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**METHODOLOGICAL PRINCIPLES OF ASSESSING THE IMPACT
OF ENVIRONMENTAL FACTORS ON THE LEVEL OF ECONOMIC
SECURITY OF HIGHER EDUCATIONAL INSTITUTIONS**

The article identifies the existing problems and develops a model for analyzing the factors of the external environment of higher educational institutions in the context of economic security management. There have been systematized the factors that have the most significant influence on the prospects of the development of higher educational institutions of Ukraine. To determine the cumulative impact on the level of economic security of higher educational institutions there have been proposed the use of the coefficient of the state of the environment. There have also been presented the results of the environment assessment of higher educational institutions of Ukraine.

Keywords: *economic security, higher education system, economic security factors of higher education, coefficient of external environment factor of higher educational institutions.*

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**МЕТОДИЧНІ ЗАСАДИ ОЦІНЮВАННЯ ВПЛИВУ ЧИННИКІВ
ЗОВНІШНЬОГО СЕРЕДОВИЩА НА РІВЕНЬ
ЕКОНОМІЧНОЇ БЕЗПЕКИ ВНЗ**

У статті визначено існуючі проблеми та розроблено модель аналізу чинників зовнішнього середовища ВНЗ в контексті управління економічною безпекою. Систематизовано чинники, які найбільш суттєво впливають на перспективи розвитку вищих навчальних закладів України. Для визначення сукупного впливу на рівень економічної безпеки вищих навчальних закладів запропоновано використання коефіцієнта стану зовнішнього середовища. Наведено результати оцінювання зовнішнього середовища ВНЗ України.

Ключові слова: *економічна безпека, система вищої освіти, чинники економічної безпеки вищої освіти, коефіцієнт стану зовнішнього середовища вищих навчальних закладів.*

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**МЕТОДИЧЕСКИЕ ОСНОВЫ ОЦЕНКИ ВЛИЯНИЯ ФАКТОРОВ
ВНЕШНЕЙ СРЕДЫ НА УРОВЕНЬ ЭКОНОМИЧЕСКОЙ
БЕЗОПАСНОСТИ ВУЗа**

В статті определены существующие проблемы и разработана модель анализа факторов внешней среды высших учебных заведений в контексте управления экономической безопасностью. Систематизированы факторы, которые наиболее существенно влияют на перспективы развития высших учебных заведений Украины. Для определения совокупного влияния на уровень экономической безопасности высших учебных заведений предложено использование коэффициента состояния внешней среды. Представлены результаты оценки внешней среды ВУЗов Украины.

Ключевые слова: *экономическая безопасность, система высшего образования, факторы экономической безопасности высшего образования, коэффициент состояния внешней среды высших учебных заведений.*

Problem statement and its connection with important scientific and practical tasks. Global technological developments and economic transformations that have recently been occurring in Ukraine under the influence of both scientific progress and systemic and structural changes in the economy and society necessitate sustainable operation and strategic development as a whole system of national economy and its individual links.

Analysis of current problems and perspectives of higher education (HE) in Ukraine in modern conditions allows to formulate the hypothesis that higher education as an essential factor in ensuring competitiveness and economic security is the most vulnerable link for the challenges of globalization and internal threats. On the other hand, in times of financial, economic, and political situation in the country, opportunities to ensure sustainable development of the national economy on innovative principles are determined by the level of human capital, education and science, the amount of resources invested in these areas of the national economy. Taking into account all mentioned above investment in higher education, which primarily formed human capital is the most efficient and prioritized at this stage as the potential of most industries depends on the professional staff level. This is particularly actualized in the emerging economic knowledge, where higher education is a basic development of economics, socio-economic progress of the country.

