



Founders: State University of Economics and Technology

ISSN: 3041-1246

E-mail: ete@duet.edu.ua Journal homepage: <https://ete.org.ua>

JEL: I22, I23, I25

DOI: 10.62911/ete.2026.04.01.15

Assessment of preconditions for the transformation of higher education institutions in Ukraine into entrepreneurial universities

Citation:

Olesnevych, O. (2026). Assessment of preconditions for the transformation of higher education institutions in Ukraine into entrepreneurial universities. Scientific and practical journal "Economics and technical engineering". Vol.4 No.1 (2026), 179–188 <https://doi.org/10.62911/ete.2026.04.01.15>

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Abstract: The transformation of higher education institutions into entrepreneurial universities represents a key direction of development in the global knowledge economy. In modern conditions, universities are increasingly required not only to perform educational and research functions but also to generate economic value through innovation, commercialization of knowledge, and active cooperation with business. The purpose of this study is to assess the current state of higher education institutions in Ukraine and determine their readiness for transformation into entrepreneurial universities based on financial, staffing, and institutional indicators. The study is based on statistical data covering the period 2010–2024, including indicators of funding, staffing structure, research activity, and university-business interaction. The results demonstrate a significant reduction in the number of higher education institutions in Ukraine (almost 50%), accompanied by a gradual increase in funding volumes, indicating the concentration of financial resources. At the same time, a decrease in research personnel and insufficient integration with the business sector limit the effectiveness of transformation processes. It is substantiated that the key factor of transformation is not the volume of resources but the efficiency of their use and the ability of institutions to integrate innovation, partnerships, and modern management practices. The scientific novelty of the research lies in the comprehensive quantitative assessment of the readiness of higher education institutions for entrepreneurial transformation and in identifying systemic imbalances between achieved results and economic efficiency. The practical significance of the study is determined by the possibility of using the obtained results to develop strategies for transforming universities and improving state policy in the field of higher education.

Received: 11/05/2026

Accepted: 19/05/2026

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Abstract: The transformation of higher education institutions into entrepreneurial universities represents one of the key directions of development within the global knowledge economy. In modern conditions, universities are increasingly required not only to perform educational and research functions but also to generate economic value through innovation, commercialization of knowledge, and active cooperation with business entities. The purpose of this study is to assess the current state of higher education institutions in Ukraine and to determine their readiness for transformation into entrepreneurial universities based on financial, staffing, and institutional indicators. The research is based on statistical data for the period from 2010 to 2024, including indicators of funding, personnel structure, research activity, and interaction between universities and business. The results demonstrate a significant reduction in the number of higher education institutions in Ukraine, almost by half, accompanied by a gradual increase in funding volumes, which indicates the concentration of financial resources. At the same time, a decrease in the number of employees engaged in research activities and insufficient integration with the business sector limit the effectiveness of transformation processes. It is substantiated that the key factor of transformation is not the volume of available resources, but the efficiency of their use and the ability of institutions to integrate innovation, partnerships, and modern management practices. The scientific novelty of the research lies in the comprehensive quantitative assessment of the readiness of higher education institutions for entrepreneurial transformation and in identifying systemic imbalances between achieved results and economic efficiency. The practical significance of the study is determined by the possibility of using the obtained results for the development of strategies for transforming universities and improving state policy in the field of higher education.

