue and develop the statutory activity (Smorodinskaya 2014). In other words, no receipt of profit (entrepreneurial income) is prohibited, but is welcomed; however, the main task remains to develop the entrepreneurial culture.

In addition to research and commercialization, EUs also perform other functions that are not inherent in traditional universities, and are related to the licensing of scientific developments, promotion of company formation, development of territories, etc. (Clark, N. D.). According to a number of economists, the distinctive features of this type of universities are:

- Multifunctionality or ability to generate and provide up-to-date knowledge,
- Orientation to fundamental scientific research, including modern trends in science and high technologies,
- A high degree of transparency and integration into the international system of science and education,
- Global experience acceptance and flexibility in relation to new areas of scientific research and teaching methodology,
- Competitive and selective approach to recruiting their students, and
- Commercial success and creation of scientific, technical and economic space within the University (Sidorova 2014; Katukov and Smorodinskaya 2012).

In the authors' opinion, the most important of these characteristics is commercialization of scientific knowledge which is carried out under the following scheme: research — discovery (invention) — evaluation of merchantability — protection of intellectual property — development of business plans to promote the products — licensing. The results of each phase are to be evaluated by a number of indicators that should be disclosed in the reports of each university. Scientific studies are estimated by the number of citations in relevant international and national science journals and the number of maintained theses for a degree; inventions — by the number of inventions submitted to the Center for Technology Transfer, and patent applications filed and patents received. The number of valid or new licenses, options or other agreements, new spin-off companies and the income received from various types of commercialization in absolute and percentage terms to the research budget are considered for assessment of the EU commercial attractiveness (Innovacionnyye processy v RF: mnenie uchenyh RAN, N. D.). Available data on the above indicators allow to estimate practical results of the innovative activity of the university.

Two EU models are mostly applied now: *according to the result* — teachers and graduates create innovative companies (TH Model), and *entrepreneurial* — according to the management methods (the model proposed by B. Clark). The first model provides for the formation of favorable conditions for students, teachers and graduates to create high-tech start-up and spin-

off companies. The second model is set by the creation of a powerful scientific center that produces and introduces new innovative products to the market, thereby attracting financial resources and increasing its independence from the state. The first model seems to be more promising in the Russian socio-economic conditions.

5. Entrepreneurial Universities in Russia

Intensive development of EUs, as a new type of universities, started with the adoption of the relevant Government Program in 2009. Its goal was a successive transformation of the leading Russian universities into EUs due to the development of their innovation infrastructure at the Government's costs and strengthening of their cooperation with manufacturers.

Two organizational types of EUs formed in Russia: Federal Universities (FU) and National Research Universities (NRU). Government Decrees No. 217–219 issued in 2010–2012 approved legal procedure of transformation. They regulated the creation of small innovative companies at the universities, collaborative studies with corporations, creation of innovative infrastructure in universities and engagement of leading scientists. According to the mentioned above, 2.6 billion US dollars had been allotted from the federal budget for innovative reform of higher education by 2015 (Akinfeeva and Golichenko 2013). However, as practice has shown, the effectiveness of these investments was low.

Only 9 regional universities were transformed into EUs by the beginning of 2017. Significantly more widespread was the organization of EUs in the form of NRU in Russia. Under the influence of internal specific socio-economic factors, this organizational type made it possible to carry out effectively both educational and scientific activities based on the principles of integrating science and education. The most important distinguishing features are as follows: ability to generate knowledge and provide an efficient transfer of technology to the economy; conducting a wide range of fundamental and applied research; presence of highly effective system of preparation of masters and personnel of the highest qualification, and developed system of programs of retraining and advanced training of personnel. All these were based on a certain federativity of the organization of educational, S&T and R&D activities. Under Russian conditions, a NRU is an integrated research and educational center that conducts research in general scientific directions and training of personnel for certain high-tech sectors of the economy.

