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### Global Challenges and Prospects of the Modern Economic Development

### IMPROVING THE RATING ASSESSMENT OF ENTREPRENEURIAL CAPACITY OF UNIVERSITIES

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#### Abstract

The advanced experience of the world's leading universities shows that a key factor in their successful development is entrepreneurial activity, which provides an adequate response to changes in the external environment, contributes to the simultaneous satisfaction of social needs of society and the needs of the market. In this regard, the definition of the entrepreneurial university as a form of integration of education, science and business within the framework of the national innovation system is very important. The study presents the author's approach to the essence and functions of the entrepreneurial university, based on which the need to assess the entrepreneurial capacity of universities in the Russian Federation is substantiated. According to the results of the study, it has been proved that this capacity, in accordance with the characteristics inherent in the entrepreneurial university and the spheres of its activity, is formed in the field of education, scientific research and is reflected through the effective financial indicators of off-budget activities. The authors propose a methodology for a comprehensive assessment of the entrepreneurial capacity, considering indicators in the main areas of university activity, which makes it possible to determine how effectively opportunities are realized and resources are used to implement the entrepreneurial function, and its ability to move to the category of the entrepreneurial university. Approbation of the methodological approach was carried out using the example of seventeen technical universities of the Volga Federal District.

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## 1. Introduction

The Department of Economic Analysis of the Network of Subordinate Institutions of the Department of Economic Policy, and The Ministry of Science and Higher Education of the Russian Federation conduct an annual monitoring of the effectiveness of universities' activity, which includes more than 70 indicators. Monitoring is carried out in the following areas:

- educational activity (15 indicators);
- research activities (16 indicators);
- international activity (13 indicators);
- financial and economic activity (8 indicators);
- staffing (5 indicators).

In addition, it includes two sections: indicators reflecting the role of the university in the training system for the region; additional indicators giving its extended characteristics.

The purpose of monitoring is “to form information and analytical materials based on information about educational institutions of higher education and their branches based on performance indicators” (Monitoring the effectiveness of universities, 2019), which, in our opinion, does not reflect the real efficiency of universities, their entrepreneurial capacity and rating on market, but only reflects the actual value of performance indicators of universities.

Currently, the Ministry of Education and Science has developed new indicators of the effectiveness of universities, which are divided into five groups: the quality of education, international activities, scientific activities, financial activities and work with personnel (each part contains from one to three points) (Performance indicators of federal budgetary and autonomous educational institutions of higher education subordinate to the Ministry of Science and Higher Education of the Russian Federation, and the work of their leaders, 2019).

Despite the widespread use of the concept of “entrepreneurial university” in modern scientific literature, there is no generally accepted approach to its definition. In this regard, the process of developing practical recommendations for the entrepreneurial transformation of existing higher educational institutions is significantly complicated. Accordingly, there is a need for further research in this direction. In addition, there is no unified system of indicators for assessing the entrepreneurial capacity of higher educational institutions, according to the results of which it would be possible to assess their rating and control the pace of development as an economic agent. This, in our opinion, determines the relevance and need to improve the methodological approach to the rating assessment of the entrepreneurial capacity of the university.

The formation of new requirements for universities' activity is a natural response to the challenges of the current stage of economic development, the transition to a new technological order, which has led to the emergence of universities that build their activities on new principles – entrepreneurial ones.

Currently, the concept of entrepreneurial universities can be divided into two main approaches:

1. Entrepreneurial universities are elements of the “triple helix” model, which describes the organizational interaction of three institutions: science (universities) - business - state with the dominant role of universities (Abreu et al., 2016; Carree et al., 2015; Mazzei, 2018).

2. Entrepreneurial universities are internationally ranked universities that commercialize scientific developments, transit to the innovative development model (Budyldina, 2018; Fernández-Nogueira et al., 2018; Hoffman, 2020; Uslu et al., 2019).

The term “entrepreneurial university” was introduced in 1998 (Smith & Clark, 1998). Clark highlighted the features of the entrepreneurial university (Creating Entrepreneurial Universities) in his concept.

