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SYSTEM OF INDICATORS FOR COMPREHENSIVE EVALUATION OF THE EFFECTIVENESS OF THE "ENTREPRENEURIAL UNIVERSITY"

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Abstract

The article examines the theoretical and methodological aspects of evaluating the effectiveness of a university operating within the framework of the "entrepreneurial model" of higher education. In today's environment, universities are not only educational and scientific centres, but also important participants in the innovative and socio-economic development of regions. In this regard, there is a growing need to develop tools that allow for a comprehensive assessment of their performance, taking into account academic, innovative, economic and social factors. The aim of this article is to develop a system of indicators that allows for assessing the effectiveness of an "entrepreneurial university" and determining its contribution to the development of the regional economy. As a result of the study, a structured system of indicators is proposed, including four key blocks: academic effectiveness, innovative and entrepreneurial activity, economic and financial sustainability, and the social and regional impact of the university. These indicators allow for a comprehensive assessment of the university's performance and identify its role in human capital formation, innovation infrastructure development, and the stimulation of entrepreneurial activity.

Key words

entrepreneurial university, system of indicators, socio-economic development, human capital, regional development.

Introduction.

In the context of the formation of a knowledge-based economy, the role of higher education institutions is expanding significantly. Universities are increasingly acting not only as centres for training personnel and conducting scientific research, but also as active participants in the socio-economic development of regions. Modern practice shows that higher education is becoming one of the key factors in increasing the innovative potential of regions, developing entrepreneurship and forming a competitive economy. The concept of an "entrepreneurial university", focused on the commercialisation of scientific developments, the development of entrepreneurial initiatives, and the training of personnel for an innovative economy, is becoming particularly relevant. The "entrepreneurial university" creates synergy between educational, research and commercial activities, acting as a driver of economic growth, increasing the competitiveness of the region and improving the quality of life of the population.

The development of an "entrepreneurial model" for universities involves the creation of a new management system focused on efficiency, flexibility and practical results in scientific and educational activities. In this context, the issue of assessing the effectiveness of entrepreneurial-type universities becomes particularly relevant. The need for such an assessment is due to the fact that the influence of a university is manifested not only in academic results, but also in innovative activity, financial stability, and social and regional development.

Despite a significant number of studies devoted to the transformation of higher education, the problem of developing a comprehensive system of indicators to assess the effectiveness of an "entrepreneurial university" remains insufficiently developed. In most cases, analysis is limited to individual aspects of university activities, which does not allow for a full assessment of their contribution to the development of the region's innovative and socio-economic environment.

B In this regard, the aim of this study is to develop a system of indicators that would allow for a comprehensive assessment of the university's performance within the framework of the "entrepreneurial model". The proposed approach is based on identifying key areas of the university's functioning, including academic performance, innovation and entrepreneurial activity, economic sustainability, and social and regional impact.

The results of the study can be used in the formation of development strategies for higher education institutions, as well as in the development of mechanisms for assessing their contribution to the development of the innovative economy and regional socio-economic systems.

Methods and materials.

The scientific research employed methods of analytical and comparative analysis, traditional descriptive methods, and factor analysis. By combining these methods, the study aims to provide a multifaceted and in-depth analysis of the problem under investigation.

The theoretical and methodological basis of the study was provided by the works of leading scientists who consider various aspects of the development of the "entrepreneurial model" of universities, taking into account foreign experience. Among the researchers, we can mention B. Clark [7], G. Itskovits [3], E. Balatsky [1], A. Grudzinsky [2], A. Muminov [5], R. Nurimbetov [6], G. Abdurakhmanova [6], and others, where the authors focus on the economic efficiency of higher education institutions and their new entrepreneurial mission.

Results.

The development of a methodology for evaluating the "entrepreneurial university" model is based on a multidimensional approach that includes academic, innovative, economic, and social indicators. Systemic integrity, focus on the end result, and applied orientation enable strategically sound management decisions to be made. At the heart of this methodology is the understanding of the university not only as an educational organisation, but also as an active participant in the regional economy, a generator of innovation and an institution for the formation of human capital.

