Iryna Kalenyuk
Doctor of Science (Economics), Professor, Director of Researching Institute of Economic Development, Kyiv National Economic University named Vadym Hetman, Kyiv, Ukraine
E-mail: kalenuk@ukr.net

Deniss Djakons
Dr.oec., As. Prof., Rector of ISMA University of Applied Sciences
E-mail: deniss.djakons@isma.lv

Modern challenges of higher education' development in Latvia and Ukraine

Abstract
The article is analyzed the tendencies and challenges of the development of higher education systems in Latvia and Ukraine. The determinative tendencies of the modern development of the world are globalization, digitalization, networking, virtualization, etc. Under these conditions, there is a colossal increase in the need for higher education. It has the following results: an increase in the number of students, the share of population coverage in higher education and, in general, people with higher education. The systems of higher education in Latvia and Ukraine are developing in line with world trends, increasing their scale and coverage of the population with higher education. The common features in the development of higher education in Latvia and Ukraine are revealed: the increase of the student contingent, the extension of the principles of lifelong learning, the exit of domestic higher education institutions into the international market of educational services, the enhancement of academic mobility and the growth of the number of foreign students. The active positions of both countries in the process of internationalization and the growth of academic mobility are confirmed. Equally important in the context of the research are the tendencies of increasing the number of researchers, increasing the number of patents, as well as increasing the level of interest of the business sector in the financing and implementation of product and process innovations. The main problems in the development of higher education of both countries are identified: insufficient amount of financing, insufficient diversification of sources of funding, poor presence of institutions of higher education in world university rankings, low level of financing of scientific research.

Keywords
higher education, knowledge economy, globalization

JEL: I28

1 Introduction

In today's world, education is one of the most important factors in the socio-economic development of the countries of the world and the formation of a new quality of economy and society. The quality and efficiency of the functioning of the education system depends to a large extent on solving the most complex external and internal problems of the development of countries in the conditions of the formation of a knowledge economy. Modern trends of digitization, networking, virtualization and globalization are creating new challenges for the development of national systems of education and higher education in particular. They, on the one hand, create new opportunities for development and cooperation, and, on the other hand, raise new challenges in the process of building an efficient economy, overcoming the countries' lag behind world trends in economic and social development. Before Latvia and Ukraine there are similar tasks to provide innovative development of the higher education system in the general context of stimulating socio-economic progress of the countries.

2 Overview of the study area

Issues related to the study of the economic problems of education and its role in the socio-economic development of countries are not lost in the world scientific literature. The problems of the importance of education, science and mentality as the main factors of growth and development and the formation of the knowledge economy under globalization were studied by famous scientists such as Ph.Altbach, V. Andrushchenko, V. Bazilevich, G. Becker, A. Grishnova, E. Denison, A.Djakona, O. Kuklin, J. Salmi, R. Solou, E. Hazelkorn, A. Chukhno, T. Schultz, L. Tsimbal, H. de Wit etc. At the same time, in today's conditions, with the spread of processes of globalization and the penetration of ICT in all spheres of life, the latest trends in the development of the education system and its role as one of the main factors in the formation of a new quality of economy and society are needed. Of particular interest is the comparative analysis of contemporary development of higher education systems in Latvia and Ukraine, including in the context of the study of trends in the development of higher education in the context of world trends, the identification of weaknesses and causes of lagging, the search for more effective mechanisms of functioning and development.

The purpose of the article is to analyze trends and challenges of the development of higher education systems in Latvia and Ukraine in the conditions of modern globalization and informatization.

3 Research results

The formation of the world and European markets for educational services is accompanied by an aggravation of competition, which actualizes the issue of ensuring and increasing the competitiveness of the national system of higher education. Such an assessment is possible on the basis of the following indicators: positions in the world and national rankings of universities; the number of students per 10 thousand population; the amount of funding for 1 student in international comparison; the percentage of GDP allocated to higher education and science in international comparison; foreign students (in absolute and relative terms); the number of academicians, professors, laureates generally recognized at the national and world level competitions; the number of patent applications for 1 million people; the extent of the foreign internship of students and young scientists, etc.