According to the World Bank, some post-socialist countries in the ranking of countries in the world in terms of education expenditure in 2014 occupied the following places: Latvia – 42 (5.7% of national income), Lithuania – 46 (5.6%), Ukraine – 57 (5.3%), Belarus – 83 (4.5%), Russia – 98 (4.1%), Georgia – 119 (3.2%) [1,2]. According to the level of education index, which characterizes the achievements of the country from the standpoint of the population education level by adult literacy indicators (2/3 weight) and the level of the combined share of students of primary, secondary and higher education (1/3 of weight), these countries had the following positions: Estonia – 11 (0,864), Lithuania – 12 (0,868), Belarus – 20 (0,834), Latvia – 31 (0,806), Russia – 32 (0,806), Ukraine – 36 (0,799), Georgia – 40 (0,787) [3]. It follows from the above that in the global socio-economic space the

task of ensuring the economic security of the national system of higher education should become a priority for the state, since education fulfills such an important social function as preservation and enhancement of human capital as an important factor of competitiveness and sustainable development of Ukraine. This necessitates the assessment of both the potential of the national higher education system, its efficiency and competitiveness, and factors that determine the current state and prospects for its development, and, on this basis, the development of higher education management mechanisms that are adequate to the contemporary national conditions of development and global challenges.

Analysis of recent publications on the issue. The study of issues related to the provision of higher education in general, refers to the range of interests of many domestic and foreign scholars and practitioners. In Ukrainian and foreign scientific literature there have been developed:

- a system of ideas and principles which underlie the concept of modernization of higher education (M.F. Stepko, Ya.Ya. Bolyubash, I.M. Gryshchenko, K.M. Levkivsky, Yu.V. Suharnikov, L.P. Buyeva, A.P. Vladyslavlyev, A.V. Darynsky, S.V. Kalabyekova);
- mechanisms and models of operation and development of higher education (T.B. Boholib, L.O. Plakhotnikova, N.L. Yaremenko, V.S. Hershunsky, G.L. Zinchenko, V.G. Onushkin, O.S. Razumovsky);
- theoretical and practical bases of effective financial and economic models of development of higher education (V.V. Hirnyak, N.I. Kozmuk, N.A. Krohmalova, O.V. Lukyanska, I.E. Novikova, T.M. Kulikov, S.P. Solyannikova, Yu.Yu. Haynatska).

The management of competitiveness of higher education in general and higher educational institutions in particular is highlighted in the works of Yu.V. Ivanov, S.S. Donetska, A.O. Klimchuk, D.V. Bondarenko, I.V. Moiseeva, T.M. Nefedova, N.V. Tsymbalenko. However, in the literature the economic security issues of higher education is a relatively new area of research.

Domestic and foreign scientists, exploring the nature of economic security as a category, have concluded that higher education is associated with socio-economic systems of different levels by a set of ties, factors, parameters, and therefore the results of modernization and reform of the educational sphere is advisable to assess in the light of economic security which is a key element of sustainable functioning of other facilities and systems [4].

According to the analysis of Ukrainian and foreign scientific literature [5, 6], which reflects the current problems of the educational system, there has been concluded the need to develop models of economic security management system of higher education in Ukraine, taking into account the set of environmental factors. This, in terms of transformation of society, considering the global trends of globalization intellectual space, will help accelerate the transition to an information economy.

Researchers define the economic security of higher education as the state in which "guaranteed protection of national interests in higher education is provided and there is development of this sector in line with long-term and medium-term needs and priorities of social and economic development" [7]. Analyzing this category at the level of higher education institutions (HEI) scientists provide such interpretation of the concept of economic security of HEI: "the state of the necessary resources and the system of relationships between agents of circulation that enable organization functions and provide the state of its security in economic, social and political changing conditions" [8]; "a component of protecting education institutions, practical measures to protect against threats and risks in the economic sphere" [9, p. 43]; "a complex of organizational, administrative, educational, social, legal and other measures to ensure the safety and security of staff, managers and students from potential threats, risks and dangers in their minimization and sustainable operation and development of the institution as a whole and each participant" [9, p. 40]; "the state of the economic potential of HEI, at which there is the guaranteed protection of economic interests of the university, its staff and students, the development of effective institutions in accordance with its mission, even under the most unfavorable conditions of internal and external processes" [10, p. 62].

