

Scenarios for the higher education development in Ukraine: flourishing, stagnation or degradation¹

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Abstract

The paper is devoted to the development of scenarios for higher education in Ukraine up to the year 2030. The relevance of the study results from the necessity of creating a roadmap for the development of higher education in Ukraine as part of the medium and long-term strategies. The basis of the study is theoretical generalization of the methodology of scenario forecasting and empirical results obtained on the basis of an expert survey on the development of higher education in Ukraine till 2030. The scenarios for the development of higher education in Ukraine by 2030 were designed according to the Delphi method: flourishing, stagnation and degradation. A benchmarking of the research results against similar results received in the EU was carried out.

Keywords: scenario, higher education, foresight, Delphi, Ukraine, forecast.

Problem statement

The change in the paradigm of economic growth of the countries from the post-industrial model to the knowledge economy causes enhancing competition based on intellectual and human capital, as well as innovative potential. Therefore, in order to form the global competitiveness of countries, governments are implementing medium and long-term economic development strategies, which are based on effective implementation of human, scientific, financial, infrastructural and management resources. The key objective of these strategies, as well as the knowledge economy, is to develop a competitive system of higher education, where universities are addressed as the main generator of national intellectual capital.

Examples of this are holistic strategies and programmes for the development of particular aspects of higher education that tend to focus on the

¹ This article is prepared within the framework of the fundamental research theme 'Imperatives of Global Competitiveness of National Systems of Higher Education', which is realized by the collective of Institute for Higher Education of KNEU.

improvements, which will make the future better. In the US it is believed that future competitiveness, security and well-being depend on the competencies of future employees, whose training should reflect the opportunities and challenges of internationalization of higher education¹.

The experience of the EU, the USA, China and many OECD member states shows that the development of a comprehensive strategy for the development of higher education and economy as a whole should be pushed out of scenarios for future development and setting appropriate goals. This allows governments to identify key priorities, objectives and directions for the development of higher education competitiveness. Institutions of countries with different levels of socio-economic development (e.g. the USA, the UK, Greece, China, Malaysia and South Africa) employ instruments of generating and examining of scenarios for the development of higher education². Thus, the study that is devoted to the generating of scenarios for the development of higher education in Ukraine for the period up to 2030 is relevant.

Review of literature and methodology.

The range of scenarios for the development of higher education, which vary both in time (from several years to a century) and in space (from the level of individual institution and a country to the global level), is quite wide. In particular, the well-known scenario of a perfect storm covers the whole world for the period up to 2030³.

General scenarios in most cases define the period of 10-15 years, for example, such scenarios were generated in California in 1993⁴ and 2007⁵, in non-profit organizations in the US⁶ and the UK⁷, the Netherlands⁸ and South Africa⁹. The UK,

which is striving for global leadership in higher education, has outlined scenarios for 25 years¹⁰. International organizations are also involved in the generating of scenarios for the development of higher education. In 2003-2007, OECD was actively generating scenarios¹¹.

Individual scenarios are more specialized, but are not less valuable. Greek authors focused only on the scenarios of development of educational activities¹², and in Kwantlen Polytechnic University (Canada) the authors outlined four scenarios that are based on the perspective on how the role of a student will be transformed within 22 years¹³.

The International Institute for Applied Systems Analysis has developed an analytical toolkit that enables the generating of scenarios for the development of key macroeconomic indicators up to 2100, taking into account the contribution of higher education system. In each of the scenarios¹⁴ an important place is given to education, namely:

– 1-st — investment in education accelerates demographic changes, economic development focuses on human well-being;

– 2-nd — trends of the past are preserved; inequalities, some global achievements and problems continue to take place;

– 3-rd — investment in education is decreasing, economic development is slowing down, inequality is increasing;

– 4-th — fragmentation of global community, internationalized knowledge-intensive and low-educated societies operating in labour-intensive low-tech sectors are defined;

– 5-th — intensive investments in education increase human and social capital, technological development intensifies, incl. resolving ecological challenges.

¹ Helms R. M. Internationalizing U.S. Higher Education: Current Policies, Future Directions. American Council on Education. 2015...

² Ihnytskyy D. Higher education in global economy: review of scenarios. Globalization challenges in business and economics. Conf. proceedings. Tbilisi State University, Georgia, 26-27 October 2018 pp.

³ Beddington J. 2030: The perfect storm scenario. The Population Institute, USA. 2010...

⁴ Ogilvy J. Three Scenarios for Higher Education: The California Case. Thought and Action, v9 n1. Fall 1993. P.25-67

⁵ Douglass J. A Look into a Possible Future: A Global Scenario for Higher Education Systems. Global University Network for Innovation. December 17, 2007.

⁶ Bryan A. Future of Higher Education: The Future of Scholarly Publication. EDUCAUSE review. March 29, 2011.

⁷ Kubler J., Sayers N. Higher education futures: Key themes and implications for leadership and management. London. 2010. 72 p.

⁸ Enders, J., etc. The European Higher Education and Research Landscape 2020-Scenarios and Strategic Debates. 2005. Center for Higher Education Policy Studies.

⁹ Modelling Future Demand and Supply of Skills in South Africa... Technical Report. ed. Adelzadeh A., Department of Higher Education and Training RSA. March 2017.

¹⁰ Blass, E., Jasman, A., Shelley, S. Visioning 2035: The future of the higher education sector in the UK. Futures, №42(5), 2010. p.445-453.

¹¹ Vincent-Lancrin S. Building Futures Scenarios for Universities and Higher Education: An International Approach. Policy Futures in Education. Volume: 2 issue: 2. June 1, 2004. p. 245-263

¹² Papanikolaou K. Web-enhanced learning scenarios. Procedia Social and Behavioral Sciences: WCES-2010. №15. 2011. p.1158–1162.