The global trend is to increase the number of students in absolute and relative terms. Growth in demand for higher education appears to indicators such as the increase in student population and the proportion of the population with higher education. According to Table 1, you can follow the process of the rapid growth in the number of students in higher education institutions in individual countries and the world at large. For 17 years, from 1999 to 2016, number of the students in the world grew from 93 to nearly 221 million. The increase in the number of students is observed in all countries, but the most - in the countries with transition economies and the dynamic development. Table 1 shows data for those countries where the number of students exceeds 1 million people (by 2016). The general increase in the number of students, at the same time, is accompanied by quite different trends in different countries. In the countries of Europe and North America after a period of rapid growth, the contingent is decreasing. At the same time, the number of students in emerging countries such as China, India, Brazil, Indonesia, Mexico, Turkey and other countries is growing rapidly (Table 1).

There are absolute champions in the number of students are Turkey, India and China, an increase in them of more than 200%. Of course, one of the reasons for such an increase in student contingent is the large population and the presence of significant potential for the expansion of higher education. It is noteworthy that the advanced countries of the world do not demonstrate the high dynamics of the number of students because of the high level of education of the entire population.

Thus, among the leaders there are 4 countries, the number of students in them exceeds one million. There are also more than one million students in countries such as China, India, the USA, Brazil, Russian Federation, Turkey, Japan, Mexico, Korea, Germany, France, Great Britain, Colombia, Spain, Australia, Ukraine, Poland and Chile. These countries account for 68.65% of the total number of graduates.

In general, countries have rather significant differences not only in the number of students, but also in the total number of people with higher education. For instance, despite the high growth of number of students, in China, less than 10% of the population have higher education, which is one of the lowest rates among the countries under investigation. A similar situation can be noted for India, Colombia and Argentina. In general, according to the OECD, the proportion of people with higher education varies greatly (Figure 1).

National systems of higher education in Latvia and Ukraine are of a very different scale, but the key problems of their development are very similar. In 2017, 1,338,600 students studied in Ukraine, accounting for 363 people per 10,000 population [3]. In Latvia, at the beginning of the 2017/2018 academic year, there were 81602 students, or 410 people per 10,000 population [4]. One important

TABLE 1 The number of students in countries, 2012 – 2016 [1]

Country	2012	2013	2014	2015	2016	2017
China	32 585 961	34 091 290	41 924 198	43 367 394	43 886 104	44 127 509
India	28 568 409	28 175 135	30 305 849	32 107 419	32 391 800	
USA	20 994 113	19 972 623	19 700 221	19 531 727	19 288 424	
Brazil	7 241 405	7 541 112	8 072 146	8 285 475	8 319 089	
Brazil	6 233 984	6 423 455	6 463 297	-	-	7 983 633
Turkey	4 353 542	4 975 690	5 472 521	6 062 886	6 689 185	
Russian Federation	7 983 111	7 528 163	6 995 732	6 592 416	6 182 300	
Iran	4 404 614	4 367 901	4 685 386	-	4 348 383	
Mexico	3 161 195	3 300 348	3 419 391	3 515 404	4 244 401	
Japan	3 884 638	3 862 749	3 862 460	3 845 395	3 846 927	
Philippines	3 044 218	3 317 265	3 563 396	-	-	3 589 484
Korea	3 356 630	3 342 264	3 318 307	3 268 099	3 204 348	
Argentina	2 726 557	2 768 211	2 869 450	2 966 125	3 061 139	
Germany		2 780 013	2 912 203	2 977 781	3 043 084	
Egypt	2 301 182	2 477 581	2 544 107	2 868 912	2 789 278	
France	2 296 306	2 338 135	2 388 808	2 424 158	2 480 186	
Thailand	2 430 471	2 405 109	2 433 140	-	2 410 713	
Colombia	1 958 429	2 109 224	2 220 652	2 293 550	2 394 434	2 446 314
UK	2 495 779	2 386 189	2 352 933	2 330 334	2 387 280	
Vietnam	2 261 204	2 250 030	2 692 124	2 466 643	2 307 361	
Spain	1 965 829	1 969 413	1 982 162	1 963 924	1 968 702	
Australia				1 903 454	1 918 625	
Pakistan	1 816 949	1 915 419	1 931 875	1 871 575	1 856 156	1 941 478
Italy	1 925 930	1 872 693	1 854 360	1 826 477	1 815 950	
Ukraine	2 390 989	2 205 595	2 146 028	1 776 190	1 689 724	1 667 288
Saudi Arabia	1 206 007	1 356 602	1 496 730	1 527 769	1 622 441	
Poland	2 007 212	1 902 718	1 762 666	1 665 305	1 600 208	
Canada	1 505 424	1 555 449	1 577 766	1 564 125	1 593 383	
Algeria	1 210 272	1 252 579	1 245 478	1 289 474	1 439 594	1 545 523
Malaysia	1 076 675	1 116 733	1 128 027	1 302 091	1 336 550	1 248 927
Chile	1 118 773	1 174 011	1 205 182	1 221 774	1 236 701	
South Africa	1 005 721	1 035 594	1 018 543	1 050 860	1 053 607	
World	**198 196 882**	**200 488 986**	**212 931 484**	**217 458 978**	**220 005 861**	**220 704 240**