The status of the NRU was awarded to 27 universities after the proper competitive selection in 2009–2010. Leaders among them were: Moscow State Technical University (MSTU); Moscow Higher School of Economics (HSE); National Research Nuclear University MEPhI; Moscow State University (MSU); Novosibirsk State Technological University (NSTU); Tomsk Polytechnic University (TPU); Tomsk State University of Control Systems and Radioelectronics (TUSUR); Perm State Technical University (PSTU); St. Petersburg State University of Information Technology, Mechanics and Optics (SPb ITMO) and St. Petersburg Polytechnic University (SPb PU) (National University Rankings 2015/16, 2016). The Skolkovo Institute of Science and Technology (SkolTech) was included into this list in 2011. Activities of the above universities should be analyzed to assess the success of the Russian experience in creating EUs. Their innovative structure is presented in Table 1.

In 2012, the Association of Entrepreneurial Universities of Russia was established, its main goal being to develop an effective partnership with government authorities and businesses within the framework of the TH Model. 7 universities had become members of this association by 2016: SPb ITMO, MEPhI, TUSUR, HSE, TPU and NRU MISIS.

Table 1. Entrepreneurial Universities in the Innovation System of Russia

Innovative Functions	Innovative Activities and Structure

Generation of Scientific Research	<p>TUSUR — Institute of Innovation Studies;</p> <p>SPb ITMO — 5 R&D establishments; HSE – 107 R&D establishments, 32 research and project labs and 16 international labs;</p> <p>MEPhi — Scientific Training & Production Complex, Bio-Business Incubator and Laboratory of Innovative Education Technologies;</p> <p>TPU — 11 research and training institutes;</p> <p>NSU — 9 research and training centers, 66 research labs.</p>
Commercialization of Science	<p>MSU — People's Science Park;</p> <p>TUSUR — Student Business Incubator, Development Commercialization Office;</p> <p>SPb ITMO — Technology Park;</p> <p>NSU — Innovative Technology Center;</p> <p>MSTU — Innovative Park;</p> <p>HSE — Center for Entrepreneurship, Center for Innovations;</p> <p>MEPhI — Center for Development of Student Entrepreneurship;</p> <p>TPU — Innovative Technology Center, Center for Technology Transfer, Student Business Incubator; TPU Technology Incubator Company.</p>
Promoting Formation and Development of Companies	<p>MSU — 120 innovative companies,</p> <p>TUSUR — scientific training and innovative complex: 135 companies created;</p> <p>SPb ITMO — 33 innovative companies;</p> <p>HSE — Department of Innovation Project Development;</p> <p>TPU — strategic partnership with 252 companies, 28 commercial companies created, Business Incubator, Center for Preproduction.</p>
Patenting and Licensing Technologies	<p>TUSUR — Agency of Intellectual Property Protection;</p> <p>St. Petersburg State Electrotechnical Institute — legal protection of intellectual property;</p> <p>HSE — Department of Intellectual Property;</p> <p>MEPhI — Center for Technology Transfer (legal protection);</p> <p>TPU — Department of Patenting and Protection;</p>
Promoting Regional Development	<p>TUSUR is an element of the Tomsk SEZ in <i>Electronics, Information & Telecommunications</i>, and R&D in federal and sectoral dedicated programs;</p> <p>SPb ITMO — the RUNNet developer;</p> <p>NSU — cooperation with the Privolzhsky Federal District and EC in information and communication technologies;</p> <p>TPU — participation in federal dedicated programs and 11 technological platforms, 20 Shared Knowledge Centers, Exhibition Center.</p>

