

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 theory²⁶⁵ 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; $B_{3n}(t)$ – 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; $\sim B_2^n(t)$ – 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.

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.

3.2. Foreign experience to provide economic security of universities development in modern conditions

The education system is a component of any country's security as it forms the most important factor in economic development - intellectual human resources which have the necessary technological knowledge and skills that in modern conditions determine competitiveness, stability and security.

Development of education has not only civilization value, but is an investment in the future and should be transformed into the development of a national economy, which would be confirmed by positive macroeconomic indicators. The general trend is quite clear: the greater the share of educated population (including higher education), the higher the level of country's economic development. This situation is

common for most countries of the world. At the same time, there are significant differences in ensuring an impact on economic outcomes by education system. Thus, countries with a high level of education (70-80% of the total population) have different values of GDP per capita (from 2 000 USD in Ukraine to 55 000 USD in Sweden and Singapore^{265, 266}). And this means, for example, that in Ukraine there is a systemic development problem: there are no jobs in the country capable of transforming the efforts of labor force with high level of education into the economy productivity. If we compare the value of the gross population coverage ratio to higher education, the index of human development, the number of scientific personnel per 1 thousand employed people, then there is a paradoxical situation: Ukraine loses its previously formed potential, and therefore has a low level of its implementation as indicators of economic development.

Under such conditions, it is important to study the foreign experience of the universities functioning as well as the education system and identify the main factors for ensuring their economic security.

The issues of education system as well as higher education institutions economic security as a part of competitive economy formation are being actively studied by Ukrainian scientists. The influence of main labor market trends on economic security have been investigated in the work of Denysenko M.P. and Breus S.V.²⁶⁷, Martyniuk V.P.²⁶⁸; the mechanisms of providing and components of economic security are disclosed in the works of Karpova K.V.²⁶⁹, Kovregin V.V.²⁷⁰. Scientists also consider the role of education in the national innovation systems formation²⁷¹ through the formation of state innovation and investment policy²⁷². In some ways, foreign experience has been researched, in particular, regarding the

²⁶⁵Офіційний сайт Державної служби статистики України [Електронний ресурс] – Режим доступу: <http://www.ukrstat.gov.ua>

²⁶⁶OECD Factbook 2016 [Електронний ресурс] / ISBN 978-92-64-02946-0 – © OECD 2016 – Режим доступу: <http://http:stats.oecd.org/wbos/>

²⁶⁷ Денисенко М. П. Економічна безпека вищих навчальних закладів: основні тенденції на ринку праці / М. П. Денисенко, С. В. Бреус // Інвестиції: практика та досвід. – 2016. – № 14. – С. 10–14.

²⁶⁸ Мартинюк В. П. Економічна безпека вищих навчальних закладів в Україні: передумови оцінювання / Економіка Менеджмент Підприємство. – 2013. – № 25 (II). – С. 193–198.

²⁶⁹ Карпова К. В. Функціональні складові економічної безпеки вищого навчального закладу: критерії та індикатори / К. В. Карпова // Європейські перспективи. – 2013. – № 11. – С. 109–113.

²⁷⁰ Коврегін В. В. Механізми забезпечення економічної безпеки вищих навчальних закладів / Коврегін В. В. // Теорія та практика державного управління. – 2015. – Вип. 4 (51). – С. 20–27.

²⁷¹ Касич А. О. Досвід формування національних інноваційних систем в країнах, що розвиваються / А. О. Касич // Актуальні проблеми економіки. – 2013. – № 5 (143). – С. 46–49.

²⁷² Касич А. О. Зміст та завдання державної інноваційно-інвестиційної політики України / А. О. Касич // Схід. – 2005. – № 6 (72). – С. 3–9.

sources of universities' activities financing²⁷³. Considerable attention is also given to the development of education in the expert environment²⁷⁴.

Ukraine's educational space is increasingly beginning to integrate into the European system: internship for teachers and students, dual diploma projects, joint research. However, these processes also have negative consequences. Thus, demographic trends, active migration of university applicants, reduction of state funding and other factors exacerbate the problem of keeping a qualified teaching staff and institutions of higher education in general, that is, the problem of economic security. It is important, however, to take into account the experience of foreign universities, which determine the main trends in the development of education and demonstrate a high level of adaptation to dynamic conditions.