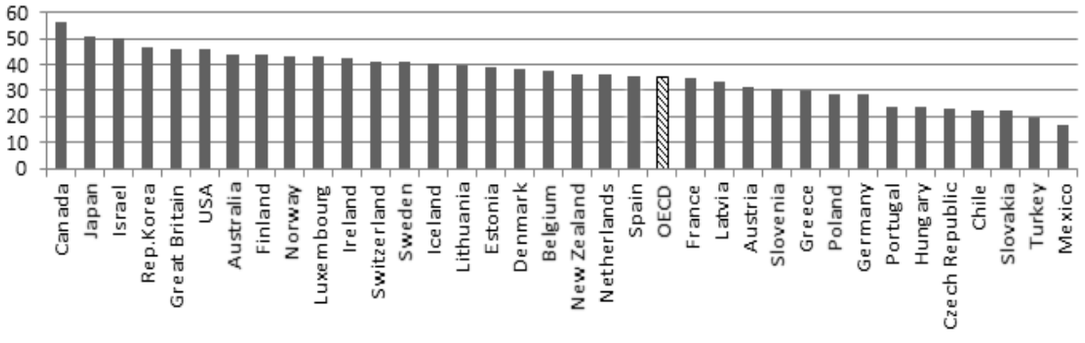

Figure 1 Share of people with higher education in OECD countries, 2016, % [2].
Source: Educational attainment and labour-force status https://stats.oecd.org/Index.aspx?DataSetCode=EDU_ENRL_MOBILE#

and indicative indicator is the relative indicator, such as the Gross enrollment ratio, calculated as the total number of pupils / students in institutions of higher education (ISCED 5 and 6), regardless of age, is expressed as a percentage of the total the population of the five-year age group after the completion of high school.

According to Table 2, we can see that most countries around the world are approaching the 100% coverage of young people in higher education and even exceed: Australia (121.86%), Greece (126.86%), Turkey (103.75%). In general, all leading countries show high rates: the United States (88.84%), Finland (86.99%), Korea (93.78%), and so on. On the other hand, many countries in the world show high rates of growth of this indicator: in just 4 years from 2012 to 2016, China has increased the total coverage by higher education from 28.04% to 48.44%. Ukraine and Latvia are also in the forefront of the world by this indicator: respectively 83.42% and 80.6%: [3].

A distinctive tendency of the present day is not

TABLE 2 Gross enrollment ratio, % [3]

	Countries	2012	2016
1	Australia	-	121.86
2	Austria	78.88	83.46
3	Canada	64.17	67.04
4	Chile	78.78	90.32
5	China	28.04	48.44
6	Finland	92.89	86.99
7	France	57.91	64.44
8	Greece	110.31	126.38
9	Iceland	81.97	73.60
10	Latvia	66.64	80.60
11	Netherlands	76.61	80.36
12	New Zealand	78.96	81.75
13	Norway	73.58	80.55
14	Republic of Korea	96.64	93.78
15	The Russian Federation	76.14	81.82
16	Turkey	69.78	103.75
17	Ukraine	81.94	83.42 (2014)
18	United Kingdom	59.84	59.41
19	USA	88.73 (2013)	88.84
	World	**32.48**	**37.46**

only an increase in the number of students, but also an even greater increase in the number of foreign students. Countries of the world in today's conditions are increasingly involved in the processes of globalization of educational space. From 2000 to 2016, their number in the world increased from 2.1 to 5.1 million. Between countries is intensifying the competition for human and intellectual resources, for increasing its presence in the world market of educational services.