The first feature is the presence of a strong management “core” that can independently direct the development of the university, quickly and adequately respond to changes, and respond to external challenges.

The second feature reflects the presence of subdivisions with highly professional employees who, firstly, carry out external relations to transfer knowledge, attract new sources of funding, interact with industry, develop lifelong education and intellectual property. Second, there is interaction between interdisciplinary project-oriented research centers of the university and the outside world.

Diversification of sources of income, as a feature of the entrepreneurial university, is important in the context of a decrease in budget funding and reflects the university's ability to expand its funding base through funds from grants, companies, local authorities, licensing fees for intellectual property, charitable foundations, revenues from services provided, student fees, etc.

Stimulating the entrepreneurial activity of divisions contributes to their transformation into entrepreneurial units that interact with the external environment, implement the results of scientific research, attract additional sources of income, as well as the acceptance of new values by employees.

These four features listed above together form a mechanism for the implementation of new developments created within the framework of the fifth element, which is the integration of entrepreneurial culture into university-wide activities, the dissemination and sustainable consolidation of ideas.

In accordance with the characteristics inherent in the entrepreneurial university, their spheres of activity are education, scientific research and their transfer, which requires interaction with the external environment. Consequently, the activities of an entrepreneurial university should meet the needs of the educational services market, the market for high-tech developments and the labor market (Etzkowitz & Leydesdorff, 2000).

According to Etzkowitz and Leydesdorff (2000) and Podoprigrina (2019) entrepreneurial universities are characterized by a decrease in dependence on state institutions; susceptibility to global trends; flexibility of the organization; adaptive management structure; integration of education, science and business; interaction with investors; training competitive professionals with entrepreneurial and innovative thinking; development of infrastructure at the university, adapted for research and business (development centers, technology parks, business incubators); an effective system of motivation and incentives for teachers; orientation not only to basic science, but also to applied research; competitive and selective selection of students; a high degree of information transparency; formation of scientific communities and business environment in the region (scientific, technical and economic space around the university).

Thus, the scientific literature represents a distinctive function of entrepreneurial universities - commercialization of scientific developments, which includes the following sequence of processes: the university conducts scientific research, the result of which is the discovery; then the commercial

attractiveness of the resulting invention is assessed; the next step is measures to protect intellectual property; after these stages, they already develop a business plan to promote the product and seek licensing (Carree et al., 2015).

In our opinion, the entrepreneurial university trains personnel in areas that are in demand in the labor market, considering the prospects for innovative development of the economy, scientific and practical research that has commercialized demand, actively interacts with the environment on the regional, country and world scale to generate income more than expenses.

Based on this approach, the following main functions of the entrepreneurial university can be distinguished:

- implementation of the educational process in entrepreneurial programs (innovative methods of training personnel, participation of students in international, research and other projects and programs; training and retraining of specialists at the request of companies);
- generation of knowledge (conducting scientific research, business incubators, technology parks, sip);
- commercialization of scientific developments (technology transfer center);
- assistance to the formation and development of companies (training of specialists, small enterprises, strategic partnerships with companies in the real sector of the economy and the financial sector);
- assistance to regional development (training of specialists for the regional economy, participation and implementation of federal and regional programs, interaction with local authorities for the development of entrepreneurship);
- international cooperation in the framework of education and scientific research.

functions, features and purpose of the entrepreneurial university are implemented in the following areas of activity:

- educational;
- research;
- financial and economic.

The first international ranking of universities was carried out in 1997 by the magazine Asia Week. In 2003, Shanghai University began compiling the annual academic ranking of the world's leading universities Academic Ranking of World Universities (ARWU), which is based on the assessment of research achievements of universities by 13 criteria (academic mobility of students and faculty, the number of international scholarship programs, scientific research, citation of scientific articles, quality of educational services, etc.) (Official site of the Association of Entrepreneurial Universities of Russia, 2020).

Since 2004, a list of the world's top universities (The Times Higher Education) has been published annually in Britain. Since 2010, two international rankings have been presented - the World Reputation Rankings and the World University Rankings. The PRSP rating, one of the most universally recognized in the world, is presented by 500 leading world universities. The volume of research activity, which is calculated by the number of published scientific articles, is an assessment criterion. Each university is competing to be in the leading world rankings, which is currently a component of the country's national education policy.