First of all, it is necessary to identify key indicators of socio-economic development in the region that allow for an objective assessment of its dynamics and current state. These include gross regional product, investment levels, employment indicators, the standard of living and quality of life of the population, and the degree of innovation activity. These parameters form the basis for further analysis and allow us to identify the extent to which the university's activities correspond to general trends in regional development.

The next stage involves assessing the university's contribution to human capital development. It is important to consider not only the total number of graduates, but also the proportion of those who remain working in the region's economy, their salary levels, career trajectories and involvement in innovation processes. Such an analysis makes it possible to determine whether the university is a source of skilled personnel for the regional labour market and whether it contributes to the formation of a knowledge- and entrepreneurship-oriented environment.

An equally important area is the assessment of the university's role in the development of innovative activity. This takes into account quantitative and qualitative indicators: the number of scientific publications and patents, the volume of commercialised developments, the number of

start-ups created and successful innovation projects. These data reflect the university's ability not only to generate new knowledge, but also to transform it into economically significant results.

The university's influence on the formation and development of the region's innovative infrastructure deserves special attention. The presence of technology parks, business incubators, technology transfer centres and other elements of the innovative ecosystem testifies to its institutional activity and readiness to act as an integrator of interaction between science, business and government.

Finally, the methodology should take into account the university's impact on the region's social environment. This refers to raising the overall level of education of the population, forming an innovative culture, and developing social activity and entrepreneurial thinking. In the long term, it is these changes that create a sustainable basis for modernising the economy and strengthening the region's competitiveness.

In addition, when creating a system of performance indicators for higher education institutions within the framework of the "entrepreneurial university" concept, the following profile is used:

— A multidimensional approach that provides for the analysis of not only the overall performance of the higher education institution, but also the assessment of the effectiveness of its individual areas of activity.

— Systemic integrity, which takes into account academic success, financial return and the socially significant consequences of activities.

— A focus on the end result, with the main emphasis on the effect achieved rather than the processes that led to it.

— Applied value, providing the opportunity to make informed management decisions, build a long-term strategy and quickly adapt current activities.

Analysis. As part of the study, the author developed a system of key indicators for assessing the performance of higher education institutions (see Table 1). Table 1 reflects a system of indicators that allow for a comprehensive assessment of the performance of a university operating within an "entrepreneurial model". Its structure is based on the principle of grouping indicators according to the key areas of the university's activities, which makes it possible to consider the results of the higher education institution's work from different angles and identify the interrelationships between the educational, scientific, economic and social components. Let us consider this in more detail.

Table 1

Key indicators of "entrepreneurial university" effectiveness[1]

Group of indicators	Indicator code	Indicator name	Content and analytical significance
Academic effectiveness	A_1	Graduate employment rate	Reflects the degree to which educational programmes meet the requirements of the regional labour market and the demand for graduates.
	A_2	Average number of scientific publications	Characterises the intensity of the university's research activities and

[1] Formulated by the author based on research findings.

			the level of academic productivity.
	A_3	Index of citations of scientific works	Demonstrates the scientific impact of the university's research and the recognition of its results in the academic community.
	A_4	Proportion of educational programmes with project-based learning	Reflects the degree of implementation of practice-oriented methods of teaching and developing entrepreneurial competencies.
Innovative and entrepreneurial activity	I_1	Share of commercialised R&D	Characterises the university's ability to transform scientific results into economically significant products and technologies.
	I_2	Number of start-ups and innovative projects created	Shows the level of entrepreneurial activity in the university environment.
	I_3	Share of applied scientific research	Reflects the focus of scientific activity on solving practical problems in economics and society.
	I_4	Number of joint projects with businesses and government agencies	Demonstrates the level of integration of the university into the region's innovation ecosystem.
Economic and financial efficiency	E_1	Share of extra-budgetary income	Shows the level of financial autonomy of the university and its ability to attract additional resources.
	E_2	Revenue per employee	Characterises the economic performance of the university and labour productivity.
	E_3	Income source diversification ratio	Reflects the stability of the financial structure and the degree of dependence on individual sources of financing.
	E_4	Level of investment activity	Shows the scale of investment in infrastructure development, scientific research and educational programmes.
Social and regional effectiveness	S_1	Percentage of graduates employed in the region	Describes the university's contribution to the development of human capital in the region.
	S_2	University participation in regional projects	Reflects the degree of involvement in solving the region's socio-economic problems.
	S_3	Social coverage index	Demonstrates the extent of the university's engagement with society through educational,

			cultural and social initiatives.
	S_4	Share of educational programmes for priority sectors in the region	Reflects the alignment of educational policy with strategic directions for regional economic development.