Keywords: entrepreneurial university; higher education institutions; innovation activity; university transformation; education funding; university-business collaboration; scientific research

Introduction

In the context of the formation of the knowledge economy, the role of higher education institutions is undergoing a fundamental transformation. Universities are increasingly becoming key actors in innovation systems, influencing economic growth, technological development, and the formation of human capital. Under such conditions, higher education institutions are expected not only to provide educational services and conduct scientific research but also to generate economic value through the commercialization of knowledge, development of innovation ecosystems, and active cooperation with business structures. For Ukraine, the transformation of higher education institutions into entrepreneurial universities is particularly relevant. This is due to structural imbalances in the functioning of the educational sector, insufficient efficiency in the use of financial and human resources, weak integration with the business environment, and a low level of commercialization of research results. Additional challenges are caused by economic instability and external factors, including military actions, which significantly affect the functioning of the higher education system and require the search for new development models. The concept of the entrepreneurial university has been widely studied in international scientific literature. Researchers emphasize the importance of institutional autonomy, diversification of funding sources, development of innovation infrastructure, and strengthening interaction between universities, business, and the state. At the same time, domestic studies mainly focus on adapting international experience to national conditions and often lack a comprehensive quantitative assessment of transformation

processes. Therefore, there is a need for research that integrates financial, staffing, and institutional indicators in order to assess the readiness of higher education institutions for entrepreneurial transformation. The purpose of this study is to assess the current state of higher education institutions in Ukraine and to determine their readiness for transformation into entrepreneurial universities.

Materials and methods

The methodological basis of the study includes methods of statistical analysis, comparative analysis, generalization, and systematization. A systemic approach was applied to ensure a comprehensive assessment of transformation processes in higher education institutions. The empirical base of the study consists of official statistical data of the State Statistics Service of Ukraine covering the period from 2010 to 2024. The analysis includes indicators of the number of higher education institutions, volumes and structure of funding, personnel characteristics, and indicators of scientific activity. The study also uses methods of structural and dynamic analysis to identify trends and patterns in the development of the higher education system.

Results

In the context of the formation of the knowledge economy, the role of higher education institutions is undergoing a fundamental transformation. Universities are increasingly becoming key actors in innovation systems, influencing economic growth, technological development, and the formation of human capital. Under such conditions, higher education institutions are expected not only to provide educational services and conduct research but also to generate economic value through the commercialization of knowledge, development of innovation ecosystems, and active cooperation with business structures.

For Ukraine, the transformation of higher education institutions into entrepreneurial universities is particularly relevant. This is due to structural imbalances in the functioning of the educational sector, insufficient efficiency in the use of financial and human resources, weak integration with the business environment, and a low level of commercialization of research results. Additional complexity is created by external factors, including economic instability and the consequences of military aggression, which significantly affect the functioning of the higher education system and require the search for new development models. In such conditions, the transition to an entrepreneurial model becomes not only a strategic direction but also a necessary condition for ensuring the sustainability and competitiveness of universities.

The purpose of this study is to assess the current state of higher education institutions in Ukraine and determine their readiness for transformation into entrepreneurial universities based on a comprehensive analysis of financial, staffing, and institutional indicators.

The empirical basis of the study is formed by statistical data from the State Statistics Service of Ukraine, which allows for an analysis of structural changes in the higher education system. The results indicate a significant reduction in the number of higher education institutions over the past decade, almost halving their total number. This process reflects structural optimization and consolidation of the educational system. At the same time, there is a steady increase in funding volumes, which indicates the concentration of financial resources in fewer institutions and creates potential for improving efficiency.

Despite a relatively high level of staffing, there is a negative trend in the number of employees engaged in research activities. This leads to a decrease in the innovation potential of universities and limits their ability to implement entrepreneurial functions. The presence of highly qualified personnel alone does not ensure effective transformation, which indicates the importance of management approaches, motivation systems, and institutional conditions.

The analysis of research funding shows an increase in absolute expenditures alongside a decrease in their share relative to GDP (*State Statistics Service of Ukraine, 2024*). This indicates insufficient macroeconomic support for scientific activity. Under such conditions, universities are forced to seek alternative sources of funding, including private investment, international grants, and partnerships with business. Such diversification of funding sources becomes a key element of the entrepreneurial model.