¹³ Scenarios of the Future of Higher Education. Kwantlen Polytechnic University...

¹⁴ Vuuren van D.P. etc. Energy, land-use and greenhouse gas emissions trajectories ... 2017. p.237-250.

Fricko O. etc. The marker quantification of the Shared Socioeconomic Pathway 2...2017. p.251-267.

Fujimori S. etc. SSP3: AIM implementation of Shared Socioeconomic Pathways ... 2017. p.268-283.

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British scientist B. Martin defines foresight as a “process involved in systematically attempting to look into the longer-term future of science, technology, economy and society with the aim of identifying the areas of strategic research and emerging generic technologies likely to yield the greatest economic and social benefits”¹. Experts of the European Commission give similar definition of foresight (forecasting) — a systematic process involving participants with relevant experience to the formation of a long-term vision of the future².

Moreover, B. Martin identified the place of scenarios in the forecasting process. He named the following stages of forecasting: *pre-forecasting* (team formation, definition of goals and requirements for experts, choice of research method), *forecasting* (analytical stage, during which the research is conducted by interviewing / questioning and subsequently results in a forecast / a **scenario** of development), *post-forecasting or forecasting result sharing* (research promotion and public discussions, creation of the development strategy of a country or selected regions/industries).

In theory and practice methodology of scenario forecasting includes a number of techniques and approaches. In this study, the Delphi expert estimation method was used as the main one. This method was developed by the experts of the American non-profit organization RAND in the 1950s-60s to determine the impact of technology on warfare³. The authors of the Delphi method are Olaf Helmer-Hirschberg, Nicolas Resher⁴ and Norman Dalkey⁵. Today, Delphi has a widespread methodology for forecasting social, economic, and political issues among Western scholars and experts.

The paper by O. Helmer-Hirschberg «Analysis of the Future: the Delphi Method»⁶ identified a procedure of the research with the use of the Delphi method, which is based on several rounds of questionnaire poll of respondents to achieve consensus or collective expert opinion. The Delphi

method main characteristics are: extramural participation, anonymity and multilevel. The key advantage of the method is the consideration of the views and attitudes of all survey participants and objective study of the topic in question. The standard procedure consists of defining the problem, developing questions, conducting several rounds of questionnaires, presenting the results of the study.

Methodology.

A comparative basis for our study was the collective paper of the Dutch Center for Higher Education Policy Studies, which focuses on the forecasting of the 15 years of the EU higher education system's development by 2020⁷. Given that Ukraine lags behind more than a decade in the reform of higher education, launched in the EU in the 1990s, and that the research of scenarios of EU's higher education was held in 2005 on the prospects for 2020, changes were made regarding the lag period for Ukraine. Therefore, it was suggested to extend the period to 2030.

Scenarios for the development of higher education in Ukraine are based on the Delphi method. We conducted a survey of representatives of higher education and business. 187 respondents from all regions of Ukraine took part in the survey. Two thirds of the respondents were women. That in general corresponds to the gender structure of higher education in Ukraine.

The questionnaire consists of 49 questions on the development of education in Ukraine and Europe⁸. These questions are divided into 5 groups: education, research and innovation; funding; quality; higher education, society and labour market; institutional governance and management. Respondents made evaluations on the following scale: event / situation very probable, probable, highly undesirable, not probable, no opinion, and which were given the corresponding numerical values — 4, 3, 2, 1, 0.

Research results. Among the general conclusions we have come to in our study, is that the positive development of higher education is least likely. However, according to the respondents, **the most likely forecast for Ukraine in 2030 is the following:**

- most excellent academics work outside the public universities, this is due to better wages and better access to research infrastructure in private universities, consulting companies, industry and enterprises (average 2.82);

¹ Martin B. Foresight in science and technology. *Technology Analysis & Strategic Management*. 1995. №7. pp. 139–168.

² A Practical Guide to Regional Foresight (2001). European Commission — Joint Research Centre — Institute for Prospective Technological Studies...

³ Delphi Method. RAND — URL: <https://www.rand.org/topics/delphi-method.html>

⁴ Helms R. M. *Internationalizing U.S. Higher Education: Current Policies, Future Directions*. American Council on Education. 2015. 50 p.

⁵ Dalkey N. *An Experimental Application of the Delphi Method to the Use of Experts* / N. Dalkey, O. Helmer-Hirschberg. Santa Monica, CA: RAND Corporation. 1962.

⁶ Helmer-Hirschberg O. *On the Epistemology of the Inexact Sciences*. / O. Helmer-Hirschberg, N. Rescher. Santa Monica, CA: RAND Corporation. 1960.

⁷ A Brief Report on the Delphi Study: ‘European Higher Education and Research in 2020’ ...CHEPS. 2005. pp. 25–60.

⁸ A Brief Report on the Delphi Study: ‘European Higher Education and Research in 2020’ ...CHEPS. 2005. pp. 25–60.