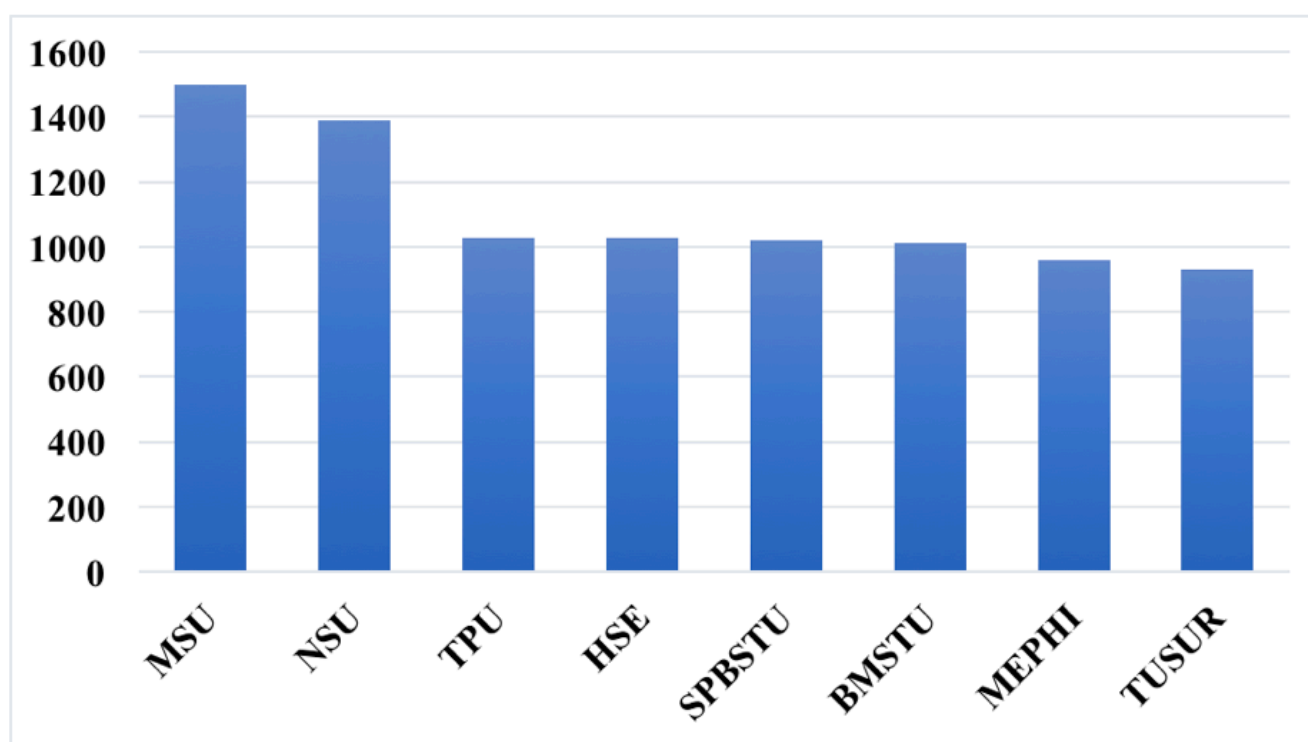
Sources: Compiled by the autor: web-resources: www.tusur.ru, www.ifmo.ru, www.eltech.ru, www.unn.ru, www.hse.ru, www.mipt.ru, www.tpu.ru (available on February 2, 2017).

By 2016, the efforts of the Government of Russia had succeeded in forming a certain network (community) of higher education institutions, in which the process of transformation towards EUs is successfully proceeding. It consists of two universities with a special status —

the Moscow State University and the St. Petersburg State University, 9 FU and 28 NRU. Those NRU include 9 classical universities, 17 Technical Schools, 1 School of Medicine and 1 School of Economics. The main directions are the following: strategic information, space, nuclear and medical technologies; energy efficiency and energy saving, innovations in the field of economic theory. (Materials of the Conference *Development of Entrepreneurial Universities as System-Forming Elements of Innovative Territorial Clusters*, 2012)

However, as shown by this study, despite all the efforts, the NRU cluster is rather limited within the system of domestic universities. It includes only 2.6% of all universities in Russia and about 6% of all universities that perform research activities. They account for 6.03% of the personnel engaged in R&D. Only 5.3% of all students and postgraduates are studying at the NRU. At the time, NRU account for one fourth of foreign teachers working in higher educational institutions of the Russian Federation.

The results of the leading research institutes on the number of publications indexed by the international databases *Scopus* and *Web of Science* are presented in Figure 1.



