

Entrepreneurial university as an element of the National Innovation System

La Universidad Emprendedora como elemento del Sistema Nacional de Innovación.

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ABSTRACT:

The authors consider experience of domestic and foreign scholars and practitioners in the field of theories of entrepreneurship in the educational sphere and study theoretical and practical approaches to the formation of the entrepreneurial university, the basis of which is determined by teaching staff competencies. The research results enable to identify trends in integrating entrepreneurial universities into the national innovation system, develop a new approach to the model of competencies, and formulate the general professional university and teaching staff competencies.

Keywords: entrepreneurial university, commercialization of scientific innovations, university competencies model, research and education centers.

RESUMEN:

Los autores consideran la experiencia de académicos y profesionales nacionales y extranjeros en el campo de las teorías del espíritu empresarial en la esfera educativa y estudian enfoques teóricos y prácticos para la formación de la universidad empresarial, cuya base está determinada por las competencias del personal docente. Los resultados de la investigación permiten identificar tendencias en la integración de las universidades empresariales en el sistema nacional de innovación, desarrollar un nuevo enfoque para el modelo de competencias y formular las competencias profesionales generales de la universidad y el personal docente.

Palabras clave: universidad empresarial, comercialización de innovaciones científicas, modelo de competencias universitarias, centros de investigación y educación.

1. Introduction

The current stage of development of higher education is characterized by the search for a university model that adequately meets the current challenges. Many researchers consider the model of the entrepreneurial university as one of university models. The Russian education is gradually integrated into the segments of the global community and

entrepreneurship, but there are some problems in this area. One of these problems is related to the formation of universities' competencies in the field of entrepreneurial activity. From the practical point of view, the modern concept of economic development based on the knowledge economy can be realized only on the basis of innovative entrepreneurship, covering not only the real sector of the economy, but also institutional and educational spheres. Such a development of the national economic system implies a significant change in market relations, since the innovative scenario of economic development is based on using the potential of all economic entities that can consolidate their material and financial resources, scientific ideas and developments. Universities are beginning to occupy an increasingly important place in emerging market relations of a new type. They are at the beginning of transforming the potential of knowledge into real innovative products.

At the same time, universities, as subjects of market relations, must adequately respond to challenges of the external environment and market requirements. Entrepreneurial activity of universities should be introduced in all types of activity: from teaching and research activity to supporting its own effective functioning.

Such an approach to understanding entrepreneurial activity of universities leads to a change in ideas about their mission and models of their functioning. The evolution of these ideas has led to the fact that the model of the entrepreneurial university is currently considered the most advanced one. However, it should be noted that the semantic content of this concept is still quite amorphous, debatable and allows for different interpretations, which significantly limit its instrumental capabilities. Clarifying this issue could significantly advance the process of forming the innovative type of economic development.

To what extent can the term entrepreneurship be applied to university activities? In economic literature, the term entrepreneurship is used in relation to activities of industrial and service enterprises, aimed at making a profit. According to the American scientist R.C. Ronstadt, entrepreneurship is a dynamic process of increasing wealth (Ronstadt, 1984). R. Cantillon was the first to pay attention to entrepreneurship as a phenomenon of the new time (Cantillon, 1953), which replaced the feudal Middle Ages, and later J.H. Thünen, F.H. Knight, E. Schneider and H. Mangoldt developed this idea and conceptually considered entrepreneurship through the function of bearing the burden of risk or uncertainty (Thünen, 1966), (Schneider & Mangoldt, 1968), (Knight, 2003). Famous American scientists R. Hisrich and M. Peters in their book "Entrepreneurship or how to start a business and succeed" give, as they believe, the most succinct definition of entrepreneurship, which covers all types of entrepreneurial behavior: "Entrepreneurship is the process of creating something new with value; a process that absorbs time and effort, involving the assumption of financial, moral and social responsibility; a process that brings cash income and personal satisfaction to achievements" (Hisrich & Peters, 2003). The American scientist A.M. Shapiro writes that almost all definitions of the entrepreneur and entrepreneurship mean such behavior, which includes, firstly, an element of initiative, and secondly, organization or reorganization of socio-economic mechanisms in order to be able to profitably use available resources and a particular situation, and, thirdly, taking responsibility for a possible failure, i.e. willingness to take risks. This definition combines economic, personal and managerial approaches (Shapiro, 2005). In a visual form, the evolution of ideas about entrepreneurship can be represented as follows (Table 1).