In Latvia, at the beginning of the 2017/2018 academic year, 8806 foreign students studied, which is about 11% of the total. 5559 Latvian students study abroad, with the vast majority - in the UK (1264 people or 14.4% of the total) [4]. Ukraine is sufficiently actively represented at the international level and has the potential to increase its presence. The number of foreign students in Ukraine has steadily increased from 17,000 in 2001 to about 53,000 in 2017 (3.2% of the total, accounting for approximately 1.2% of the world market). After the events of 2014, import processes (departure of Ukrainians to study abroad) have considerably accelerated. According to UNESCO, in 2016, 77,219,000 Ukrainians (4.6% of the total number of students) studied abroad, with almost 30,000 in Poland [5].

The complexity of evaluating the innovation development of the higher education system requires the complexity of taking into account the indicators that characterize the parameters of personnel, financial, logistical, informational and infrastructural provision of the most innovative, as well as all other areas of activity of higher educational institutions. Extremely important in this system are all the indicators characterizing the relationship between universities and the external environment as part of a single innovation process (with the

subjects of financing R&D, with business - indicators of commercialization, with foreign partners, etc.).

An analytical characteristic of the development of higher education in Latvia and Ukraine reveals the main common features and differences between the two systems. The main tendencies of the development of higher education systems in Latvia and Ukraine are the increase of the student contingent, the extension of the principles of lifelong learning, the exit of domestic higher education institutions into the international market of educational services, the enhancement of academic mobility and the growth of the number of foreign students. Equally important in the context of the research are the tendencies of increasing the number of researchers, increasing the number of patents, as well as increasing the level of interest of the business sector in the financing and implementation of product and process innovations.

A common feature of the higher education system of Latvia and Ukraine is a significant lag behind the main indicators of innovation development from the average parameters for the European Union. The negative characteristics of the development of higher education systems in Latvia and Ukraine also include the fact that Ukrainian and Latvian higher education institutions are not yet among the top 100 world rankings of universities.

Indicators of funding are important evidence of the importance given to society by education and higher education. Government spending on higher education in Ukraine has a steady upward trend, which, at the same time, overlaps with the negative effects of inflation and generally remains insufficient for the full development of higher education institutions. In general, education and higher education expenditures account for a significant share of total budget expenditures, even though there has been a slight decrease in recent years. From 2000 to 2010, the share of expenditures on Ukrainian higher education grew: as a percentage of GDP from 1.3 to 1.8 percent, in total general budget expenditures from 4.7 percent to 6.6 percent. After 2010 and especially after 2014, the values of these indicators have a steady tendency to decrease: as a percentage of GDP to 1.5 percent, in the general budget expenditures to 3.7 percent [1]. In Latvia, government expenditures for the whole education system amounted to 5.34% of GDP in 2015, including 1.18% for higher education [2].

In the international educational statistics, the indicators of funding per student are also important, which can be expressed both in constant units and in parity on purchasing power. The average annual cost per student in the higher education system is € 9800 in the EU, including training, research and social affairs. [6] According to UNESCO, the state funding for one student of higher education for PPPs amounted to 5,863.85 dollars in Latvia, 3,189.67 in 2016 in Ukraine. Data on the amount of funding per student in different countries taking into account purchasing power parity are given in Table 3.

Indicators for financing research activities are extremely important for the country's innovative development. Unfortunately, they are extremely low in Latvia, somewhat higher - in Ukraine, but in general are not sufficient for science and education to fulfill their innovative function.

In Ukraine, the share of total science expenditure in GDP was 0.48% in 2016 and 0.45% in 2017. For comparison, in 2016, the share of spending on research and development in GDP of the EU-28 countries averaged 2, 03%. More than the average share of research and development costs was in Sweden - 3.25%, Austria - 3.09%, Germany - 2.94%, Denmark - 2.87%, Finland - 2.75%, Belgium - 2, 49%, France - 2.25%. The world leaders in terms of the share of research spending are Israel - 4.25%, Korea - 4.23%, Japan - 3.14%, the United States - 2.74% of GDP.