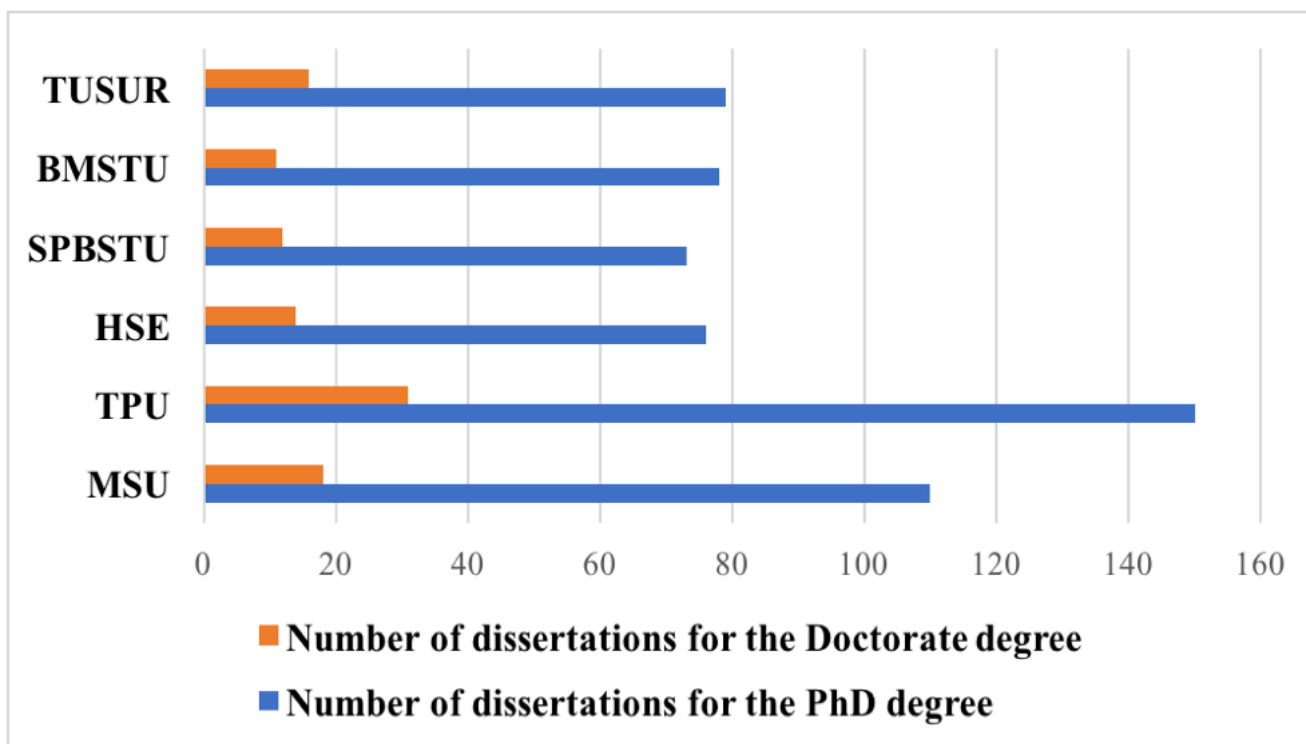
Sources: Compiled by the autor: www.msu.ru, www.tusur.ru, www.hse.ru, www.nsu.ru, www.tpu.ru, www.spbstu.ru, www.bmstu.ru, www.mephi.ru (available on February 3, 2017).

Figure 1. Number of Publications Indexed by the International Databases Scopus and Web of Science for Leading Russian Research Institutions in 2014–2016

The situation is also good with S&T and R&D activities as evidenced by a significant number of maintained theses for a degree (Fig. 2).