Table 1
Stages of development of theories of entrepreneurship

Stages	Scientists	Insights
1	R. Cantillon (XVIII - XIX)	Introduced the concept of risk (the main functional characteristic of entrepreneurship is the desire to make a profit and readiness for losses). In the XIX century, this thesis was supported by J. Thünen, F.H. Knight, E. Schneider and H. Mangoldt (Cantillon, 1953), (Thünen, 1966), (Schneider & Mangoldt, 1968), (Knight, 2003). They considered entrepreneurship as a managerial function that is not

		related to either ownership of capital or labor, but wholly dependent upon establishing and maintaining effective interactions between factors of production.
2	J. Schumpeter	Entrepreneurship is innovation, and attention is focused on entrepreneurial ability of society. J. Schumpeter believes that the foundation for economic development is the specific function of the entrepreneur, who is able to use the "new combination" of factors of production, the result of which are innovations (Schumpeter, 1948).
3	J. Schumpeter, F.A. Hayek, L. Mises (second half of XX century)	Developed a multifunctional business model. It was regarded as a process of developing an idea. J. Schumpeter claims that the socio-economic system has inertial potential. The managing subjects are not inclined to innovations because of their rational nature and they often refuse introducing new technologies, personnel combinations and profitable financial investments as they are to adapt to the sustainably functioning environment (Schumpeter, 1948), (Hayek, 2002), (Mises, 2000).
4	The modern stage of development of the theory of entrepreneurship	Socialization of production and the growing role of innovation in the post-industrial development of society have established new priorities. In the forefront of development of entrepreneurial activity there is no rational use of resources; there is rationalization of management forms and methods for long-term sustainable development of organizations. The main role is played by the ability to transform the conditions of activities in accordance with changes in the needs of society and production.

Source: compiled by the authors.

In the education system, entrepreneurship is an initiative, creative and innovation activity of the higher education institution, which plays an important role in shaping and developing the educational potential of society, and thereby achieving a socio-economic effect at all levels of the economy (Cantillon, 1953).

The world scientific community has developed several theoretical models that reveal the phenomena of the entrepreneurial university. The study of the transforming mission of the university and the formation of the entrepreneurial university is presented in the works of B.R. Clark (1998), A.A. Gibb and P. Hannon (2006), D. Gibbs (2009), M. Gibbons et al. (1994), G. Itskovitz (2010), D.A. Kirby (2006), G.N. Konstantinov and S.R. Filonovich (2007), L. Leydesdorff and M. Meyer (2007), J. Ropke (1998), F. Webster (2004), E.C. Zeeman et al. (1976) and others.

The first to start this question was B.R. Clark, who identified the entrepreneurial university as an institution striving for innovation, taking risks in mastering "new practices, the result of which is unclear". At the same time, the author considered the discrepancy between the capabilities of the university and the requests from the outside to be the cause of this change in university activities. The author analyzed the ten-year experience of actively developing five European Universities: Warwick University (UK), University of Twente (Netherlands), University of Strathclyde (UK), Chalmers University (Sweden) and University of Joensuu (Finland). Based on the analysis, he identified five key principles that characterize the transformation of universities in the entrepreneurial direction (Clark, 1998).

In the work of D.A. Kirby, entrepreneurial universities are characterized by a desire to reduce the share of state funding for R & D in favor of increasing investment from industrial enterprises in the long term; understanding and implementing the concept of "open innovation" and transferring knowledge and technology; supporting for entrepreneurial initiatives of individual researchers; achieving a deeper degree of interaction with other

subjects of the innovation system (science parks, business incubators, technology transfer centers, etc.); and paying special attention to continuing education programs related to entrepreneurship (Kirby, 2006).

E.C. Zeeman et al. believe that the current stage of development of science is characterized by a close merger and interaction of fundamental science and technology, which form techno-science (Zeeman et al., 1976).

The search for new knowledge and new ways of using it has become an important area of activity in modern societies, and universities have to solve this problem (Gibbons et al., 1994). One of the features is the strategic thinking and strong leadership of the university, namely, management departments and structures that will be able to quickly respond to the ever-changing demands of the external environment, to restructure themselves to new tasks and activities, and to determine the values of the university, both traditional and entrepreneurial ones. The extended development of the university, which determines the promising directions for its development and promotes the establishment of relations with external structures, is the next feature of the entrepreneurial university. At the same time, the number of such structures will include not only external organizations and professional companies that search for financial resources, transfer knowledge and protect intellectual property, but also research and development units that solve various issues concerning interaction with business.