In Latvia, expenditures on R&D amounted to 0.63% of GDP in 2015 and 0.46% in 2016. Thus, Latvia is one of the EU countries with the lowest level of financing of science in general, and also - on the indicator of business expenses for research and development. In the structure of all expenditures on science in 2016, the most significant were government expenditures (0.22% of GDP) and foreign sources (0.12%), the share of business - only 0.1% of GDP, while the average in the Eurozone - 1.3 % [7]. In 2017, EUR 138 million or EUR 0.51 per cent of GDP in 2017 was allocated, which is well below the EU average of 2.07 per cent of GDP [8].

Such a critically low level of financing of science in Ukraine reflected in the general indicators of the effectiveness and the presence of Ukrainian universities in the global educational environment. So, in the famous Shanghai ranking of world universities (called the world-ranking research universities), our universities are absent in the first 500, and in the group of 501-1000 candidates for world leaders.

The world-renowned QS World University Ranking annually performs both the global rankings of the world's universities and the specific university rankings: by individual subjects, job prospects, by rating of the best MBA programs, regional rankings, rankings in the best cities, universities created over the past 50 years, etc. The following Ukrainian universities were present in the overall ranking of QS World University Ranking 2018: in the group 401-410 - Kharkiv National University named after VN Karazin, 411-420 - Taras Shevchenko National University of Kyiv, 501-550 - National Technical University "Igor Sikorsky Kiev Polytechnic

TABLE 3 State funding for 1 student in the countries of the world (2012-2016), PPP USD [6]

Countries	2012	2015	2016
Australia	8 165.56	9 954.44	
Austria	17 219.31	17 938.14	
Belarus	2 540.18	2 926.75	3 083.1
Canada	12 510.172013	16 858.71	16 362.12
Denmark	18 772.69	20 658.292014	
Estonia	4 521.43	9 641.55	
Finland	14 628.20	14 535.67	
France	12 836.11	13 372.87	
Germany	17 222.46	16 262.81	
Iceland	10 371.17	12 052.89	
Israel	6688.79	6 940.73	
Japan	8 762.24	9 496.692014	8 705.11
Latvia	4 820.02	5 863.85	
New Zealand	9 282.522013	10 035.52	10 068.17
Norway	27 181.732013	23 036.56	
Poland	5 358.12	7 476.46	
Korea	4 183.40	5 127.95	
The Russian Federation	3 931.64	4 629.29	
Spain	7 629.16	7 988.03	
Sweden	18 978.71	20 658.35	
Turkey	8 806.09	7 990.87	
Ukraine	3 505.76	3 222.012014	3 189.67
United Kingdom	15 243.162013	14 446.92	15 353.81
USA	10 920.89	11 240.532014	

Institute", 701-750 - Kharkiv Polytechnic Institute, 801-1000 - Vasyl Stus Donetsk National University and Sumy State university [9].

Webometrics evaluates the university's presence in the global space, taking into account the relevance and importance of its results. In the last edition of January 2019, the following two institutions are present at the first two thousand: Taras Shevchenko National University of Kyiv (1195th place) and National Technical University "Igor Sikorsky Kiev Polytechnic Institute" (1628th place) [10].

Also known as the University of Universities21, which is the only university in the world ranked not by individual universities, but by national higher education systems. Characteristically, this rating recently broke the limits of just rating and turns into a global network. The main activities of this network are educational innovations, student experience and the involvement of researchers. In the latest edition of 2018, Ukraine ranked 38th out of 50. Since the beginning of this rating, our country's position has changed considerably: in 2012 and 2013, the 25th place, 2014 - 42, 2015 - 41, 2016 - 42, 2017 - 35 [11] If you look at the subindex, then the strongest values in Ukraine are in the category "Resources", the average - in the categories "Environment" and "Links", and bad in the category "Results". This again shows that our country has significant potential, there are resources, but powerful impulses are needed for activation and support in order to bring the domestic system of higher education into a competitive position in the global educational environment.

In Latvia, only four universities have more or less prominent positions in world rankings: Riga Technical University (QS World University Ranking – 751 place; Scimago Institutions Ranking – 660; The World University Rankings – 801; Webometrics – 1676); University of Latvia (QS World University Ranking – 801 place; Scimago Institutions Ranking – 658; The World University Rankings – 801; Webometrics – 1011); Latvia University of Agriculture (Scimago Institutions Ranking – 760; Webometrics – 3609); Riga Stradins University (QS World University Ranking – 801 place; Scimago Institutions Ranking – 690) [12].