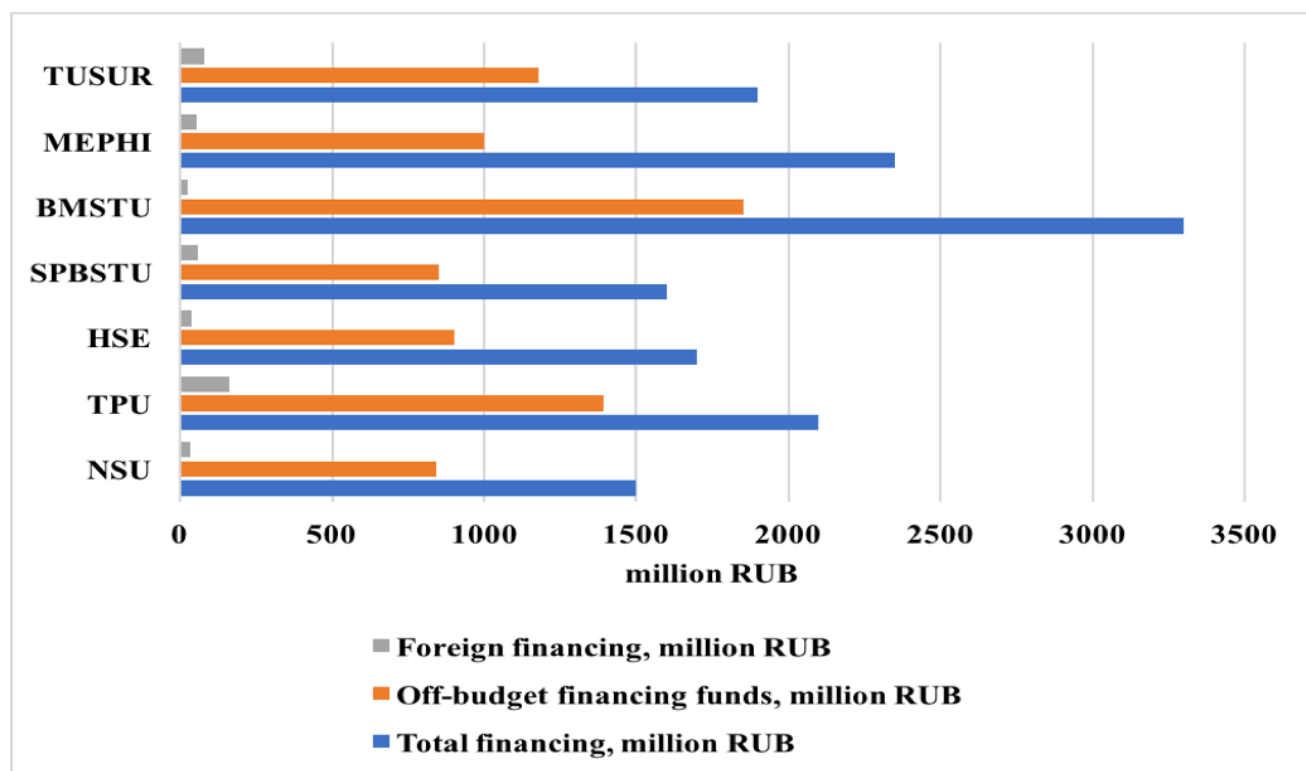
The share of R&D studies conducted by the NRU under contracts with businesses is almost twice as high as the average for Russia (19.5%) and amounts to 36.2% (Materials of the Conference *Development of Entrepreneurial Universities as System-Forming Elements of Innovative Territorial Clusters*, 2012; Tomsk Polytechnic University, N. D). The main part of the expenditures still taken from budget allocations constitutes 54% (against 65% in general for higher education institutions). However, there is an increase in the amount of funding from extra-budgetary Russian and foreign sources. See the funds for 2015 in Figure 3.

The results of the analysis given below decisively prove the certain success in the Russian experience of the development of EUs.



Sources: Compiled by the autor: <http://vak.ed.gov.ru>, www.msu.ru, www.tusur.ru, www.hse.ru, www.nsu.ru, www.tpu.ru, www.spbstu.ru, www.bmstu.ru, www.mephi.ru (available on February 5, 2017).

Figure 2. Number of Maintained Theses for a Degree for Leading Russian Research Institutions in 2014–2016



Sources: Compiled by the autor: <http://vak.ed.gov.ru>, www.msu.ru, www.tusur.ru, www.hse.ru, www.nsu.ru, www.tpu.ru, www.spbstu.ru, www.bmstu.ru, www.mephi.ru (available on February 9, 2017).

Figure 3. Investments out of the Russian Extra-budgetary Funds and Foreign Sources into Innovative Sectors of Leading Russian Research Institutions in 2014–2015

120 spin-off companies and 35 scientific and production entities operate in the territory of the People's Science Park of MSU with an area of over 4,000 square meters. Totally, the Park employs more than 1,500 people, including teachers, students, graduates and staff of the university. Its total output amounted to \$200 million in 2016. The investment volume amounted to more than \$900 million in 2012–2015 (Materials of the Conference Development of Entrepreneurial Universities as System-Forming Elements of Innovative Territorial Clusters,

2012).