HIGHER EDUCATION REFORMS IN UKRAINE

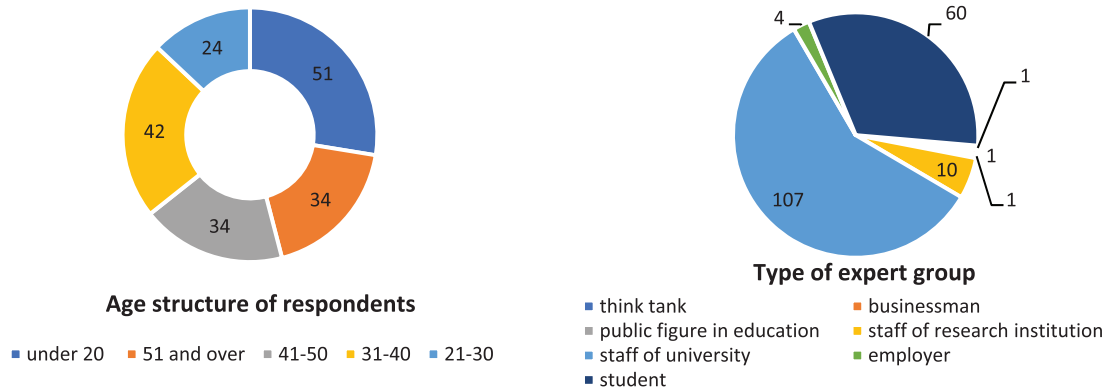


Figure 1. Sociological profile of respondents

- more than 25% of first-degree students study in another European country for the full duration of their programme (average 2.82);
- more than 10% of students are registered with institutions that have their seat outside Europe. Prestigious foreign institutions (for example, the US, Australia) open their branches and corps (average 2.79);
- research fields that are economically less relevant for business and industry are far weaker than they were in 2015 according to state funding, number of graduate students and career opportunities for academic staff (average 2.79);
- participation rates in higher education have increased considerably to some 70% of 18-22-year olds (average 2.79);
- it is common practice in all countries for higher education institutions to select their students at both bachelor and master levels (average 2.72).
- striking feature of higher education is its strong functional stratification (average 2.71);

- technological breakthroughs have made ‘anytime, anyplace learning’ the dominant learning mode. Lectures, audiences and other traditional structures are not so important, although they are still used to gain specific skills, personal contacts in mixed learning (average 2.71);
- Ukraine has failed to achieve the objectives of the development of the knowledge economy (average 2.70);
- rapid growth in graduate supply far exceeds societal demand, resulting in graduate unemployment and over-schooling on a large scale (average 2.69);
- more than 50% of academic journals are e-journals, owned and controlled by academics themselves. Scientists won the battle with publishers, electronic journals are prestigious and subscribers pay only a small fee (average 2.69);
- proportion of academic staff in higher education with long-term or tenured positions is significantly lower than it was in 2015 (average 2.68).

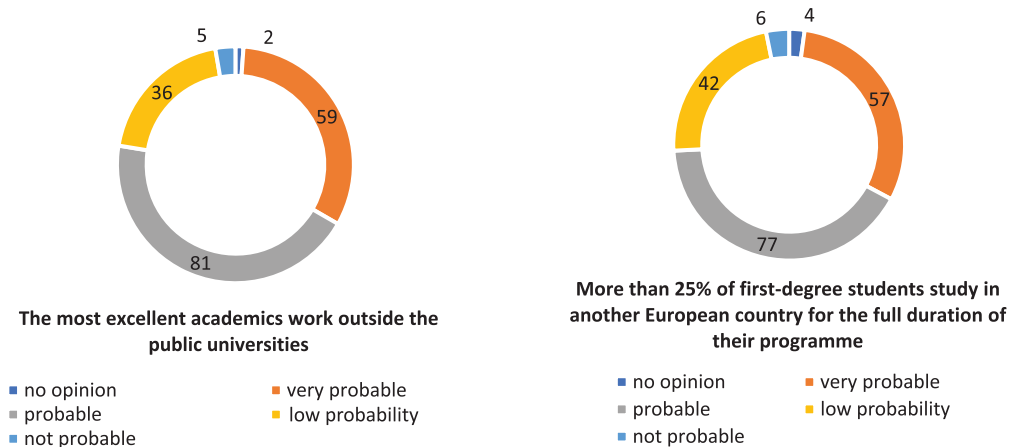


Figure 2. Competition for academic staff and student mobility

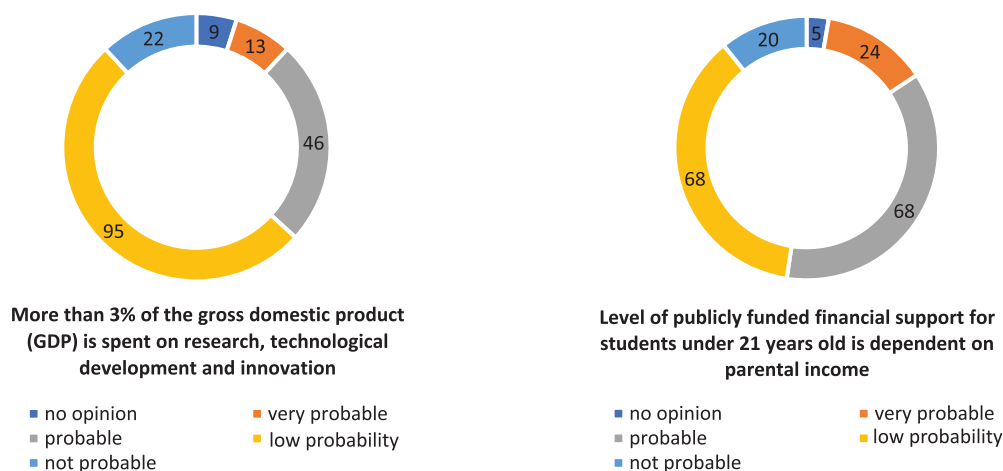


Figure 3. Financial expectations for the development of higher education in Ukraine

– employability of graduates is used as the main indicator of the quality of study programmes (average 2.65);

At the same time, according to the respondents, **the least likely** events and situations in higher education in Ukraine of 2030 are the following:

– there is a variety of accreditation agencies, some linked to national ministry of education, others private and for-profit (average 2.36);