The higher education system, as well as any open socio-economic system is characterized by trends that result from the combination of the function, development, reform and modernization. The flow of these processes, taking into account the set of factors that determine the content and quality, necessitates the development of appropriate methodological grounds. However, functioning means here the state of the higher education system in which there is no significant changes caused by external and internal factors, allowing to support the economic security of higher education (ESHE) at the current level in the whole. The development of higher education as a system and its reform is dialectically interacting concepts that exist in unity and opposites (the unity means that development and reform aimed at improving the efficiency of the system to new tasks and provide results in accordance with the criteria of the existence of the system, the opposite appears deep in terms of changes and their implementation). Modernization is essentially the opposite of a process of gradual development of the system and provides changes in the trajectory of its development under the influence of subjective factors [11, p. 145]. This allowed the scientist to conclude that the criterion of effectiveness of the provision of ESHE is the number of risks that, on one hand, define the conditions for the functioning of higher education, on the other hand, they are formed as a result of development, reform and / or modernization of higher education [11, p. 146].

According to the results of the studies [12] there have been found that at the design of management system of economic security of HEI must take into account both the level of its economic potential and specific threat generated by the external environment. There also have been formed the element structure of the economic potential of universities and suggestions regarding the analysis of environmental

institutions in the context of economic security with the use of a coefficient of favorability (unfavorability) of the external environment $c^{ee}(k^{3c})$ which generally will give an opportunity to characterize the relationship between threats, opportunities and uncertainties of the external environment on the level of implementation of economic capacity of HEI at any given time.

Outstanding study issues. Improving assessment tools, search methods and technologies of management of economic security of HEI under uncertainty and risk belong to the range of problems to be addressed at the stage of reforming the national system of higher education. This, in turn, necessitates the development of methodological basis for diagnosis and monitoring ESHE which would include: classification of environmental factors, the algorithm of diagnosis, determination of criteria and limit values of indicators of economic security as a system of higher education in general and individual universities in particular.

The purpose of the study is to systematize the main factors (internal and external) and developing methodological approach for assessing their overall impact on the level of economic security of HEI.

The presentation of the main results and their justification. The analysis of scientific literature on the economic security of higher education led to the conclusion that the management of economic security of higher education system needs, including the identification of major threats, dangers and risks, which cumulative effect determines ESHE levels – high, medium or low. This grading proposed in the work [4] is justified as follows: a high level is determined by the existence of significant threats (for higher education, according to the author's work [4], such threats are force majeure); an average level of ESHE is determined by the impact of threats that can reduce the effectiveness of higher education system, which, however, does not affect its development and self-development; a low level is determined under conditions where there is virtually no system capable of development and survival, there is limited implementation capacity, the system is not considered to be attractive for investment in productive and human capital.

The main threats to ESHE in Ukraine, in addition to global challenges are the following: financial and economic crisis and, consequently, inadequate funding needs; undeveloped system of public-private partnerships; high staff turnover with higher qualifications and as a result the loss of human capacity. There is also a decline in the quality of training graduates, their knowledge discrepancy challenge to be addressed in transition to the knowledge economy; the outflow of students abroad against the background of unfavorable demographic situation. It includes as well reduction of interest in certain professions; threats from neighboring environment, which includes customers, suppliers, competitors and contact groups; domestic problems of HEI, including unwillingness of management to ensure development in terms of limited resources and the adverse effects of environmental factors [4, 7, 13].

The analysis of existing and potential opportunities and threats of external manifestations in order to assess their impact on the realization of the economic

potential of a higher educational institution will predict the level of economic security and develop a set of appropriate policy measures. The importance of this analysis is determined that a backdrop of global competition, each higher education institution should develop a strategy oriented to maximize the economic potential (the resource limits) and strengthening market positions (both global and domestic markets). It is necessary to take into account the growing impact of various risks, in particular relating to free pricing in the market of educational services, integration and globalization processes, and the uncertainty of the external environment that is dynamically being changed.

The study has involved the expert evaluation factors of universities in Ukraine, which are grouped into two groups – threats and opportunities. The experts attribute the following to the group of threats factors: reducing the number of potential entrants due to worsening demographic situation and implementation of academic mobility; insufficient budget funding of higher education; high prices for energy, utilities, etc.; employers' assistance in the development of HEI (universities cooperation with employers); unfavorable investment climate and limited investment resources available; reducing the solvency of the population; increased competition in the domestic and international education market. The group of opportunities factors for the development of higher education according to the results of the expert evaluation is recommended to include the following: public policy in education; labor market conditions in the context of the proposals of the teaching staff; labor market in the context of the demand for specialists of certain professions; a system of licensing and accreditation; system of training, retraining and advanced training of academic staff.