The success of the Siberian region was particularly interesting. For example, TUSUR became one of those nine universities in the world that created an ecosystem of innovations in unfavorable conditions. 31 universities in 35 countries were evaluated by experts to select the above 9 leading ones in this field. Today TUSUR has its own globally recognized scientific school in view of the TH Model.

TPU is another successful example of the formation of an innovative cluster. An innovative infrastructure has been formed on its territory to ensure the implementation of the main stages of R&D: scientific studies, selection, and science-intensive commercial products. All required elements of the innovation infrastructure are located and functioning on the territory of TPU for this purpose (see Table 1). The total volume of R&D of the university in 2012–2015 amounted to more than 7.6 billion rubles (more than 2 billion rubles in 2015). The share of R&D contracts for the real economy exceeded 63%. Customers were both leading Russian and foreign innovative corporations. The staff of the TPU cluster registered 257 intellectual deliverables in 2015, including 3 Eurasian patents. 11 Licensing Agreements were signed to use the TPU's intellectual deliverables by various businesses.

Moreover, there has been a steady growth trend in publications of young scientists and TPU staff since 2015, which was reflected in an increase in the number of publications indexed by the international databases *Scopus* and *Web of Science* — 1,456 (without duplication). 279 articles were published in foreign high-ranking science journals. The university's Hirsch Index rose to 44 in 2015. According to *Scopus*, 69 TPU employees had a Hirsch index > 10 (Tomsk Polytechnic University, N. D.).

A significant contribution of the innovative cluster of TPU was made to the development of the region. Only in 2015, more than 1 billion rubles were paid to the regional budget. 2 thousand jobs were created on the territory of the cluster. In 2015, TPU successfully implemented 3 projects under Government Decree No. 218, which was also an endogenous source of growth in the region's economy (Tomsk Polytechnic University, N. D.).

An attempt to implement the TH Model with a *clean slate* was undertaken in 2010 by creating the Skolkovo Foundation. Its main goal was to form a pool of innovative projects (companies), and to ensure their interaction among themselves and with key actors of the innovation system.

One of the main innovative actors of the Foundation should be the university (Skolkovo Institute of Science and Technology, SkolTech) and the Open University of Skolkovo (OSU). It is expected that the budget financing of these universities will be more than 110 billion rubles in 2013–2020. The number of graduates of the Skolkovo Institute of Science and Technology by 2020 should be no less than 1,000 people, and the specific number of publications indexed by the *Scopus* and *Web of Science* international databases, per 100 researchers, will be within 75–85. The number of graduates of SkolTech by 2020 should be no less than 1,000 people. This is despite the fact that training is conducted only at the master's and doctoral levels. Studies are not concentrated around academic disciplines, like in classical universities, but around solving interdisciplinary technological tasks in five priority areas of work of the Skolkovo Technopark, namely: energy, computer science, biomedical technologies, space science and technology, global nuclear science and technology (Skolkovo, N. D.).

6. Discussion of Analysis Findings

Within the framework of this research, a sufficient number of scientific materials have been studied to make clear conclusions about the successes and problems of formation of such phenomenon as an *Entrepreneurial University* in the Russian higher school.

Having analyzed the results, it may be stated that there is a stable tendency to transform classical universities into EUs in Russia within the context of the TH Model in 2012–2016. This process covers mainly the leading universities in the country, which are located in large industrial cities, and their number is still small. In our opinion, particular attention should be

drawn to the fact that initiators of this process are the leading universities in Tomsk (TUSUR and TPU).

It may be affirmed that one of the results of the Government's Education Reform is the formation of a kind of hierarchical innovation pyramid, the top of which are the Moscow State University and several (7–8) National Research Universities located in capitals and major regional centers. In addition to the educational mission, these universities effectually develop their S&T and R&D and cluster of innovative companies, promote the development of small and medium businesses in the region, as well as participate in the socio-economic development of the territories.

Meanwhile, analyzing the EUs formation in Russia as a whole, it is worth noting that it generates new problems rather than helps solve existing ones. First, this is the problem of the universities themselves where the R&D component develops to a greater extent due to the creation (mainly funded by the Government) of the innovation infrastructure, and, to a lesser extent, by changing training programs and involving students into the scientific and related entrepreneurial activities.