The first group of indicators characterises academic effectiveness. It reflects the results of the university's educational and scientific activities, which form the basis of its intellectual potential. For a university focused on an "entrepreneurial model", academic activity remains a fundamental element of all areas of activity. The successful functioning of the academic system guarantees the training of sought-after specialists, the strengthening of scientific traditions, and the generation of innovative knowledge that can form the basis for technological solutions and entrepreneurial projects. The key metrics in this category are the proportion of employed graduates (A_1), reflecting the alignment of educational standards with market needs; the average volume of publications and scientific works (A_2), indicating the scale of research activity; the citation rate of publications (A_3), serving as an indicator of scientific authority; and the percentage of programmes using project-based learning (A_4), which indicates the degree of applied focus of the educational process.

The employment rate of graduates allows us to determine the extent to which the training of specialists meets the requirements of the labour market. Indicators of publication activity and citation of scientific works demonstrate the level of scientific productivity and the significance of the research conducted. In turn, the proportion of educational programmes implemented using project-based learning methods indicates the degree of practical orientation of the educational process and the development of entrepreneurial competencies among students.

The second group of indicators relates to the university's innovation and entrepreneurial activities. These indicators reflect the educational institution's ability to transform scientific results into practical developments and commercial products. Key parameters: the share of R&D that has been commercialised (I_1); the rate of emergence of new enterprises and projects (I_2); the share of applied scientific work (I_3) confirming a focus on solving real-world problems; and the number of joint initiatives with external structures (I_4), reflecting the level of interaction with stakeholders.

The proportion of research work that has reached the implementation stage is important, as it shows the effectiveness of knowledge commercialisation mechanisms. The number of start-ups and innovative projects created characterises the level of entrepreneurial activity in the university environment. This group is complemented by indicators reflecting the share of applied research and the extent of cooperation with business structures and government organisations.

The third group of indicators covers the economic and financial efficiency of the university's activities. These indicators make it possible to assess the stability of the educational institution's financial system and its ability to develop independently. A reliable and diversified revenue system reduces dependence on external factors and increases adaptability to changes in the environment. The key metrics in this group are the share of extrabudgetary revenues (E_1), reflecting the level of financial self-sufficiency; income per employee (E_2), determining the overall level of productivity; the income source diversification ratio (E_3), which reflects the strength of the financial structure; and the level of investment involvement (E_4), which indicates the direction of resource use for development.

The share of extrabudgetary revenues demonstrates the level of financial autonomy, while the indicator of income per employee characterises the overall economic performance of activities. The diversification ratio of funding sources shows the degree of stability of the

financial structure, while the level of investment activity reflects the allocation of resources for the development of infrastructure, scientific research and educational programmes.

The fourth group of indicators is devoted to socio-regional effectiveness. It allows assessing the impact of a university on the development of the territory in which it operates. With the growing importance of regional innovation platforms, universities act as a vital bridge between education, scientific research, business and society. The analysis of this category covers the proportion of graduates who remain to work in the region (S_1), which reflects the contribution to the region's workforce; the level of participation in various regional projects (S_2), demonstrating the depth of integration into the region's development; the social coverage index (S_3), which characterises the scale of relations with the population; and the share of educational programmes focused on priority sectors of the economy (S_4), which indicates the alignment of the university's activities with the needs of the regional economy.

A significant indicator is the proportion of graduates who continue their professional activities in the region, as it reflects the university's contribution to the formation and preservation of human capital. Indicators of participation in regional projects and the level of social coverage characterise the degree of the university's involvement in solving social problems and interacting with the population. This group is complemented by the indicator of the proportion of educational programmes focused on priority sectors of the region's economy, which demonstrates the consistency of the university's educational policy with the needs of regional development.