Interaction between universities and the business sector remains limited. The most common form of cooperation is student internships, while more complex forms such as joint research, commercialization of innovations, and co-development of educational programs are insufficiently developed (*Pokidina, 2016*). At the same time, the business sector demonstrates a certain readiness for cooperation, which creates opportunities for expanding partnership models and forming sustainable innovation ecosystems.

The conducted analysis allows identifying several key patterns. First, there is a clear concentration of financial resources within a reduced number of institutions. Second, there is a decline in research activity, which weakens the innovation component of university development. Third, the level of commercialization of knowledge remains low, limiting the ability of universities to generate economic value. Fourth, interaction with the business environment is insufficiently developed. Finally, institutional factors, including governance systems and strategic orientation, play an increasingly important role in determining transformation outcomes.

These results confirm that the transformation of universities into entrepreneurial institutions is determined not by the scale of available resources but by the efficiency of their use and the ability to integrate innovation, partnerships, and management practices into a coherent system.

The findings of the study indicate that the higher education system of Ukraine is currently undergoing structural transformation. Despite the availability of significant financial and human resources, their use remains insufficiently effective due to institutional constraints. The key scientific result of the research is the substantiation of the decisive role of efficiency in the transformation process. It is demonstrated that the success of transformation depends primarily on the ability of universities to effectively capitalize intellectual resources rather than simply increase their volume.

The main problems identified in the study include insufficient interaction with business, low levels of commercialization of research results, high dependence on state funding, and a decline in research potential. At the same time, key trends include the concentration of resources, increasing differentiation among universities, and the growing importance of modern management models.

Practical recommendations based on the research results include the development of university-business partnerships, implementation of KPI-based management systems, diversification of funding sources, development of innovation infrastructure, and improvement of state policy in higher education. These measures should be implemented in accordance with the Law of Ukraine "On Higher Education" (2014) and the Law of Ukraine "On Scientific and Scientific-Technical Activity" (2015).

The study confirms that the transformation into an entrepreneurial university has a nonlinear and threshold nature and depends primarily on the effective use and capitalization of intellectual capital. Further research should focus on the development of a system of indicators for assessing the level of entrepreneurial transformation and on conducting comparative analyses of individual universities to identify best practices and effective models of transformation.

Figures 1 and 2 show the amount and structure of funding for higher education institutions in Ukraine.

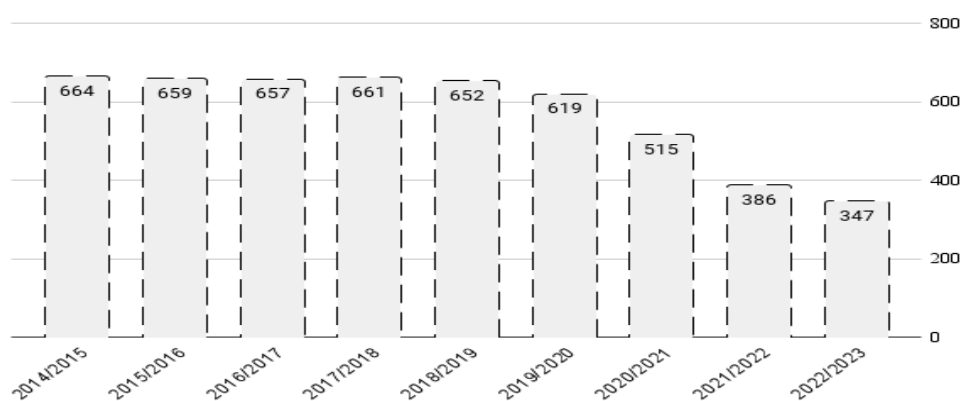


Figure 1. Dynamics of the number of HEIs and structure of funding in Ukraine (2014–2023).
Source: created by the author based on data from (*State Statistics Service of Ukraine, 2024*)