– higher education management has developed into a recognisable professional career. One manifestation of this is the emergence of various educational training programs for professionals in this field (average 2.40);

– tuition fees are set on the basis of graduate salaries in each discipline (average 2.44);

– the number of government-subsidised student places in public higher education institutions is demand-driven. Student demand

determines the number of seats, and the government refrain from limiting the number of seats (average 2.45);

– private higher education institutions that are accredited by recognised accreditation agencies are treated in all respects the same way as accredited public higher education institutions (average 2.46);

– there is a single European qualification structure that includes all higher education programmes. The qualification structure determines the competence and educational achievements associated with the requirements of the labour market (average 2.46);

– all (national as well as European) accreditation schemes have been abandoned for various reasons, in particular, because they do not have important information for students and employers (average 2.48);

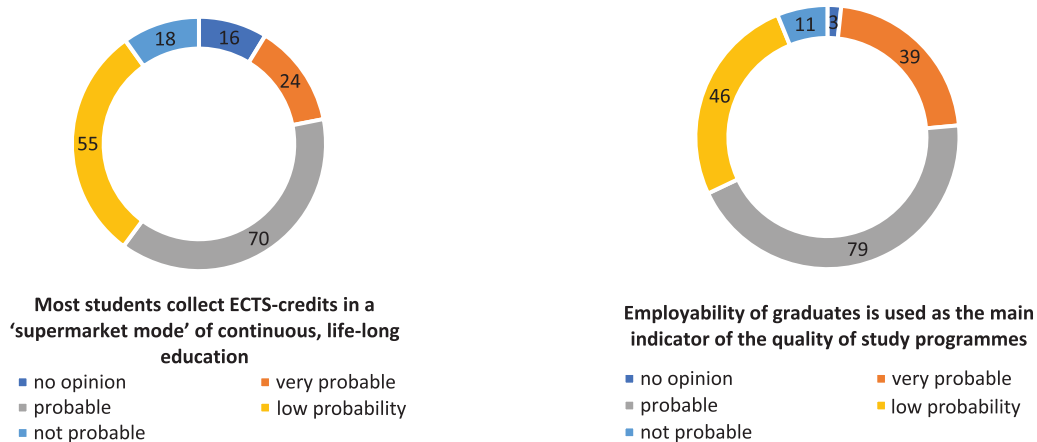


Figure 4. Expectation of the behaviour model of stakeholders

– quality of study programmes is fairly consistent across all countries — from North to South and from East to West (average 2.48);

– typical higher education institution is managed in a businesslike way, stressing efficiency and productivity (average 2.49);

– control over educational courses and programmes has shifted from institutional executives and managers to external stakeholders (average 2.49).

The survey of Ukrainian respondents let us compare the results with the expectations of Europeans (table A.1 in Appendix). According to the questionnaire, the average expectations of Ukrainians are mostly higher than those of Europeans. In their views, the polls' results in Ukraine and the EU have similar considerations in the following:

– there is a single European qualification structure that includes all higher education programmes (standard deviation 0%);

– control over educational courses and programmes has shifted from institutional executives and managers and to external stakeholders (standard deviation 0.4%);

– more than 60% of basic research (in terms of full-time equivalent researchers) is conducted outside higher education institutions (standard deviation 3.6%);

– more than 25% of first-degree students study in another European country for the full duration of their programme (4.4%);

– there is a variety of accreditation agencies, some linked to national ministry of education, others private and for-profit (standard deviation 4.9%);

– academic staff structure in higher education is standardised across all countries and all higher education and research institutions (standard deviation 4.9%);

– the European Union has a single, centralised accreditation office for higher education, which is part of the EU apparatus (standard deviation 5.9%);

– only a few universities consider making an independent and critical contribution to intellectual and cultural life to be an important part of their mission (standard deviation 7.7%);

– quality of study programmes is fairly consistent across all countries — from North to South and from East to West (standard deviation 10%).

These similarities show how close expectations are in different countries.

The largest differences between respondents from Ukraine and the EU are found only in some respects. Unlike the EU respondents, the Ukrainian respondents are more inclined to

believe the following events and conditions to happen in future:

- vast differences in academic salaries still exist across countries (standard deviation 49.4%);

- it is common practice in all countries for higher education institutions to select their students at both bachelor and master levels (standard deviation 47%);

- striking feature of higher education is its strong functional stratification (standard deviation 43.4%);

- more than 50% of academic journals are e-journals, owned and controlled by academics themselves (standard deviation 40.8%);

- universities' research agendas are determined in close interaction with external stakeholders (standard deviation 40.5%).

Differences and similarities allowed us to come up with scenarios that differ from those offered by European colleagues. Basing on the survey, we have modelled only three scenarios for the development of higher education:

- the first scenario is 'flourishing of higher education in Ukraine';

- the second — 'stagnation of higher education in Ukraine';

- the third — 'degradation of higher education in Ukraine'.

Scenario: Flourishing of higher education in Ukraine.

Education, research and innovation. In 2030, Ukraine implements the provisions of the Bologna Declaration and introduces a model of preparation for bachelor's and master's degrees under 3+2 model, the degrees become comparable with European ones, and the education gained earlier or in another way is recognized. Universities' research programs meet 90% of the needs of stakeholders, due to close cooperation with them. More than 60% of basic researches are carried out in higher education institutions. The level of involvement in higher education among young people aged 18-22 is more than 70%. In Ukraine in 2030 educational areas that are non-priority for business and industry from the economic point of view are much weaker. More than 3% of GDP is spent on researches, technological development and innovations. Several "clusters of excellence" that can compete on a global level in each of the areas of scientific research are created. Regional authorities are responsible for the development of regional innovation clusters, where universities, local authorities, state research institutes and enterprises effectively interact in research and innovation. The mobility of students is increasing, and branches of Western and Asian universities are opening in Ukraine.