The university needs financial resources to carry out its own activities, but most importantly, sources of these activities. So a diversified funding base is also an important feature. By receiving funds from charitable foundations, commercial companies, income from services and tuition fees, the university gains independence from state budget funds. But the university, becoming entrepreneurial, must continue to carry out its main task - training and research. The entrepreneurial culture formed within the entire organization is designed to combine all of the above, to motivate all the substructures of the university to innovate, to constantly search for and create new knowledge.

The study of N.M. Bunyak also substantiates the concept of two models of the entrepreneurial university: entrepreneurial by result - teachers and graduates create innovative companies; entrepreneurial by the type of activity of the management team (university-entrepreneur) (Bunyak, 2016).

J. Ropke in his work approves three main features of the entrepreneurial university. First of all, the university should behave as an entrepreneurial organization. At the same time, students, teachers and researchers should be entrepreneurs, and the goal of entrepreneurship is interaction of the university with the environment. At the same time, these features are impossible without each other, and only the presence of all three allows the university to be considered entrepreneurial (Ropke, 1998).

In the concept of integration and internationalization of national educational systems, it is distinguished between "internationalization" and "globalization" (Gibbons et al., 1994). But there are some opposing points of view. For example, a number of researchers have come to the conclusion that there is no "entrepreneurial university", but only relevant "entrepreneurial practices", taking over which the university demonstrates its success in fulfilling the "third mission" and the degree of adaptation to the changing external conditions (Gibb & Hannon, 2006), (Gibbs, 2009).

The implementation of the model of the entrepreneurial university in Russia was described by G.N. Konstantinov and S.R. Filonovich. According to the authors, "entrepreneurial university" is considered a higher education institution, "regularly making efforts to overcome limitations in three areas - knowledge generation, training and transformation of knowledge into practice by initiating new activities, transforming the internal environment and modifying interaction with the external environment". Researchers see one of the development opportunities of such a university model as an integral part of a high-tech cluster (Konstantinov & Filonovich, 2007).

At the turn of the XX and XXI centuries, the higher education system experienced radical changes. Turning to history, the first universities appeared in the XI century, with the

opening of University of Bologna, where rhetoric and Roman law were taught and later in the XII century - University of Paris, which acted as institutions for the preservation and transmission of culture. All subsequent universities, such as Oxford, Cambridge and many others, were created and developed for many centuries exclusively for this purpose.

Thanks to "academic revolutions" that play the main role in the evolution of the university, its mission and role in society was transformed, which gave universities the opportunity to choose a strategy for their development.

The first academic revolution was at the end of the XIX century and the beginning of the XX century, when education developed independently without the participation of science, and reacted poorly to changes in the national, including regional, innovation system. As a result of the first academic revolution, research was integrated into the field of the academic mission, which made it possible to supplement and enrich both education and science. Educational university has become a research one. In the literature one can find such a notion as the "Humboldt model of the university", the main principles of which are freedom and unity of training and research. Where, "academic freedom" means the right to self-government under state legal supervision. Thus, the role of scientific practice-oriented research has increased, and knowledge creation is becoming a new mission of the university.

The second academic revolution was in the 30s of the XX century, including the period of the Second World War. At this time the university, which was a separate organization, turned into a center for the dissemination of advanced scientific achievements. G. Itskovitz and F. Webster describe it as the transition of research results in the field of intellectual property, marketable products and economic development (Itskovitz, 2010), (Webster, 2004). Thanks to the second academic revolution, the third mission of the university, capitalization of knowledge, was added to training and research. Science began to act as an internal factor in developing the production process.

G. Itzkowitz, L. Leydesdorff and M. Meyer proposed a non-linear interaction model based on the creation of entrepreneurial universities embedded in the relationship spiral - University-State-Business, where each of the subjects has to simultaneously interact with the other two (Itskovitz, 2010), (Leydesdorff & Meyer, 2007). The proposed model is called the triple helix. Here the core of innovation is the university, which is education and science. It generates ideas and interacts with business under the leadership of the state, which forms the regulatory framework.

The authors agree with the provisions that have been introduced into the theory of the entrepreneurial university by S.I. Ashmarina, I.A. Plaksina (2014) and N.M. Bunyak (2016).