It is very important that Latvia has recently adopted program documents on the development of science, technology and innovation in the context of transforming the economy towards creating greater added value, productivity and competitiveness. These documents include: The

Guidelines for National Industrial Policy (2014-2020), Guidelines for Science, Technology Development and Innovation (2014-2020), which are part of the National Development Plan 2014-2020 (National Development Plan) and includes The Smart Specialization Strategy (RIS3, 2014-20). The key goals are to achieve in 2020 the following indicators: to increase the total expenditures on DIR to 1.5% of GDP; increase business expenses by 11%; increase the number of researchers in the private sector to 6.8%; double the number of patents; to ensure a high level of coverage of the population by higher education. The Smart Specialization Strategy (RIS3, 2014-20), outlined above, outlines five key areas: Knowledge-based bioeconomics; Biomedicine, medical technologies, bio-pharmacy and biotachnologies; Advanced materials, technologies and engineering systems; Smart energy; Information and communication technologies [8].

Providing innovative development of the national economy is possible only on the basis of reaching a certain level of financing of the system of higher education and research activities in particular. In the context of the limited resources of state financing, the emphasis should be on diversifying the sources of funding for scientific activity, which is possible due to the increase in the inflow of business funds, charitable foundations, international funds and organizations. The involvement of the business sector in the system of higher education is particularly relevant in the context of implementing the cooperation within the framework of the knowledge triangle: education, science and business. Increase in the receipt of financial resources (state budget, business and own sources of universities) to universities can be obtained at the expense of: improving the regulatory framework for funding innovation activities of higher educational institutions, reducing the income tax on innovative enterprises by 5%, supporting the creation of institutes of innovation infrastructure, motivation intellectual activity and the formation of an innovative culture of society. An urgent problem is the optimization of the managerial influence on all higher educational institutions in order to strengthen their autonomy, innovation activity and ensure the transfer of knowledge from the education system to business.

4 Conclusions

Priority directions of development of research activity of higher educational establishments are: motivation of realization of innovations; development and implementation of mechanisms for technology transfer; development of business incubators and industrial park structures, etc. It is expedient to increase the cooperation between higher education institutions and the business sector through the following: opportunities for the creation of enterprises at universities, the attraction of scientists and students to innovation activity of enterprises, preferential taxation of small and venture enterprises, expansion of opportunities for entrepreneurial activity of higher educational institutions; material incentives for patenting the results of scientific research and commercialization of innovations, etc.

The strategic future of Ukraine and Latvia depends on whether the government determines its key priority to strengthen the scientific potential of the countries and create conditions for its effective use in the light of global trends. Key issues are: increasing the financing of education and science; increase of inflow of financial resources from entrepreneurial, non-profit and foreign sources; support of scientists, creation of conditions for realization of their potential; creation of powerful research universities as generators of innovation development.

References

[1] **E-source:** http://data.uis.unesco.org
[2] *Educational attainment and labour-force status* **E-source:** https://stats.oecd.org/Index.aspx?DataSetCode=EDU_ENRL_MOBILE#
[3] *Official site of the State Statistical Service of Ukraine* **E-source:** https://ukrstat.gov.ua
[4] *Higher education and science in Latvia 2019* **E-source:** https://izm.gov.lv/images/LV-science-and-HE-in-brief FINAL.pdf
[5] **E-source:** http://uis.unesco.org/en/uis-student-flow
[6] *Education at Glance 2018* **E-source:** http://www.oecd.org/education/education-at-a-glance/
[7] *Specific Support to Latvia. The Latvian Research Funding System. – European Commission. – EU, 2018* **E-source:** https://rio.jrc.ec.europa.eu/en/library/specific-support-latvia-final-report-%E2%80%93-latvian-research-funding-system
[8] **E-source:** https://ec.europa.eu/eurostat/documents/2995521/9483597/9-10012019-AP-EN.pdf/856ce1d3-b8a8-4fa6-bf00-a8ded6dd1cc1
[9] **E-source:** https://www.topuniversities.com/university-rankings
[10] **E-source:** http://www.webometrics.info/en/current_edition
[11] **E-source:** https://universitas21.com/rankings
[12] **E-source:** https://www.languagecourse.net/universities--latvia