Quality of education. In Ukraine in 2030 there is a Unified qualifications framework, which includes

all higher education programs. Qualification structure determines the competencies and educational achievements that are associated with the requirements of the labour market. The employment rate of graduates is one of the main indicators of the quality of educational programs.

Higher education, society and the labour market. In Ukraine in 2030 the most talented scientists work in state universities and cooperate with private institutions. This is a consequence of better pay and better access to research infrastructure than in private universities, consulting companies, industry and enterprises. All major universities consider independent and critical contributions to intellectual and cultural life to be an important part of their mission.

Institutional governance and management. At the Ukrainian university in 2030, there is a clear division of functions between educational, research and public services — this division is reflected in organizational structures, sources of income and personnel policy. The tasks of universities become more complex and specific, and this requires the creation of various organizational structures that affect the working conditions and wages. The university has full managerial and financial autonomy.

Scenario: Stagnation of higher education in Ukraine.

Education, research and innovation. In 2030 the implementation of the Bologna Declaration and a significant differentiation of universities depending on the depth of implementation of preparation for bachelor's and master's degrees in the 3+2 model continues. The process of recognition of education that has been gained before or in another way begins. Research programs of universities are formed in cooperation with external stakeholders by 1/3. Less than 40% of basic researches are conducted within higher education institutions. The level of involvement of people aged 18-22 in higher education is less than 50 per cent. Educational areas that are non-priority for business and industry from the economic point of view become less and less demanded among students, but the state education quota still exists. About 1% of GDP is spent on researches, technological development and innovations. In some regions of Ukraine, innovation clusters are created, but at the global level, they are not competitive. The number of students studying in EU countries is increasing.

Funding of education. Due to the integration of the national education system into the European one, less than 50% of research projects in higher education institutions are carried out at the expense of the European Research Council. Research projects are partially funded by national

organizations on a competitive basis. The higher education system in Ukraine in 2030 is partially fee-paying (40% and 60% respectively).

Quality of education. In 2030 in Ukraine the creation of a Unified qualifications framework continues. This structure includes all higher education programs. The employment rate of graduates is the main indicator of the quality of educational programs.

Higher education, society and the labour market. In Ukraine in 2030 talented scientists are working outside the state universities. This is a consequence of better pay and better access to research infrastructure in private universities, consulting companies, industry and enterprises. Only a few universities consider independent and critical contributions to intellectual and cultural life to be an important part of their mission.

Institutional governance and management. In 2030 universities perform research and educational function at the ratio of 10% and 90%, respectively. The University management is based on efficiency and productivity.

Scenario: Degradation of higher education in Ukraine.

Education, research and innovation. Until 2030 the traditional system of bachelor's and master's degrees is maintained in Ukraine. Educational levels correspond to the European ones, but the procedure of recognition of degrees obtained in Ukraine remains long. Higher education can be gained only in the traditional way in the institutions of higher education. There is a lack of recognition of the education gained online. Research programs of universities do not meet the needs of stakeholders, the interaction system "university-science-business" is not established. The nature of the researches is more fundamental. Less than 10% of basic researches (in terms of full employment) are held within the walls of higher educational institutions. The level of involvement in higher education is less than 30% for people aged 18-22 years. The state education quota for economically unprofitable professions that are not demanded by business still exists. Less than 0.7% of GDP is spent on researches, technological development and innovations. The pilot project of the innovation cluster of medium technologies starts operating in 2030. Emigration for education to the EU, the USA and China is increasing.

Funding of education. Funding of Ukrainian research projects under the EU framework programmes and grants for researches from national organizations have sporadic nature. The higher education system in Ukraine is functioning at the expense of the individuals and state education quota (70% and 30% respectively).

Quality of education. In Ukraine in 2030 there is no Unified qualifications framework, which includes all higher education programs. The quality of educational programmes is determined by the quality assessment body of the Ministry of Education and Science.

Higher education, society and the labour market. In Ukraine in 2030 the most talented scientists work in foreign universities and companies. This is a consequence of better pay and better access to research infrastructure existing there. Universities do not consider independent and critical contributions to intellectual and cultural life to be an important part of their mission.

Institutional governance and management. In 2030 universities perform a research and educational function at the ratio of 5% and 95%, respectively. The University does not have full autonomy in the management, it remains a part of the higher education system, which is managed by the Ministry of Education and Science.

Discussion.

We are aware that our scenarios do not include several aspects that are important for the characteristics of higher education system. One of them is the level of internationalization of universities and the higher education system in total, while number of foreign students may play an important role for its structure and effectiveness. Technological breakthroughs may cause more dramatic changes in higher education even in more close periods.

The scenarios we come up with — flourishing, stagnation or degradation — should be addressed as those that may have different levels of possible intensity (high, moderate or low), especially when talking about stagnation scenario, which is the main one. We were unable to have several rounds of questionnaire poll of respondents, but did it only in a short number of experts, so it may in some way influence the results too. Although our results are based on estimations, they are rather similar to those that are offered as forecast for the Ukrainian economy (balanced development, foreign subjectivity, grey zone or disintegration), which uses some more calculations¹.

The questionnaire is much concentrated on European future, which in times of Brexit underway may lead to some more diversified scenarios of the higher education systems both in the EU and Ukraine. This also may be under the influence of general European integration activity and results as well. Thinking in these terms, one should also take into account the current state

and possible outcomes of military situations with some of Ukrainian territories being under foreign occupation, which may turn the future upside down. Finally, it is the matter of investments to safekeep rich knowledge Ukraine has created till the moment and to make it economically and commercially useful, which means that investments may come not only from the state, but may be of private nature. So real internationalization of the higher education sector within the global economy may bring some more scenarios for Ukraine.