The purpose of the paper is to study the international experience of ensuring the universities' economic security and determine the key factors of their competitiveness, taking into account the global trends in the education system.

The attention at the national level is given to education system development in contemporary conditions both in developed countries and in developing countries. However, the differences in various countries are significant, confirming the position of higher education institutions in the main ratings that authoritative organizations annually comprise. Among the key ratings are Times, Shanghai University, Quacquarelli Symonds Consulting, and others (Table 3.2).

Table 3.2

University rankings

Times Higher Education World University Rankings	Academic Ranking of World Universities ARWU - FIELD 2016	QS world University Rankings	Webometrics
consists of			
2003 p.	2003 p.	2005 p.	2004 p.
The Times newspaper	Shanghai Jiao Tong University	Quacquarelli Symonds Consulting	Spanish laboratoryCybermetricsLab
research areas of university activities:			
The quality of teaching and research, the level of knowledge dissemination and innovation, the material and technical base quality	Indicators of university's activity as a scientific institution	Statistical performance indicators of higher education institutions and expert assessment	Presence in the Internet assessment of 25 thousand universities
indicators			

²⁷³Касич А.О. Особливості фінансування вищої освіти в Україні та інших країнах світу / А.О. Касич, В.А.Циган // Ефективна економіка. – 2013. – №12.[Електронний ресурс]. – Режим доступу: <http://www.economy.nauka.com.ua>.

²⁷⁴ Освіта в Україні [Електронний ресурс] – Режим доступу: www.cedos.org.ua

1	2	3	4
1. Teaching (learning environment) 2. Research (volume, income, reputation) 3. Citation. 4. International cooperation. 5. Income from education activity.	1. Total number of graduates who received the Nobel Prize or Fields Medal. 2. Total number of university staff who received the Nobel Prize or the Fields Medal. 3. Number of frequently cited authors who work in 21 subject areas. 4. Number of articles published in the Nature and Science journals over the past 5 years	Six basic indicators are used: Research activity, teaching, employers' opinion, career potential, number of foreign students and teachers.	Four indicators: popularity - the number of links from external resources; presence - the number of web pages indexed by Google; predominance - citation of scientific publications; openness - using information from Google Scholar citation profiles.
sampling in the monitoring process			
THE 2016: 980 of universities	1,200 universities are studied and only 500 get to the Ranking	US and UK leading universities	20 thousand world universities and 344 Ukrainian

Source: compiled by the authors according to the data^{275, 276, 277, 278}

Among 980 universities of the Times Higher Education World University Rankings there are 148 universities from the United States, 91 universities from the UK, 52 universities from China, 35 universities from Australia, 24 universities from the Russian Federation, 12 universities from Czech Republic, and 9 universities from Poland. Only 4 universities from Ukraine are included to the ranking: Kyiv National Taras Shevchenko University, National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Lviv National Polytechnic University, V.N. Karazin Kharkiv National University. They are at places under 800th.

The best universities according to the latest version of the World Ranking in 2017 have been recognized the following ones: Oxford, California Institute of Technology, Stanford, Cambridge, Massachusetts Institute of Technology, Harvard. These universities determine trends in the development of the education system in the

²⁷⁵ ARWU World University Rankings 2016 [Электронный ресурс] – Режим доступа: <http://www.shanghairanking.com/ARWU2016.html>

²⁷⁶ QS World University Rankings [Электронный ресурс] – Режим доступа: <https://www.topuniversities.com/university-ranking/>

²⁷⁷ Ranking Web of Universities [Электронный ресурс] – Режим доступа: www.webometrics.info/en/world?page=6

²⁷⁸ World University Rankings [Электронный ресурс] – Режим доступа: <https://www.timeshighereducation.com/world-university-rankings/2017/>

world, and therefore their experience is important for study. Gradually positions of universities from other countries are increasing in world rankings, in particular the universities from China, Poland, and the Czech Republic. For example, Charles University from the Czech Republic is ranking from 401 to 500th place.

The main criterion for effective functioning of higher education institution in modern conditions is the assessment of graduates by employers. That is why the leading universities cater to the needs of their graduates in employment, and therefore the training of specialists including labor market requirements permeates all the basic activities of the University. The modern labor market needs active enthusiasts, professionals, universals and people with a creative mindset.