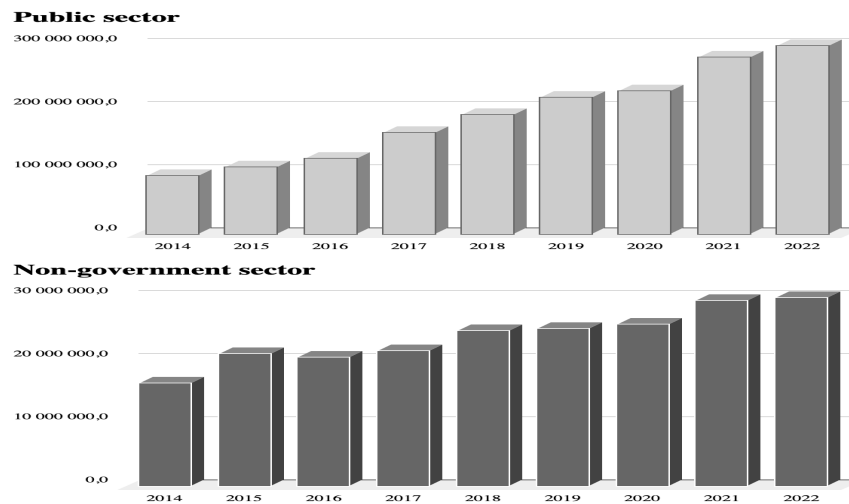


Figure 2. Structure of funding for higher education in Ukraine 2014- 2022

Source: created by the author based on data from (*State Statistics Service of Ukraine, 2021*)

The combined analysis demonstrates a clear inverse relationship between the number of HEIs and funding volumes. While the number of institutions decreased by approximately 50%, total funding continued to grow, indicating resource concentration. At the same time, the structure of funding shows a predominance of public sources, which reflects the high dependence of universities on state financing.

During the study period, the number of higher education institutions has decreased significantly, and accordingly, the number of higher education institutions in 2012-2015, which was 664, reached its lowest point in 2022-2023 at 347, by approximately 50% of the initial number of higher education institutions. Compared to the amount of funding, where the amount of money is steadily increasing every year, the number of higher education institutions is sharply declining, and in the context of military events, the statistical forecast leaves no hope for the previous years in terms of restoring the number of higher education institutions. However, the trend of increasing financial investments in education has positive consequences in expanding the resource base of existing universities and affects their quality and comprehensive development.

Thus, according to statistics, domestic HEIs are well staffed, so Figure 3 shows a cross-section of the number of HEI employees according to academic degree and academic rank. Thus, Ukrainian HEIs are filled with a fairly high number of employees who can actively participate and/or motivate students to engage in entrepreneurial activities, unleashing their entrepreneurial initiative. However, in addition to motivating and educating students, university staff and faculty can and should be engaged in entrepreneurial activities in entrepreneurial universities. It is the motivation and support of employees for entrepreneurial activity that is the key to the successful transformation of higher education institutions into entrepreneurial ones.

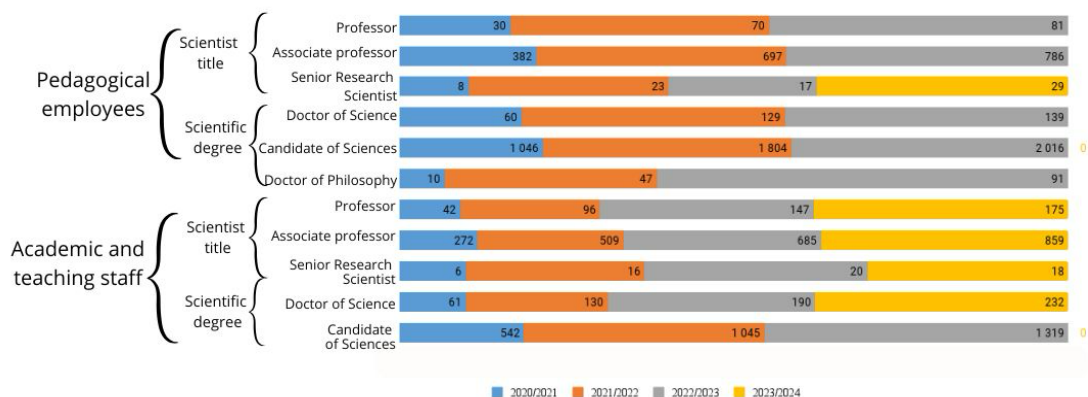


Figure 3. Due to incomplete data for 2023–2024, the analysis is limited to the period 2020–2023.