Conclusions.

Based upon the survey results, the most probable scenario of higher education development is the second one, i.e. stagnation. This scenario is characterized by slow changes in higher education, low level of funding of science and researches, lack of full autonomy of universities and slow integration to the European educational and research network. The scenario of the flourishing of higher education presupposes a qualitative leap in the development of the national system of higher education and its integration not only with the European, but also with the global network and the development of the national innovation system. But the scenario of degradation is probable as well — the preservation of the current dynamics in the development of higher education, its gradual decline and non-compliance with the requirements of the future society and the economy.

Quantitatively, the probability of each of the scenarios (taking into account the trends of the last decade) can be apportioned: flourishing — 15%, stagnation — 60% and degradation — 25%. Taking into account the analysis of the results of modelling scenarios by the International Institute for Applied Systems Analysis, it can be argued that the trajectory of the development of the higher education system up to 2030 will determine the dynamics of the main macroeconomic indicators until 2100.

In general, the materialization of one of these scenarios depends on a number of factors. The key determinants of the further development of higher education in Ukraine include: *political* (political will and charismatic leader with sufficient authority, the ability to delegate institutional autonomy; prioritization of the economic function of higher education over the social one), *economic* (availability of sufficient resources for fundamental and applied research, their effective commercialization, ensuring a consistently high level of funding of educational and research services), *institutional* (efficiency of integration of higher education into the national innovation system, the depth of the development

¹ Zgurovsky, M. (2015). Forecast of the Ukrainian economy: medium-term (2015-2020) ... p.128

of entrepreneurial ability of academic staff and *universities'* competence, the ability to overcome corruption pressure and ensure the priority of the quality of higher education system in Ukraine, the development of the system of internal and external management of higher education institutions).

The study revealed a significant lack of scenarios for the development of not only the higher education system, but also of other components of the socio-economic development of Ukraine. A more in-depth study of the opinions and expectations of key stakeholders at a high-quality level can help the country to formulate and implement effective, breakthrough economic development strategies.

References

A Brief Report on the Delphi Study 'European Higher Education and Research in 2020' / [J. Huisman, P. Boezeroy, A. Dima et]. The European Higher Education and Research Landscape 2020 — Scenarios and Strategic Debates / [J. Huisman, P. Boezeroy, A. Dima та ін.]. Netherlands: Center for Higher Education Policy Studies (CHEPS), 2005. pp. 25–60.

A Practical Guide to Regional Foresight (2001). European Commission — Joint Research Centre — Institute for Prospective Technological Studies. URL: <http://foresight.jrc.ec.europa.eu/documents/eur20128en.pdf>.

Beddington J. 2030: The perfect storm scenario. The Population Institute, Washington, DC, USA. 2010. 12 p. URL: https://www.populationinstitute.org/external/files/reports/The_Perfect_Storm_Scenario_for_2030.pdf

Blass, E., Jasman, A., Shelley, S. Visioning 2035: The future of the higher education sector in the UK. *Futures*, №42(5), 2010. p.445-453.

Bryan A. Future of Higher Education: The Future of Scholarly Publication. *EDUCAUSE review*. March 29, 2011. URL: <https://er.educause.edu/articles/2011/3/future-of-higher-education-the-future-of-scholarly-publication>.

Calvin K. The SSP4: A world of deepening inequality. *Global Environmental Change*. №42. 2017. p.284-296.

Dalkey N. An Experimental Application of the Delphi Method to the Use of Experts / N. Dalkey, O. Helmer-Hirschberg. Santa Monica, CA: RAND Corporation. 1962. URL: https://www.rand.org/pubs/research_memoranda/RM727z1.html.

Delphi Method. RAND. URL: <https://www.rand.org/topics/delphi-method.html>

Douglass J. A Look into a Possible Future: A Global Scenario for Higher Education Systems. Global University Network for Innovation. December 17, 2007. URL: <http://www.guninetwork.org/articles/look-possible-future-global-scenario-higher-education-systems>.

Enders, J., File, J. M., Huisman, J., &Westerheijden, D. F. The European Higher Education and Research Landscape 2020-Scenarios and Strategic Debates. 2005. Center for Higher Education Policy Studies. URL: <https://ris.utwente.nl/ws/portalfiles/portal/5574394/Enders05european.pdf>.

Fricko O. etc. The marker quantification of the Shared Socioeconomic Pathway 2: A middle-of-the-road scenario for the 21st century. *Global Environmental Change*. №42. 2017. p.251-267.

Fujimori S. etc. SSP3: AIM implementation of Shared Socioeconomic Pathways. *Global Environmental Change*. №42. 2017. p.268-283.

Helmer, O. Analysis of the future: The Delphi method. Rand Corp Santa Monica Ca. 1967. 13 p. URL: <https://www.rand.org/content/dam/rand/pubs/papers/2008/P3558.pdf>

Helmer-Hirschberg O. On the Epistemology of the Inexact Sciences. / O. Helmer-Hirschberg, N. Rescher. Santa Monica, CA: RAND Corporation. 1960. URL: <https://www.rand.org/pubs/reports/R353.html>.

Helms R. M. Internationalizing U.S. Higher Education: Current Policies, Future Directions. American Council on Education. 2015. 50 p. <https://www.acenet.edu/news-room/Documents/Current-Policies-Future-Directions-Part-2-US.pdf>

Illynskyy D. Higher education in global economy: review of scenarios. Globalization challenges in business and economics. Conference proceedings. Tbilisi State University, Georgia, 26-27 October 2018 pp.