Combining the views of university teachers and employers, Times Higher Education²⁸⁰ has compiled its list of most important employment conditions: a diploma in higher education of a prestigious university; excellent academic grades; knowledge of at least two foreign languages; work experience; high level of specialization. The main indicators of higher education quality are the following: job placement according to the specialty during the year after the graduation (the indicator is determined in months) and the level of salary for graduates.

Higher education has many benefits besides success in the labor market. Nevertheless, students and their families are guided primarily by the economic profitability associated with the investment of time and money.

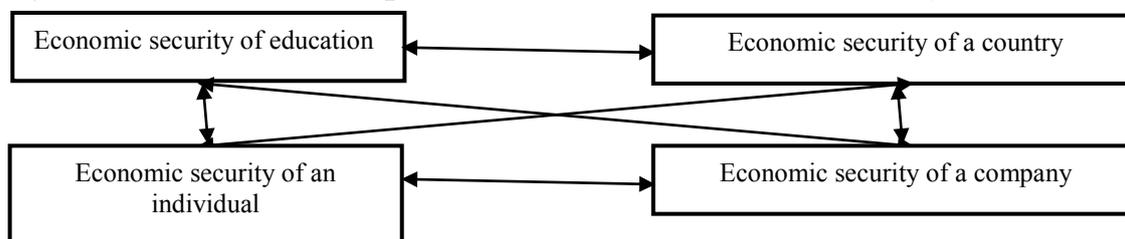
The indicated criteria depend on the level of education and specialty. Yes, university graduates and postgraduates earn more than secondary school graduates and are less likely to face unemployment, even in severe economic times.

The study concluded²⁷⁹ that graduates with masters degrees earn more, often much more than graduates with only a bachelor's degree. Thus, the average earnings of graduates with master's degrees in Florida already in the first year of work is about 49 thousand dollars compared with less than 34 thousand dollars for graduates with bachelor's degrees. Among the most well-paid graduates there are those who have degrees in the field of information technologies, business, medicine, law. Therefore, both for universities and for applicants it is important to find out which industries will create the new jobs, although it should be taken into account that some rapidly developing industries are relatively small. The success of each graduate determines a number of factors that cannot be influenced solely by learning experience. Nevertheless, the success of graduates in the labor market is valuable information, especially for university applicants and their families. That is why, for example, in

²⁷⁹ Schneider, M. Higher Education Pays: Measuring the Economic Security of Florida's Postsecondary Graduates [Электронный ресурс]– Режим доступа: http://onestop.fiu.edu/Registrar/Higher_Education_Pays_Measuring_the_Economic_Security_of_Floridas_Postsecondary_Graduates.pdf

the United States there is a detailed monitoring of graduates employment level, their wages, even in the context of particular universities.

The nature of all these processes reflects the concept of "economic security", which is very complex and multifaceted. The quadrangle of economic security, presented below (Fig. 3.1), reflects causal relationships, which are very important for ensuring the sustainable development of the entire national economy.



Source: authors' development

Fig. 3.1. The quadrangle of economic security in national economy

A university that is capable of training a highly skilled specialist increases his ability to take a high-paying workplace that is most important to the graduate. Thus, the economic security of an individual is ensured, whose high-performance work enhances the economic security level of a company and a country. The economic security of an individual in modern conditions depends on the following: firstly, the ability to obtain modern knowledge and ability to initiate activities; secondly, understanding the need to learn progressive experience not only in professional life and throughout life. These are the purposes of the world leading universities. Studying their experience allows us to assert that the key components of universities economic security are: the quality of education, the effectiveness of research and their competitiveness.

Universities in developed countries are not just education institutions but are at the forefront of the society, science and culture development, and therefore their development forms not only their security, but also is the basis of the whole country economic security. That is why, in the process of university development strategy, there are consultations with the community, which allow taking into account the requirements of the public, local authorities, strategic guidelines for the state development. For example, the University of Washington mission is to create a unique community of teachers and students who are capable of large-scale research and seek to improve the lives and livelihoods of students in the region, the country and the world²⁸⁰. An even more ambitious mission is the one of Cambridge

²⁸⁰Washington University Consolidated Financial Statements [Электронный ресурс]– Режим доступу:<https://wustl.edu/about/mission-statement/>

University, which is to contribute to the development of society through the achievement of teaching, learning and research at the highest international level²⁸¹.