## **2. Problem Statement**

The market for educational services is growing and the university needs to improve its competitiveness, expand the boundaries of its activities, and develop its potential for its viability. Therefore, the university's activity in the 21st century is to transfer knowledge – education and to develop research activities, expand the university infrastructure, improve the quality of personnel training, establish relationships with foreign universities and companies, improve the financial and economic situation in general. From this view, we can conclude that all main directions of the university's activity, characterizing its main resources and contributing to the emergence of the transfer of research results into the field of intellectual property, commodity product and economic development, together contribute to the formation of the entrepreneurial capacity.

Changes and challenges in the external environment of organizations around the world require a new approach to formulate and assess the results of their functioning. To meet the new requirements as a natural response to the challenges of the current stage of economic development, the transition to a new technological order, the reduction of budgetary funding, the peculiarities of functioning in a pandemic, universities are faced with the task of building their activities on new principles - entrepreneurial ones. It is necessary to determine the most effective areas of universities' entrepreneurial activity. In connection with this, it becomes necessary to identify reserves and directions of growth, to increase their competitiveness. We need to assess the entrepreneurial capacity, since there is no methodological support of it. Therefore, it is necessary to develop theoretical and methodological foundations, including new indicators reflecting the results of modern areas of activity of Russian universities. Such a system of indicators should be formed considering the practical activities of Russian universities that have accumulated the capacity of entrepreneurship.

## **3. Research Questions**

The authors had to answer the following questions: What are the principles of building entrepreneurial universities? What are the functions of entrepreneurial universities? What are the components of the entrepreneurial capacity of the university? What indicators are to assess the entrepreneurial capacity of the university? Is there a relationship between financial performance and entrepreneurial potential of the university? How is it possible to identify the level of the entrepreneurial capacity of the university? How to use the results of the assessment to improve competitiveness?

## **4. Purpose of the Study**

The purpose of the study is based on the method of complex analysis to cover a wide range of aspects related to the formation of objective key indicators characterizing the entrepreneurial capacity of Russian universities. The rating assessment of the entrepreneurial capacity should, in our opinion, reflect the achievement of results, which can be combined into three blocks in accordance with the functions performed and areas of activity (Table 1).

**Table 1.** The matrix of the rating assessment of the entrepreneurial capacity of the university

<i>Activity</i>	<i>Functions implemented</i>	<i>Score indicator</i>
Educational	<ul style="list-style-type: none"> <li>- Implementation of the educational process in entrepreneurial programs;</li> <li>- Promoting the formation and development of companies;</li> <li>- Promoting regional development;</li> <li>- International cooperation</li> </ul>	<ul style="list-style-type: none"> <li>- Percentage of students who were targeted admitted to the first year of full-time education and pursued undergraduate and specialty programs;</li> <li>- Share of students from third-party organizations in the total number of students who pursued advanced training or professional retraining programs in the educational organization;</li> <li>- Share of students pursued bachelor's, specialist's, and master's degrees in the fields of engineering, technology and technical sciences, with whom agreements on targeted training have been concluded, in the total number of students enrolled in these areas of knowledge;</li> <li>- Share of foreign students pursued undergraduate, specialist, and graduate programs in the total number of students (reduced contingent);</li> <li>- Share of foreign students who graduated bachelor's, specialty, master's degree programs, in the total number of students (reduced contingent);</li> <li>- Proportion of full-time students who pursued bachelor's, specialty, master's programs and who were trained abroad for at least a semester (trimester) in the total number of full-time students;</li> <li>- Share of foreign citizens from among the teaching staff in the total number of teaching staff;</li> <li>- Share of foreign citizens from among graduate students of the educational organization in the total number of graduate students</li> </ul>
R&D	<ul style="list-style-type: none"> <li>- Knowledge generation;</li> <li>- Promoting the formation and development of companies;</li> <li>- Promoting regional development;</li> <li>- International cooperation</li> </ul>	<ul style="list-style-type: none"> <li>- Share of income from R&amp;D carried out on its own (without involving co-performers) in the total income of the educational organization from R&amp;D;</li> <li>- Share of funds received by the educational organization from intellectual activity in the total income of the educational organization</li> </ul>
Financial and economic	<ul style="list-style-type: none"> <li>- Implementation of the educational process in entrepreneurial programs;</li> <li>- Knowledge generation;</li> <li>- Promoting the formation and development of companies;</li> <li>- Promoting regional development;</li> <li>- International cooperation</li> </ul>	<ul style="list-style-type: none"> <li>- Share of income from R&amp;D in the total income of the educational organization;</li> <li>- Share of funds received by the educational organization from R&amp;D carried out by foreign citizens and foreign legal entities;</li> <li>- Share of funds from educational activities received by the educational organization carried out by foreign citizens and foreign legal entities;</li> <li>- Share of income from funds from income-generating activities in income for all types of financial support (activities) of the educational organization;</li> <li>- Share of university revenues from non-budgetary sources;</li> <li>- Share of extra-budgetary funds in income from educational activities;</li> <li>- Share of extrabudgetary funds in R&amp;D revenues</li> </ul>