Kriegler E. etc. Fossil-fueled development (SSP5): An energy and resource intensive scenario for the 21st century. *Global Environmental Change*. №42. 2017. p.297-315

Kubler J., Sayers N. Higher education futures: Key themes and implications for leadership and management. London: Leadership Foundation for Higher Education & Association of Commonwealth Universities. 2010. 72 p.

Martin B. Foresight in science and technology / B.R. Martin. *Technology Analysis & Strategic Management*. 1995. №7. pp. 139–168.

Modelling Future Demand and Supply of Skills in South Africa: 10 Year Skills Demand and Supply Forecast. Technical Report. ed. Adelzadeh A., Department of Higher Education and Training RSA. March 2017. http://www.dhet.gov.za/Commissions/Reports/Modelling_future_of_demand_and_supply_of_skills_in_south_africa/Modelling_future_demand_and_supply_of_skills_in_south_africa.pdf

Ogilvy J. Three Scenarios for Higher Education: The California Case. *Thought and Action*, v9 n1. Fall 1993. P.25-67.

Papanikolaou K. Web-enhanced learning scenarios. *Procedia Social and Behavioral Sciences: WCES-2010*. №15. 2011. p.1158–1162.

Scenarios of the Future of Higher Education. Kwantlen Polytechnic University. URL : <http://www>.

kpu.ca/president/strategicplanning/kpu-scenarios-of-the-future-of-higher-education

Vincent-Lancrin S. Building Futures Scenarios for Universities and Higher Education: An International Approach. Policy Futures in Education. Volume: 2 issue: 2. June 1, 2004. p. 245-263 URL: <https://doi.org/10.2304/pfie.2004.2.2.3>

Vuuren van D.P. etc. Energy, land-use and greenhouse gas emissions trajectories under a green growth paradigm. Global Environmental Change. №42. 2017. p.237-250.

Zgurovsky, M. (2015). Forecast of the Ukrainian economy: medium-term (2015-2020) and long-term

(2020-2030) time horizons. International Council for Science (ICSU); Committee on System Analysis under the Presidium of the National Academy of Sciences of Ukraine; National Technical University of Ukraine "Kyiv Polytechnic Institute"; Institute for Applied Systems Analysis of the National Academy of Sciences of Ukraine and the Ministry of Education and Science of Ukraine; World Data Center for Geoinformatics and Sustainable Development. NTUU "KPI." URL: <http://ied.kpi.ua/wp-content/uploads/2015/10/Foresight-2015.pdf>

Appendix

SCENARIOS OF HIGHER EDUCATION DEVELOPMENT IN UKRAINE AND EUROPE

№	Ukraine (by 2030)	EU (by 2020)	Number of respondents		Standard deviation		Average (score, max=4)		
			EU	Ukraine	EU	Ukraine	EU	Ukraine	Δ
1.	Consensus has been achieved on the Bachelor-Master structure: a uniform 3+2 structure is implemented in all countries and degrees are comparable across Europe		162	187	0,67	0,87	1,87	2,53	0,66 (35,3%)
2.	Recognition of prior learning has become a common practice in higher education institutions		161	186	0,62	0,81	1,87	2,53	0,66 (35,3%)
3.	Universities' research agendas are determined in close interaction with external stakeholders		162	186	0,66	0,74	1,85	2,60	0,75 (40,5%)
4.	More than 60 % of basic research (in terms of full-time equivalent researchers) is conducted outside higher education institutions		161	186	0,78	0,87	2,49	2,58	0,09 (3,6%)
5.	A striking feature of higher education is its strong functional stratification		159	186	0,59	0,89	1,89	2,71	0,82 (43,4%)
6.	Participation rates in higher education have increased considerably to some 70% of 18-22-year olds		160	185	0,84	0,92	2,28	2,79	0,51 (22,4%)
7.	Research fields that are economically less relevant for business and industry are far weaker than they were in 2015		162	186	0,67	0,89	2,02	2,79	0,77 (38,2%)
8.	More than 3% of the gross domestic product (GDP) is spent on research, technological development and innovation		160	185	0,72	0,80	2,04	2,56	0,52 (25,5%)
9.	Regional (both intranational and cross-border) authorities are responsible for regional innovation clusters		163	184	0,62	0,77	1,82	2,52	0,7 (38,5%)
10.	Only a few 'clusters of excellence' are competitive on a global level in each (multi-) disciplinary research field		160	185	0,66	0,81	1,86	2,51	0,65 (35%)