The article by S.I. Ashmarina and I.A. Plaksina concerning the formation of a new entrepreneurial model of a modern university focuses on the role of the market: "..... Not so long ago, university applicants and industry, economic or government structures were considered to be the main stakeholders of the university which formed a pool of requests for graduates. Now a "dynamic investment market", a so-called third force, has emerged under the influence of new trends in economic development, the influence of which forms a new "entrepreneurial" type of university development" (Ashmarina & Plaksina, 2014).

Thus, the image of the entrepreneurial university includes:

- 1) Inclusion in the "triple helix";
- 2) Inclusion in the market mechanism;
- 3) Focus on self-sufficiency in financial and other resources for current activities and development while maintaining the primacy of the main mission of the university - dissemination of new knowledge.

This theoretical understanding of the entrepreneurial university as an element of the national innovation system makes it possible to predict and design possible and desired development trends of this system as a whole, its individual parts and collaborations.

2. Methodology

The research material presented in this study is based on the analysis and synthesis of both

theoretical developments of entrepreneurial universities and the modern practice of their formation and activity.

For the processing of the material, the methods of monographic desk research, complex and system analysis, and comparative analysis were used.

The data obtained provide rich material for analysis, synthesis and conclusions.

The current legislation in Russia provides universities with virtually unlimited business opportunities. Most higher education institutions fix them "conservative" in their Charters, with a view to future expansion. So, for example, the Charter of Samara State University of Economics declares more than 40 types of activities. Among them, except for training, scientific and training-methodical activities and their experimental implementation, there is control of exclusive rights to the results of intellectual activity; patent research; labor protection and assessment of its conditions; expert and appraisal activities; sports and fitness activities; organization and holding of exhibitions, fairs, symposia, conferences, etc.; entertainment activities; advertising and publishing; internships in the Russian Federation and abroad; legal services, audit expert appraisal activities; hotel services; sales of services and own products of structural divisions; investment and urban planning activities; functions of the customer-developer for construction work; real estate management; rental of movable and immovable property; international cooperation; foreign economic activity, etc.

The analysis of entrepreneurial opportunities enshrined in the Charter shows that not all of them really "work". At the same time, the university is aware of non-working opportunities as a reserve for the further development of its entrepreneurial activity.

The analysis of entrepreneurial activity of other Russian universities shows that almost all Russian universities currently carry it out. This practice is presented in commercial projects in the field of science and training activities, as well as in the formation of entrepreneurial competencies of the university, its faculty and graduates.

For example, Yuri Gagarin State Technical University of Saratov has centers for collective use in the field of studying physicochemical and mechanical properties of special materials, developments of modern energy-efficient building materials, the Regional Inter-Branch Innovation Technology Center "Intech", which studies are conducted on unique scientific equipment. The centers operate under commercial cooperation agreements. In 2017, the total amount of research, development and innovation-production work carried out directly by the units amounted to 13080.5 thousand rubles.

Samara State University of Economics has built a model of the entrepreneurial university based on entrepreneurial management and training in order to develop the entrepreneurial competence of specialists, graduate students, doctoral students and students. The University includes: High School of Management, Center for Business Education; Audit Center; Education Center for Certification of Professional Accountants; High School of International Business; Faculty of Secondary Higher and Additional Education; Center for Development of Enterprises and Real Estate Market; Authorized Center for Education and Certification; Center for Corporate Development; Institute of Economics and Management of Construction and Housing and Public Utilities; Samara Interregional Center "Earth"; Center for Language Training; Advanced Training for Teaching Staff; Center for Training International Finance Specialists; Center for Continuing Professional Education; Center for Certification of Finance Specialists; Regional Education Platform of the Nationwide System of Training and Advanced Training of Tourism Industry Professionals; Samara Regional Branch; Free Economic Society of Russia. Huge opportunities for the implementation of entrepreneurial initiatives of university staff and students are provided by the Coworking Center "FUTUROOM" - a unique office space for creative people and their projects, located in the very center of Samara. It is an ideal platform for both individual and team projects, for a large group of startups and a single freelancer.

If we compare the data presented with the data on the forms of entrepreneurial activities in other Russian and a number of foreign universities, we will notice their representativeness and, accordingly, the ability to rely on them as an empirical basis for theoretical conclusions and practical recommendations.

3. Results

The study shows that in the evolution of the university model it is necessary to distinguish three stages: educational, research and entrepreneurial university. At the same time, the evolutionary process on the scale of the world university community goes towards the model of the entrepreneurial university with exponential acceleration. In Russia, it is also accelerating, but most of all under the influence of the limited financial support of universities from the state.