Source: authors.

All indicators for assessing the entrepreneurial capacity of the university are calculated in the form of coefficients, which makes it possible to determine the rating (both in individual areas and for the university as a whole) based on the average indicator.

It is proposed to determine the rating of the university in three categories based on the average:

- low if the university's rating is less than the average;
- average, if the university's rating is equal to the average;
- high if the university's rating is higher than the average.

This approach, in our opinion, will also reveal the reserves for the growth of the entrepreneurial capacity of the university.

## **5. Research Methods**

The methodological scheme of the research is based on the relationship and interdependence of indicators of educational and research activities of the university, as well as the implementation of the entrepreneurial capacity of the university in the international knowledge environment. The methodological and theoretical basis of the research is both classical and special research methods. The method of complex analysis made it possible to cover a wide range of issues, problems and solutions in the field of formation, organization of entrepreneurial activity in Russian universities. The method of systems analysis, with the help of which the directions and forms of the universities' entrepreneurial activity, which increase their competitiveness in modern socio-economic and knowledge systems, are studied. The method of monographic desk research, which made it possible to identify the contribution of Russian and foreign scientists to the development of the theory and practice of indicators of universities' entrepreneurial activity and criteria for their assessment. The method of comparative analysis, which made it possible to draw conclusions about the results of the rating assessment of the entrepreneurial capacity of Russian universities. The application of these methods made it possible to make a reasonable assessment of universities' entrepreneurial activity, to identify the directions of its further development.

## **6. Findings**

Approbation of the proposed methodology was carried out using the example of seventeen technical universities of the Volga Federal District (VFD), since they, in our opinion, are most consistent with the model of the entrepreneurial university: they lead the educational process, could participate in grants, implement research projects, create new technologies with market capacity and commercialization opportunities. As a base for the study, the authors used open information sources containing information about universities' activity in 2018. The results of the rating assessment of the entrepreneurial capacity of the surveyed universities are presented in Table 2 (the average indicator for educational activities - 0.15, research - 0.31, financial - economic - 0.32, final - 0.26).

**Table 2.** Rating assessment of the entrepreneurial capacity of VFD universities, 2018

University	Activity						Final rating	Capacity level
	Educational		R&D		Financial and economic			
	Indicator value	Capacity level	Indicator value	Capacity level	Indicator value	Capacity level		
Nizhny Novgorod State Engineering and Economic University	0,21	High	0,5	High	0,07	Low	0,26	Average
Nizhny Novgorod State University of Architecture and Civil Engineering	0,14	Low	0,05	Low	0,46	High	0,22	Low
Nizhny Novgorod State Technical University n.a. R.E. Alekseev	0,14	Low	0,46	High	0,28	Low	0,29	High
Penza State Technological University	0,14	Low	0,01	Low	0,16	Low	0,10	Low
Penza State University of Architecture and Construction	0,07	Low	0,49	High	0,32	Average	0,29	High
Perm National Research Polytechnic University	0,14	Low	0,39	High	0,48	High	0,34	High
Perm State Agro-Technological University	0,49	High	0,50	High	0,35	High	0,45	High
Ufa State Aviation Technical University (USATU)	0,14	Low	0,45	High	0,36	High	0,32	High
Ufa State Petroleum Technological University	0,15	Average	0,24	Low	0,54	High	0,31	High
Volga State University	0,18	High	0,5	High	0,25	Low	0,31	High