Source: created by the author based on data from (*State Statistics Service of Ukraine, 2024*)

The willingness to embrace new technologies and innovative pedagogical practices is the next key factor in the management of entrepreneurial universities. This includes the development of new learning environments, the introduction of e-learning platforms, and the integration of technology into the teaching and learning process. For example, Figure 4 shows the number of employees involved in research and development who have a degree in 2010-2023. According to the illustrated statistics, one can observe a negative dynamic of the share of employees involved in research activities, which is the basis for further transformation process of the universities into entrepreneurial ones.

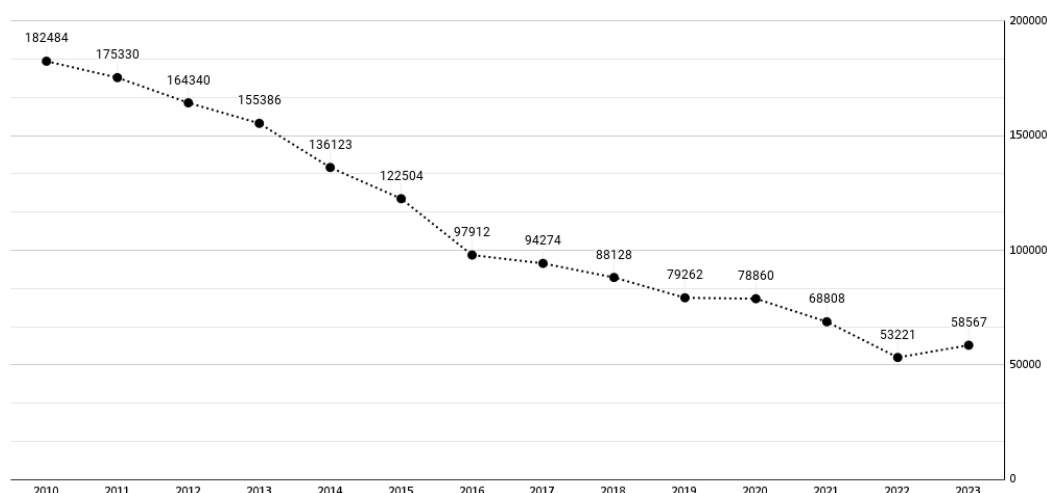


Figure 4. Number of employees engaged in research and development with a scientific degree in Ukraine in 2010-2023, persons

Source: based by author on data from (*State Statistics Service of Ukraine, 2024*)

The motivation of employees to engage in research, and thus in entrepreneurial activities, depends on many factors, the most significant of which is the amount of funding. Table 1 presents a statistical sample of research funding indicators for 2010-2023. While the annual increase in research expenditures is observed, the statistical indicators also illustrate a decrease in the share of expenditures in relation to GDP, which indicates an inadequate environment for research.