The level of these factors and their status on the results of expert evaluation is given in Table 1. In assessing the impact of environmental factors on ESHE there were used grading individual performance of numerical scale by John Harrington (desirability theory) [14].

Analyzing the set of environmental factors there was expected to consider their multi-directional influence and assumptions in certain times, not all factors can be uniquely identified, taking into account the existing risks and uncertainty.

To solve this problem there was used a dynamic analysis approach, outlined in the work [15]. This allowed to estimate the cumulative impact factors of threats and opportunities factors on the level of economic security of HEI at a certain point of time using coefficient of favorability (unfavorability) of the external environment. This also made it possible to conclude that in 2016 the cumulative effect of environmental factors was $-0,213$ (the prevalence of threats over the opportunities).

Table 1
The expert assessment results of the environment state of HEI in Ukraine in 2016 (calculated by the authors)

Factors	Significance of factors	Threats				Ambiguity	Opportunities				Considered level of factor influence
		Level of factor influence					Level of factor influence				
		Very high 0,80-1,00	Medium 0,63-0,80	Low 0,37-0,63	Very low 0,10-0,37		Very low 0,10-0,37	Low 0,37-0,63	Medium 0,63-0,80	Very high 0,80-1,00	
1. Demographic situation and potential number of entrants	0,08	0,9									-0,072
2. State policy in education	0,11							0,8			+0,088
3. State funding of higher education institutions	0,09	0,9									-0,081
4. Fees energy, utilities, etc.	0,06	0,9									-0,054
5. Promoting employers of universities (university cooperation with employers)	0,08		0,8								-0,064
6. The labor market in the context of the supply of scientific and pedagogical resources	0,07							0,8			+0,056
7. The labor market in the context of the demand for specialists of certain professions	0,09							0,4			+0,036
8. The system of licensing and accreditation	0,10								0,7		+0,070
9. The system of retraining and advanced training of academic staff	0,06								0,7		+0,042
10. Investment climate (favorable) and investment funds (availability)	0,07	0,9									-0,063
11. The population solvency (in terms of access to education)	0,09	0,9									-0,081
12. Competitors	0,10	0,9									-0,090
The influence level of environmental factors (favorable or unfavorable impact on the level of economic security of HEI)											-0,213
The coefficient of favorability (unfavorability) of the external environment											0,787

The coefficient of favorability (unfavorability) of the external environment c^{ee} (k^{3c}) generally characterizes the relationship between threats and opportunities: the more uncertain and unfavorable external environment is, the lower the level c^{ee} and, consequently, the level of economic security of HEI. The model of this indicator can generally be represented by the dependence:

$$k^{3c} \in \left\langle B_1(t), \tilde{B}_2(t), B_3(t) \right\rangle, \quad n \in N, \quad (1)$$

where $B_1^n(t)$ is the state of the n^{th} environmental factor that at time t corresponds to the value determined according to the desirability theory [14] as such, as the assessment of which is to influence the realization of the economic potential of HEI may be provided and which favorably affects the level of economic security of HEI; $B_3^n(t)$ – the state of the n^{th} environmental factor that at time t is beyond the values that correspond to the interval of desirability and which adversely affects the economic security of HEI; $\tilde{B}_2^n(t)$ – the state of n^{th} environmental factor whose value at time t cannot be uniquely identified. The specification of external environment factors is the basis for university development strategy focusing on achievement (maintaining) a sufficient level of economic security in the face of uncertainty and risk.

Conclusions and recommendations for further study. Recognizing the crucial role of higher education for restructuring economy of Ukraine on innovative principles, the transition to higher technological modes due to the development of science and technology, increase of human capital and sustainable development necessitates the development of the general concept of economic security of the national economy basing on the maximum usage of the of higher education potential. At the heart of the economic security of higher education there is economic security of individual HEI which is the result of implementation of relevant strategies at different levels for sustainable development and competitiveness of higher education as a whole and its individual components. This, in turn, necessitates the study of environmental factors (threats and opportunities) that will contribute to the feasibility of strategic measures to overcome the negative trends, threat prevention and risk reduction, use of existing opportunities to improve competitiveness and economic security of individual universities, and higher education in general.