Leading universities in the educational services market clearly understand that their credibility and future economic security depend on the educational process quality and scientific achievements level. Accordingly, one should dwell on the foreign universities experience generalization in terms of ensuring the high standards of educational and research process. The main indicators characterizing the world leading universities activities are presented in Table 3.3.

Table 3.3

World leading universities activities indicators

	Indicators	Oxford		Stanford		Harvard		Charles University in Prague
		2015	2016	2015	2016	2015	2016	2016
1	Number of students, bachelors, masters, PhD	22348	22602	16190	16336	21430	21790	51438
		11703	11603	6994	7032	7240	7330	18896
		10645	10999	9196	9304	14190	14460	32542
2	Number of teaching staff, professors, researchers	1680	1747	2153	2180	1514	1631	4653
		4501	4634					
3	Revenues, US dollars, millions	1982	1718	9051	9797	4525	4776	393
4	Expenditures, US dollars, millions	1714	1737	8351	9307	4463	4700	391
5	Net profit, US dollars, millions	268	-19	700	490	62	76	2
6	Net assets, US dollars, millions	3692	3913	30434	31719	45402	43397	601 (assets)
7	Fixed assets, US dollars, millions	1640	1728	7797	9000	6184	6529	-
8	Average cost of a bachelor's degree, US dollars	-	-	44184	45729	-	-	-

Source:^{282, 283, 284, 285}

Key factors of economic security of foreign universities are the following: personnel, material and technical base, financial capabilities, organizational

²⁸¹University of Cambridge Annual Report 2016 [Электронный ресурс] – Режим доступа:<https://www.cam.ac.uk/annual-report>

²⁸²Facts and Figures Charles University [Электронный ресурс] – Режим доступа:<http://www.cuni.cz/UKEN-109.html>

²⁸³Financial report Harvard University 2016 [Электронный ресурс] – Режим доступа:<https://finance.harvard.edu/annual-report>

²⁸⁴Stanford University Annual Report 2016 [Электронный ресурс] – Режим доступа:<https://www.ox.ac.uk/sites/files/oxford/field>

²⁸⁵The University of Oxford Financial Statements 2015/16[Электронный ресурс] – Режим доступа:<http://www.ox.ac.uk>

innovations, etc. Let us dwell on their generalized characteristics, using the experience of leading universities in the United States, Great Britain, and the Czech Republic.

1. Personnel, its reputation, qualification, initiative, ability to apply innovative approaches in professional activity determine the quality of teaching.

The characteristics of both teaching staff and university applicants are important to ensure a successful educational process. For example, Cambridge²⁸³ believes that the reputation of the university has been built for a long time, and its key condition is attracting the best academic staff and students. Supporting the University's financial capability to attract and retain the best staff and provide research and training services that are consistent with the level of the world's leading universities are identified as priority strategic goals for the nearest years.

The basis for providing effective staffing activities is the modern management system. On the basis of managerial approaches generalization taken as the basis by world's leading universities, it is necessary to distinguish key principles, in particular, dedication, integrity, objectivity, responsibility, openness, honesty and leadership.

Leadership is strategically important for personnel development in today's world, and, accordingly, universities develop and implement programs for personal development and visible leadership. Australian universities create professional development funds for advanced training and internships. US universities conduct surveys of staff on professional activity topical issues. Among the important for personnel development, special programs are planned to reduce the number of bullying in the workplace cases.

The scholarship system is used to attract university applicants with the highest intellectual potential. In the context of increasing the students' employment level universities create career centers, which, among other things, provide feedback to employers' professional associations. For example, the Munich Technical University is the only university outside of the United States, Great Britain and Japan, which turned out to be Top 10. The university's president believes the University's success is based on deep links with industry in Bavaria. University scientists work in such companies as BMW, Siemens and Lindner.

In the United States, the education system is characterized by close links with large corporations, small firms, some of which are generated by universities themselves. Leading universities, in particular, the Massachusetts Institute of Technology, California Institute of Technology and Stanford University are known for their collaboration with the business community.

Universities belong to the states and, accordingly, their activities are regulated by local laws, and society brings their needs to universities and colleges through the labor market demand and professional associations.

The basic approach of educational activity used by leading universities is the competence through collaboration. It is significant that the basis of professional competencies at universities in the UK is the cultural competence of graduates, which is included in the primary development goals.