In addition, there is widespread skepticism towards the model of entrepreneurship among the majority of the higher education teachers. The question is open: *What is on the first place for an institution of higher education — education or business?* There is an opinion that entrepreneurial activity carries hidden threats to the educational process itself. It seems that the answer to the above question may be found in the strategies studied within the framework hereof, Russian NRU (where students are successfully taught to entrepreneurship), as well as grants and commercializing of research results by external investment. However, there is another problem while developing EUs in our conditions, namely, the adaptability to this model, mostly for technical universities, which have great opportunities to participate in grants, implement R&D projects, and create new technologies that have market potential. Only one Humanities University and one School of Medicine received the EU status in Russia.

The other important problems while expanding the practice of transforming the traditional university into the EU are the following:

- High level of dependence of the higher school on the government and, first of all, when choosing the direction of activity,
- Limited transparency and availability of information on the results of their operation, including data on the commercialization of scientific activities (the number of patents, licenses, author's certificates issued, etc.),
- Underdevelopment of the innovative business environment of higher education institutions as the basis for the formation of entrepreneurial skills of their students,
- Low level of entrepreneurial culture and lack of entrepreneurial experience among their teachers, and
- Limited transparency and availability of information on the results of their operation, including data on the commercialization of scientific activities (the number of patents, licenses, author's certificates issued, etc.).

Relationships of universities and the real economy are also an important problem for accelerating the development of EUs in Russia. In most cases, they implement the traditional linear model of knowledge transfer. Universities are responsible for the function of education and research, industry - for production and sale, and intermediary organizations (if any) - for the actual transfer process.

Considering all the mentioned above, it may be concluded that it is still prematurely to talk about the development of triple relations in the *government-business education* system in the Russian NRU.

Domination of the government in practically every paired interconnection by the vertical principle makes it very difficult to implement the triple model of innovation development in Russia. It is precisely overcoming the domination that will significantly boost the process of EUs

formation in Russia. In our opinion, universities should implement the required transformation to survive in a new socio-economic environment, especially, to start the formation of an entrepreneurial corporate culture in students and teachers. It must be done by creating an effective system of motivation and encouragement of teachers to scientific work and commercialization of the results. Certainly, it is important to create an entrepreneurial infrastructure in higher education institutions in order to develop entrepreneurial skills of students during their studies.

Summarizing the results hereof, it may be acknowledged that not all the tasks assigned to this study have been fully implemented. For example, the influence of the EUs development on the endogenous growth of the region's economy is not sufficiently described herein. This is a certain drawback of this work and it determines the goals for further research of the Russian experience of the EUs development.

7. Conclusion

Global experience shows that EUs (as educational, research and production centers) respond to new innovative needs of the economy and business in the field of education. In the process of their functioning, an active role is played by business and the government, thereby realizing a new model of innovation development — the TH Model. Thus, they solve a wide range of problems of social and regional development now. Formation of EUs takes place in various ways due to national peculiarities. The higher the level of economic development and the demand for innovative products are, the more perfect and effective is the system of EUs (and vice versa).

In Russia, the process of transforming traditional universities into the entrepreneurial ones has just started, and only about 30 universities may be referred to this category by certain criteria. At the same time, it requires scaling and acceleration to implement the course set by the Government of Russia for a radical technological modernization of the economy as an endogenous factor of growth. To do this, it is necessary to resolve problems related to personnel retraining and to create a powerful source of innovative ideas and technologies in higher education. In addition, this is quite impossible without radically increasing the R&D competencies of not only the leading universities in the capital, but primarily the regional ones. Regional EUs should become the sources of their innovative growth. They should raise their S&T competence and R&D capacity within a short time. This will provide them with a leading position for outsourcing research activities to the real economy which is a generator of applied ideas and developments, key platforms for the development of innovative entrepreneurship, and sources of the most qualitative and authoritative examination of applied scientific and technological solutions for companies and government agencies.

Unfortunately, weakness of the legal background and lack of coordination while forming EUs create many problems. The solution for these and many related problems would determine the answer to the question of whether Russia will be able to join the global innovation economies of the 21st century or not.

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