Table 1. Expenditures on research and development by type of work in Ukraine in 2010-2023

Year	Expenditures on research and development - total, UAH million	Basic scientific research		Applied scientific research		Scientific and technical (experimental) developments		Share of research and development expenditures, as a % of GDP
		UAH million	as % of total expenses	UAH million	as % of total expenses	UAH million	as % of total expenses	
2010	8107,1	2175,0	26,8	1589,4	19,6	4342,7	53,6	0,75
2011	8513,4	2200,8	25,9	1813,9	21,3	4498,7	52,8	0,65
2012	9419,9	2615,3	27,8	2023,2	21,5	4781,4	50,7	0,67
2013	10248,5	2698,2	26,3	2061,4	20,1	5488,9	53,6	0,70
2014	9487,5	2452,0	25,9	1882,7	19,8	5152,8	54,3	0,60
2015	11003,6	2460,2	22,4	1960,6	17,8	6582,8	59,8	0,55

2016	11530,7	2225,7	19,3	2561,2	22,2	6743,8	58,5	0,48
2017	13379,3	2924,5	21,9	3163,2	23,6	7291,6	54,5	0,45
2018	16773,7	3756,5	22,4	3568,3	21,3	9448,9	56,3	0,47
2019	17254,6	3740,4	21,7	3635,7	21,1	9878,5	57,2	0,43
2020	17022,4	4259,0	25,0	3971,4	23,3	8792,1	51,7	0,41
2021	20973,8	5163,7	24,6	4821,3	23,0	10988,8	52,4	0,38
2022	17117,8	4081,3	23,8	4827,6	28,2	8208,9	48,0	0,33
2023	21348,1	4424,4	20,7	6348,4	29,7	10575,3	49,6	0,33

Source: compiled by the author based on (*State Statistics Service of Ukraine, 2024*)

It is worth noting that under such conditions, universities which are planning to transform into entrepreneurial ones need to consider alternative ways to finance and commercialize projects other than research and development. Therefore, this factor of readiness for the transformation of higher education institutions into entrepreneurial ones indicates the need to find alternative sources of funding other than the state. It is worth noting that it will also be necessary to consider the number of innovative developments implemented in the activities of industrial enterprises, as shown in Figure 5.

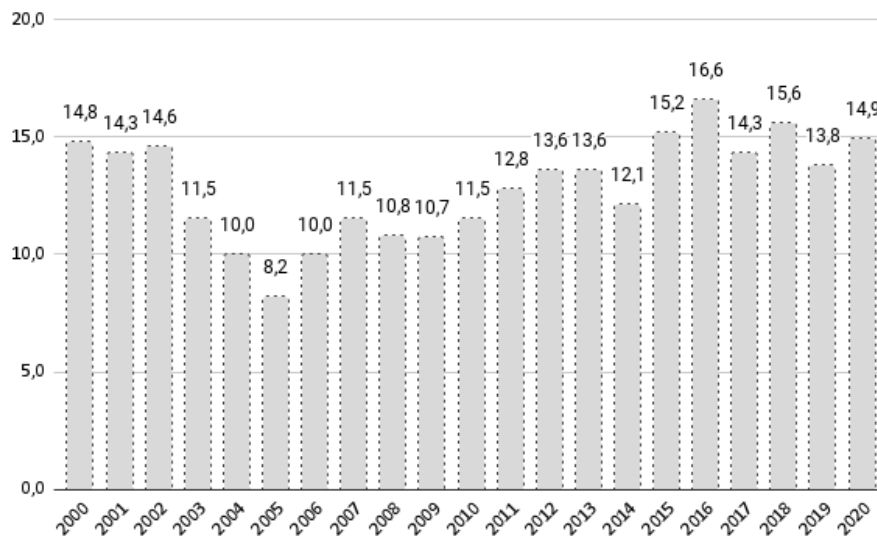


Figure 5. Percentage share of the number of industrial enterprises that implemented innovations in the total number of industrial enterprises in Ukraine in 2000-2020.

Source: created by the author based on data from (*State Statistics Service of Ukraine, 2024*)

Unlike higher education institutions, research activities are encouraged by enterprises, but the share of projects implemented in the analyzed period remained at 15%. This indicates a stable need for the development of scientific activities of enterprises, and thus the maturity of the business sector to further cooperate with universities.