Література

1. Леонова Ж. К. Высшее образование как фактор экономической безопасности в условиях развития инновационной экономики / Ж. К. Леонова // Вестник Российской академии естественных наук. – 2016. – № 4. – С. 22–25.
2. World development indicators 2014. The World Bank. Documents&Reports. Retrieved from: <http://wdi.worldbank.org/table/2.7>.
3. Информационно-аналитический портал «Гуманитарные технологии» [Электронный ресурс]. – Режим доступа: <http://gtmarket.ru/ratings/education-index/education-index-info>.

4. Плотников Н. В. Обеспечение экономической безопасности высшего образования: теоретические и методологические аспекты: автореф. дис. ... док. экон. наук: 08.00.05 / Н. В. Плотников; Федеральное государственное бюджетное учреждение высшего образования «Санкт-Петербургский государственный экономический университет». – Санкт-Петербург, 2016.

5. Батова В. Н. Экономическая безопасность учреждения высшего профессионального образования в условиях глобализации [Электронный ресурс] / В. Н. Батова // Электронный научный журнал «Современные проблемы науки и образования». – 2015. – № 1 (Ч. 1). – Режим доступа: <http://www.science-education.ru>.

6. Вища освіта України в умовах трансформації суспільства: стан, проблеми, тенденції розвитку, 2007–2011 рр.: Наук.-допом. бібліогр. покажч. Вип. 2. Ч. 2 / НАПН України, ДНПБ України ім. В. О. Сухомлінського, Ін-т вищої освіти; Упоряд.: Н. В. Лисиця, Г. П. Чорнойван, Н. А. Стельмах, Л. М. Айвазова, Н. М. Бублик; Наук. консультант Б. І. Корольов; Наук. ред. П. І. Рогова; Бібліогр. ред. Л. О. Пономаренко. – Київ, 2014. – 416 с.

7. Плотников Н. В. Теоретические и практические аспекты определения угроз высшего образования / Н. В. Плотников // Новая наука: опыт, традиции, инновации. – 2015. – № 3. – С. 120–127.

8. Алимova Н. К. Экономическая безопасность образовательного учреждения в условиях становления инновационной экономики: Дис. ... канд. экон. наук: 08.00.05 / Н. К. Алимova. – Москва, 2009. – 184 с.

9. Управление экономической безопасностью высшего учебного заведения: Учебник / Под общ. ред. С. Д. Резника. – М.: ИНФРА-М, 2013. – 345 с.

10. Дмитриев С. М. Экономическая безопасность технического вуза: концептуальные основы / С. М. Дмитриев, М. В. Ширяев, С. Н. Митяков // Высшее образование в России. – 2014. – № 2. – С. 59–66.

11. Плотников Н. В. Проблемы обеспечения экономической безопасности высшего образования на современном этапе / Н. В. Плотников // Научный журнал НИУ ИТМО. Серия «Экономика и экологический менеджмент». – 2015. – № 3. – С. 143–150.

12. Тарасенко І. О. Методичні засади оцінювання економічного потенціалу ВНЗ в контексті управління економічною безпекою / І. О. Тарасенко, Т. М. Нефедова, О. С. Тарасенко // Вісник Київського національного університету технологій та дизайну. Серія «Економічні науки». – 2017. – № 3 (111). – С. 7–18.

13. Вахович І. М. Стан і проблеми вищої освіти в Україні / І. М. Вахович, Л. І. Ішук, С. О. Пиріг // Актуальні проблеми економіки. – 2014. – № 1 (151). – С. 63–69.

14. Kendall M. G. Rank Correlation Methods / M. G. Kendall. – N.Y.: Hafner Publ.Go., 1995. – 196 p.

15. Колобов А. А. Менеджмент высоких технологий. Интегрированные производственно-корпоративные структуры: организация, экономика, управление, проектирование, эффективность, устойчивость / А. А. Колобов, И. Н. Омельченко, А. И. Орлов. – М.: Издательство «Екзамен», 2008. – 621 с.