Leading universities are leaders in research and are serious about their responsibilities to disseminate and present the results of their academic research activities through publications, training, conferences, counseling and other transfer of knowledge and advocacy. Leading universities either independently or with the help of national research councils monitor the researches perfection to make sure they conform to the world standards.

The effectiveness of scientific research is determined not only by the University's revenues from commercialization, but also by the number of firms founded on the basis of university's scientists intellectual property. Publications by lecturers and university students and their presentation in Scopus and Thomson-Reuters bases are important. The Hirsch Teacher's Index is used not only in making managerial decisions about career growth, but also in making agreements.

2. Material and technical base. Only a high quality material and technical base will enable the university to achieve excellence in teaching, research and support of the world image in the future. This is the main approach when determining the amount of funding for these goals. Most of the leading universities have their own campuses. Accordingly, universities develop a campus development program that seeks to improve not only the learning process conditions, but also conditions for comprehensive development of students and their living conditions through the transport systems and infrastructure upgrading. Creating, for example, nanoscale hubs, business schools, incubators - all these investments in the development of the material and technical base are the ability of students to become active participants in the already innovative processes, which significantly increases the image of the university, and, therefore, its economic security.

3. Financial capabilities. The basis of universities economic security in modern conditions is their financial capabilities, which have significant differences in different countries. So, leading universities have annual revenues of \$ 2-9 billion. (Table 1) Against the background of total annual education expenditure in Ukraine, which is about 6% of GDP and does not exceed \$ 6 billion. There are also differences in the structure of university profits. Ukrainian universities receive mainly state funding (69.9%), which is the same as in the developed OECD countries (69%), but is lower than in the EU-21 (79%). The nearest neighbors of Ukraine also fund their universities mainly for budget funds: the Czech Republic (79.3%), Estonia (78.2%), Slovakia (73.8%), Poland (77.6%), Russia (63.5%), Latvia (63.6%). Instead, higher education institutions in the US, UK, Australia, Korea and Japan are largely funded

by households. At the same time, there are countries in which the business actively invests in universities: Korea (28.6%), Canada (21.7%), Israel (18%), the USA (16.4%), Japan (14.1%), The Netherlands (13.9%), Russia (12.7%), the Czech Republic (12.3%), Sweden (10.4%). In Ukraine, business investment in higher education is extremely low and represents about 1% of all funding for higher education²⁷⁶.

Supporting financial sufficiency for the university means the ability to continue to attract and retain the best staff, as well as provide research and teaching materials that are consistent with the world's leading universities positions .

The gradual reduction of public expenditures on education, population decline, inefficient use of financial resources at the level of the universities themselves, low commercial attractiveness of research results and limited capacity to ensure their compliance with the world level leads to sustainable development complications, and therefore the financial capacity of universities should be considered as one of the most critical factor in raising the economic security level of Ukrainian universities.

Globalization of the educational space leads to the unification of economic security key factors of functioning the universities in different countries. The study of foreign experience in ensuring the leading universities development allowed, among other things, to highlight the importance of providing effective staff management through the selection of teaching staff and university applicants; development of material and technical base; increasing financial capabilities, encouraging professional growth of teachers and students, etc.

Investigating the nature and influence of economic security main factors on the competitive positions of leading universities allows us to determine the target directions of development for Ukrainian higher education institutions. Further research needs the introduction of strategic approaches to the practice of management in Ukrainian universities.

3.3. Probleme der Sicherheit des Ukrainischen Bildungsraumes

Die sozialpolitischen und wirtschaftlichen Umwandlungen in der Ukraine bedingen die objektive Notwendigkeit der Ausarbeitung von neuen wissenschaftlichen weltanschaulichen, methodologischen und konzeptuellen Einstellungen zum Problem der Sicherheit des ukrainischen Bildungsraumes. Integrationsprozesse, Globalisierung, Demokratisierung, Bildung des einheitlichen Informationsraumes, ein schnelles Verschwinden von Schranken zwischen den Ländern, das alles bildet Voraussetzungen, bei denen die Grundlagen für die Tätigkeit des Staatsbildungswesens nach den Weltstandards sollten verwandt werden, und zwar, was den Inhalt, die Unterrichtsformen und –methoden, die allgemeinen