№	Ukraine (by 2030)	EU (by 2020)	Number of respondents		Standard deviation		Average (score, max=4)		
			EU	Ukraine	EU	Ukraine	EU	Ukraine	Δ
11.	Standardised course modules developed by leading European scholars are widely used (and available online) in many basic disciplines		162	183	0,78	0,94	2,13	2,67	0,54 (25,4%)
12.	More than 10% of students are registered with institutions that have their seat outside Europe		159	185	0,72	0,85	2,2	2,79	0,59 (26,8%)
13.	More than 25% of first-degree students study in another European country for the full duration of their programme		161	185	0,61	0,92	2,7	2,82	0,12 (4,4%)
14.	The European Research Council funds more than 50% of the research projects in higher education institutions		161	185	0,64	0,80	2,69	2,63	-0,06 (-2,2%)
15.	All national research-funding organisations have opened their competitive grants to applicants from all over Europe		161	185	0,74	0,86	2,34	2,5	0,16 (6,8%)
16.	All higher education students pay tuition fees		160	185	0,75	1,05	2,03	2,57	0,54 (26,6%)
17.	Individual higher education institutions set their own tuition fees		160	185	0,64	0,98	1,94	2,67	0,73 (37,6%)
18.	Tuition fees are set on the basis of graduate salaries in each discipline		161	186	0,82	0,90	2,4	2,44	0,04 (1,7%)
19.	The level of publicly funded financial support for students under 21 years old is dependent on parental income		160	185	0,68	0,86	2,01	2,53	0,52 (25,9%)
20.	Private higher education institutions that are accredited by recognised accreditation agencies are treated in all respects the same way as accredited public higher education institutions		160	185	0,76	0,78	1,91	2,46	0,55 (28,8%)
21.	The number of government-subsidised student places in public higher education institutions is demand-driven		161	183	0,72	0,83	2,18	2,45	0,27 (12,4%)
22.	The effective marketing of 'quality' rather than the genuine quality of education and research attracts the brightest students		160	184	0,7	0,79	2,23	2,57	0,34 (15,3%)
23.	All (national as well as European) accreditation schemes have been abandoned		159	183	0,76	0,86	2,84	2,48	-0,36 (-12,7%)
24.	There is a variety of accreditation agencies, some linked to national ministries of education, others private and for-profit		160	183	0,7	0,84	2,25	2,36	0,11 (4,9%)
25.	The European Union has a single, centralised accreditation office for higher education, which is part of the EU apparatus		160	182	0,74	0,80	2,7	2,54	-0,16 (-5,9%)

HIGHER EDUCATION REFORMS IN UKRAINE

№	Ukraine (by 2030)	EU (by 2020)	Number of respondents		Standard deviation		Average (score, max=4)		
			EU	Ukraine	EU	Ukraine	EU	Ukraine	Δ
26.	Most students collect ECTS-credits in a 'supermarket mode' of continuous, life-long education		159	183	0,69	0,87	2,23	2,51	0,28 (12,6%)
27.	There is a single European qualification structure that includes all higher education programmes		159	183	0,73	0,82	2,46	2,46	0 0,00%
28.	The employability of graduates is used as the main indicator of the quality of study programmes		160	178	0,69	0,90	2,38	2,65	0,27 (11,3%)
29.	The quality of study programmes is fairly consistent across all countries — from North to South and from East to West		158	183	0,74	0,76	2,76	2,48	-0,28 (-10,1%)
30.	The quality of academic research is highly skewed — research is much stronger in the North-West with Southern and Eastern countries lagging significantly behind		159	183	0,66	0,81	1,94	2,56	0,62 (32%)
31.	The most excellent academics work outside the public universities		158	183	0,66	0,93	2,46	2,82	0,36 (14,6%)
32.	The proportion of academic staff in higher education with long-term or tenured positions is significantly lower than it was in 2015		157	183	0,66	0,89	2,01	2,68	0,67 (33,3%)
33.	The rapid growth in graduate supply far exceeds societal demand, resulting in graduate unemployment and over-schooling on a large scale		157	183	0,75	0,81	2,41	2,69	0,28 (11,6%)
34.	The academic staff structure in higher education is standardised across all countries and all higher education and research institutions		156	183	0,66	0,81	2,65	2,52	-0,13 (-4,9%)
35.	Vast differences in academic salaries still exist across countries		158	182	0,64	0,93	1,78	2,66	0,88 (49,4%)
36.	It is common practice in all countries for higher education institutions to select their students at both bachelor and master levels		158	182	0,74	0,91	1,85	2,72	0,87 (47%)
37.	Ukraine has failed to achieve the objectives of the knowledge economy. The most excellent research is still done elsewhere (e.g. United States, South East Asia, China)		158	184	0,75	0,90	2,01	2,70	0,69 (34,1%)
38.	The emphasis in undergraduate studies is much more on broad education ('Bildung') than on the transmission of pragmatic job-relevant knowledge and skills		156	183	0,68	0,81	2,21	2,51	0,3 (13,6%)
39.	More than 40% of masters students hold a bachelor's degree from a different institution (possibly but not necessarily in another country)		156	183	0,69	0,81	2,26	2,62	0,36 (15,9%)

№	Ukraine (by 2030)	EU (by 2020)	Number of respondents		Standard deviation		Average (score, max=4)		
			EU	Ukraine	EU	Ukraine	EU	Ukraine	Δ
40.	Technological breakthroughs have made 'anytime, anyplace learning' the dominant learning mode		158	183	0,76	0,86	2,41	2,71	0,3 (12,5%)
41.	More than 50% of academic journals are e-journals, owned and controlled by academics themselves		158	183	0,76	0,88	1,91	2,69	0,78 (40,8%)
42.	Only a few universities consider making an independent and critical contribution to intellectual and cultural life to be an important part of their mission		157	183	0,74	0,79	2,74	2,53	-0,21 (-7,7%)
43.	There is a clear split between teaching, research and community service functions — this split is reflected in organisational structures, sources of revenue and staffing policies		155	181	0,72	0,80	2,19	2,58	0,39 (17,8%)
44.	The typical higher education institution is managed in a businesslike way, stressing efficiency and productivity		157	180	0,63	0,79	1,94	2,49	0,55 (28,4%)
45.	Control over educational courses and programmes has shifted to institutional executives and managers and to external stakeholders		157	180	0,62	0,82	2,48	2,49	0,01 (0,4%)
46.	Higher education management has developed into a recognisable professional career		156	180	0,61	0,70	1,85	2,40	0,55 (29,7%)
47.	Well over one-third of all higher education executives are drawn from backgrounds outside higher education		156	180	0,65	0,81	2,29	2,56	0,27 (11,8%)
48.	A majority of higher education institutions are amalgamations or federations of previously independent entities		156	181	0,77	0,83	2,21	2,59	0,38 (17,2%)