Universities in Russia are increasingly engaged in entrepreneurial activity and are moving towards the model of the entrepreneurial university under the influence of a number of factors. One of them is insufficient funding from the state budget. At the same time, the administrative press has a great influence on the nature of university activities, the main lever of which is the monitoring of university activities conducted annually by Rosobrnadzor. One of the important positions of this monitoring is university financial and economic activity. The insufficient values of indicators on university activities can result in deprivation of the university right to carry out training activities.

It should be noted that the awareness of the fact that Russian universities lag behind a number of important indicators from the global level, reflected, in particular, in international university rankings, and the desire to reduce this lag (including for reasons of national prestige) led to ambiguous government decisions on selective support for universities.

The first step in this direction was the allocation of a priority group of universities - national research universities. The Decree of the President of the Russian Federation "On the implementation of a pilot project for the creation of national research universities" approved a special status of universities, implying substantial additional funding and universities' commitments to significantly increase the effectiveness of their activities, primarily in the field of scientific research. Currently, there are 29 universities in Russia with this status.

The second group of privileged universities is support universities, which appeared in the regions at the beginning of 2016 on the basis of combining existing universities and focused on supporting the regional development by training highly qualified personnel for the local labor market and implementing training and innovative projects in cooperation with regional business and authorities. There are 33 such support universities.

The next step in this direction was the federal project "Development of Scientific and Scientific-Production Cooperation" within the framework of the national project "Science". In accordance with this project, in the period from 2019 to 2021, it is planned to create five world-class research and education centers (REC) annually in various regions of Russia. These centers, as defined in the project passport, should be created on the basis of integration of universities with scientific organizations, and they should cooperate with organizations operating in the real economic sector.

Funding for the centers being created is assumed to be multichannel with the federal budget share prevailing. The creation of REC should be considered as a reference model of the entrepreneurial university. Entrepreneurial activity in universities that are included in REC, is an integral part of large-scale entrepreneurial processes. These entrepreneurial processes are implemented by an alliance in which relations between the participants are built on a commercial contract basis. The results of the collaboration will have not only scientific, but also economic significance. In fact, this will mean that the university becomes a full-fledged business entity, and this function does not just supplement the main activity. It becomes its institutionalized part.

It should be especially noted that a fundamentally important condition for successful activity of alliances in the form of RECs is the preservation of the identity of their constituent entities, which implies the preservation and development of their specific basic competences.

Specific basic competences of organizations (including universities), as shown by our earlier studies (Volkodavova et al., 2018), (Webster, 2004), (Zeeman et al., 1976), (Zhabin & Volkodavova & Shatrova, 2016), are the skills to preserve fundamental and applied knowledge in specialized areas and the culture of their storage and use, the ability to

produce new knowledge and create alliances for innovation. These competencies represent the greatest value for all agents of entrepreneurial chains. They are also a platform for the formation of competencies of university teachers and students.

Until recently, there were two main groups in these competencies: hard skills and soft skills. The hard skills were narrow professional, and the soft ones were communicative and managerial. The rapid development of digital technologies has led to the fact that in addition to these two groups of competencies, a third one has appeared - digital skills.

A certain part of people are to have skills from one or two of these groups. For university professors, the package of professional competencies should include the skills from all three groups. It is difficult to identify the dominant group. All of them are mandatory.

A member of the innovative alliance significantly differs from other participants by the following features – staff competences - the entrepreneurial university. And this difference should be reflected and consolidated in business chains and networks with the participation of universities. The university should be one of the elements of the innovative entrepreneurial alliance. The university has to be its intellectual core and governing body.

4. Conclusions

It is impossible to consider the formation of the national innovation system, regional innovation systems and research and education centers without defining the role of universities in them. The study allowed identifying global trends in the evolution of university models from a traditional educational institution to a research and, further, to the entrepreneurial university. Entrepreneurial universities are characterized by their involvement in the “triple helix”, involvement in market mechanisms and by a focus on self-sufficiency in financial and other resources for ongoing activities and development, while maintaining the dominant role of the main university mission - dissemination of knowledge.

Under current conditions in Russia, entrepreneurial activity of universities is a condition for their development and survival. Therefore, it is necessary to study entrepreneurial competencies and select the most promising areas of entrepreneurial activity of universities, outlined in this article, in more detail. Such a study is more relevant because it provides rich empirical material on the implementation of national projects for the purpose of developing education and science.

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