of Technology								
Kazan State University of Architecture and Engineering	0,11	Low	0,5	High	0,71	High	0,44	High
Kazan National Research Technical University named after A. N. Tupolev - KAI	0,09	Low	0,44	High	0,34	High	0,30	High
Kazan National Research Technological University (KNRTU)	0,11	Low	0,45	High	0,38	High	0,31	High
Samara Polytech	0,10	Low	0,43	High	0,55	High	0,36	High
Yuri Gagarin State Technical University of Saratov (SSTU)	0,15	Average	0,44	High	0,22	Low	0,27	High
Kalashnikov Izhevsk State Technical University	0,24	High	0,5	High	0,46	High	0,4	High
Ulyanovsk State Technical University (USTU)	0,11	Low	0,5	High	0,43	High	0,21	Low

The rating assessment of the entrepreneurial capacity showed that some universities have a high entrepreneurial capacity in both educational and scientific activities, but the financial results are not high enough (Nizhny Novgorod State Engineering and Economic University, Volga State Technological University). Kalashnikov Izhevsk State Technical University, Perm Agro-Technological University have a high entrepreneurial capacity. However, when making decisions on the development of the entrepreneurial capacity, it is necessary to consider the level of deviation from the average indicator.

## 7. Conclusion

The study showed that entrepreneurial universities in the Russian Federation have not received large-scale development, and they are much less involved in the triple helix. The greatest development of entrepreneurial universities received in large cities, many continue to preserve their traditional methods of activity with the introduction of certain elements of entrepreneurship.

In our opinion, this situation is associated with many factors, the main of which are:

- dependence of universities on funding from budgetary funds;
- instable economic development;
- insufficient interaction between universities and business in the framework of personnel training and scientific and applied research;
- problems of commercialization of innovative activities;
- lack of the developed infrastructure for technology transfer;
- weak entrepreneurial culture in universities;
- failure to consider the basic elements for creating the upper level of infrastructure (before creating an innovative infrastructure, it is necessary to form a scientific base, but the other extreme is dangerous, a balance is needed);
- insufficient activity of big business in technological innovations, etc. (Podoprigririna, 2019).

Thus, entrepreneurial universities should function as commercial organizations, university staff and students should behave and think like entrepreneurs, the university should be associated with the region, developing business in it (Uslu et al., 2019). The mechanisms of the triple helix in the development of Russian universities have just been introduced. In our opinion, to accelerate this process, increase the competitiveness in the world market, we need an effective rating assessment of their activities.

The study made it possible to establish that the main features of the entrepreneurial university are the dissemination of knowledge, generation of knowledge, assistance to the formation and development of companies, regional development and international cooperation with the aim to provide adequate commercialization of the complex “education - science – entrepreneurship”. Increasing the entrepreneurial capacity of the university is impossible without a high-quality learning process, high qualifications and competitiveness of graduates. In addition, to develop the entrepreneurial capacity of Russian universities, it is necessary to encourage effective innovations, search for innovative forms of educational and scientific activities, the complex nature of activities at the university, covering all levels of management and directions.

A rating assessment of the entrepreneurial capacity can be based on multilevel hierarchical indicators using quantitative and qualitative methods, as well as integrated indicators (Goryacheva & Myzrova, 2020). To validate the assessment, the rating indicators must be supplemented with weight criteria determined by the method of correlation-regression analysis, considering the influence of regional factors and having their own individual characteristics for each of the areas of activity. This approach will make it possible to identify the “weak” and “strong” positions of the university within the framework of the entrepreneurial capacity and determine the directions for further development. The competitiveness of each university largely depends on the formed entrepreneurial capacity.

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