Interaction between universities and the industrial sector is currently in the form of partnership, as partnerships are beneficial for both parties. From this partnership, both parties receive not only funding and human resources, but also have the opportunity to influence the improvement of the entrepreneurial infrastructure of the studied universities.

The diversity of goals and activities of higher education institutions determines the wide range of forms of their interaction with business organizations, methods and timing of their implementation, the range of persons and units involved in the interaction, the number of participants, etc., including job fairs, sponsorship of conferences, interaction with individual departments of higher education institutions (short-term) and laboratories, research centers, internships, basic departments (long-term). V. Pokidina's study summarizes the most common forms of collaboration between universities and businesses in the following groups: collaboration in research and development (R&D), academic mobility, student mobility, commercialization of R&D results, development of a curriculum, implementation of a lifelong learning project (LLL); entrepreneurial initiatives; management (Guerrero, M., & Urbano, D., 2012)

Although some companies are trying to build a dialogue with universities and create a channel for supplying the required professional staff for their operations, the level of activity of such isolated cooperation is rather low, as only about 30% of the total flow of students, mostly from leading universities, is involved. In addition, most higher education institutions' cooperation practices are limited mainly to the more familiar concept of student mobility, i.e., providing students with internships or short-term work placements at enterprises. Other cooperation initiatives, such as joint research and development, commercialization, development of educational programs, and promotion of entrepreneurial initiatives, are not widespread, and this does not allow for a complete picture of the needs of the business environment (Guerrero, M., & Urbano, D., 2012)

The most common form of cooperation between business organizations and higher education institutions is assistance in organizing internships for students, which is implemented by 71% of enterprises, although quite often it is done formally by signing documents (internship agreements and reports). Only 32% of enterprises engage students in work at the enterprise. The main obstacle to the implementation of the first two forms of partnership is the attempt of business leaders to protect trade secrets, which they see as a threat to the preservation of which they see in outsiders (students). Even less common is the individual selection of young professionals (Guerrero, M., & Urbano, D., 2012)

Conclusions

The results of the study confirm that the higher education system of Ukraine is undergoing structural transformation characterized by a reduction in the number of institutions alongside a simultaneous increase in funding volumes, which indicates a process of resource concentration. At the same time, several negative trends have been identified, including a decline in research personnel, a critically low share of expenditures on research and development in gross domestic product (0.33 percent in 2023), limited interaction with the business sector, and a low level of commercialization of research results. In addition, significant differentiation between universities in terms of financial capacity and human resources has been observed. The scientific novelty of the research lies in the comprehensive assessment of the readiness of higher education institutions for entrepreneurial transformation through the integration of financial, human resource, and institutional indicators. The results demonstrate that the key problems of the current system include a high dependence on state funding, weak interaction between universities and business, and insufficient development of innovation infrastructure. Based on the findings, a set of practical recommendations has been developed, including the expansion of public-private partnerships, diversification of funding sources, implementation of performance evaluation systems, strengthening of mechanisms for commercialization of research results, and improvement of state policy in the field of higher education. Thus, the study substantiates that the transformation of universities into entrepreneurial institutions depends not on the scale of available resources, but on the efficiency of their use and the ability to integrate research, education, and innovation activities into a unified value-creation system. The conducted analysis also made it possible to identify both strengths and weaknesses of the current higher education environment, particularly in terms of staffing structure, research engagement, publication activity, and financing of innovation processes. Further research should focus on assessing the internal capacity of individual universities, developing quantitative indicators of

readiness for entrepreneurial transformation, and defining clear stages and mechanisms for its implementation. This approach will contribute to a deeper understanding of transformation processes and enhance the practical applicability of research results in shaping effective development strategies for higher education institutions.

Conflicts of interest

The authors declare no conflict of interest.

Funding

This research received no external funding.

Author Contributions

The author contributed to all stages of the research process. Conceptualization of the study, development of the research methodology, data collection and analysis, interpretation of results, and preparation of the manuscript were carried out solely by the author.

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