The coordination of these components forms a unified management mechanism that allows the university to be a full participant in the processes of innovative development [10].

The analysis shows that an "entrepreneurial university" is a multidimensional institutional model, the effectiveness of which is determined not by individual indicators, but by their combination and interrelationship. Academic sustainability forms the intellectual foundation, innovative activity ensures the transformation of knowledge into economic results, financial stability guarantees strategic autonomy, and social and regional involvement enhances the university's public significance.

Discussion.

The results of the study show that the effectiveness of an "entrepreneurial university" cannot be reduced to a single category; it arises from the complex interaction of academic performance, innovative activity, financial stability, and social engagement. This multidimensionality reflects the dual role of the university as a generator of knowledge and an active participant in regional development. The alignment of educational outcomes with labour market demands, reflected in graduate employment rates and the relevance of educational programmes, underscores the fundamental role of human capital formation. At the same time, indicators of innovation activity, such as the commercialisation of R&D, the creation of start-ups and applied research, demonstrate that universities are increasingly transforming knowledge into tangible economic value.

The interdependence between innovation and socio-regional engagement is particularly important. Universities that actively participate in regional projects and collaborate with businesses and government agencies are more effective in creating a sustainable innovation ecosystem. This suggests that strategies focused exclusively on academic performance or internal research productivity may not reflect the full societal impact of higher education. In addition, the data confirms that financial autonomy and diversified sources of income increase universities' ability to invest in infrastructure, research and entrepreneurial initiatives, strengthening their strategic sustainability.

These findings are consistent with the concepts of the "triple helix" and "entrepreneurial university" models, which emphasise the importance of systemic integration of education, science and social application. The study also shows that project-based learning and applied research serve as bridges connecting academic excellence with innovation and social impact, highlighting the value of educational programmes that develop entrepreneurial competencies alongside traditional academic skills.

At the same time, the results reveal certain limitations and context dependence. The effectiveness of entrepreneurial universities is significantly determined by external factors such as government policy, the structure of the regional economy, the availability of skilled personnel, and the involvement of local businesses. Therefore, a universal system of indicators may not fully reflect the priorities or problems of a particular region.

From a practical perspective, the proposed indicator system provides a basis for strategic planning, benchmarking and policy development. By integrating academic, innovation, economic and socio-regional dimensions, universities and governing bodies can identify areas requiring targeted interventions, track progress and optimise resource allocation. The holistic approach applied in the study highlights the need for continuous adaptation of management mechanisms, development of a culture of innovation, and strengthening of cooperation with external stakeholders to maximise both economic and social returns.

Discussion.

In our opinion, the "entrepreneurial university" has a significant positive impact not only on the region's economy, but also on its social environment. Its contribution to the development of human capital is reflected in an increase in the number of qualified specialists employed in the region's economy and an increase in their salaries, as well as in an increase in the overall level of education of the population, thanks to educational programmes and projects aimed at the general public. The introduction of the concept of an "entrepreneurial university" also contributes to the development of innovative activities, the creation of new enterprises and the attraction of investment to the region, the creation of technology parks, business incubators and innovation centres, which in turn forms a favourable innovative culture in society.

At the same time, the effectiveness of the "entrepreneurial university" in creating a favourable socio-economic environment depends on a number of factors, including government support, cooperation with business, and the availability of qualified personnel.

To increase the effectiveness of the "entrepreneurial university" on the socio-economic development of the region and strengthen its positive impact on the social environment, it is necessary to strengthen public-private support, including funding for scientific research, the development of innovative infrastructure and the stimulation of entrepreneurial activity, as well as support for the university's educational and social initiatives; developing cooperation with business, including the creation of joint laboratories, the organisation of internships and the commercialisation of scientific developments, as well as involving business in the implementation of the university's social projects; strengthening international cooperation, etc. [8].

Thus, the "entrepreneurial university" is a key tool for modernising the regional economy and creating a sustainable social environment. Its development requires comprehensive management, stronger cooperation with business and the state, active implementation of digital technologies, and systematic support for innovative infrastructure. Only if these conditions are met can the "entrepreneurial university" ensure long-term economic growth, increase the region's competitiveness, and sustainably improve the quality of life of the population.

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