

- [7] Програма Європейського Союзу ERASMUS+. URL: <https://erasmusplus.org.ua/novyny/2552-mizhnarodnyi-tyzhden-erazmus-v-ukraini-4-81119.html> (дата звернення: 02.01.2020).
- [8] Паризьке комюніке. Париж, 25 травня 2018 р. Міністерства освіти і науки України : вебсайт. URL: <https://mon.gov.ua/storage/app/media/news/%D0%9D%D0%BE%D0%B2%D0%B8%D0%BD%D0%B8/2018/06/06/12/paris-communiqueenua2018.pdf> (дата звернення: 12.06.2022).
- [9] Яцейко М. Демократизація освіти: аналіз основних чинників. Мультиверсум : філософський альманах. Київ : Центр дух. к-ри, 2006. № 56. С. 199–209.
- [10] Favell A. The Europeanisation of Everyday Life: Cross-Border Practices and Transnational Identifications Among EU and Third Country Citizens, EUCROSS 2011. URL: https://pure.au.dk/ws/files/53643017/EUCROSS_D2.1_State_of_the_Art.pdf (дата звернення: 16.06.2022).

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**INNOVATIVE ACADEMIC ENTREPRENEURSHIP AS A DRIVER OF
TRANSFORMATIONAL CHANGE IN HIGHER EDUCATION AND SCIENCE**

Annotation. The purpose of the work is the study of the complex essence of higher education as an integral part of the anthroposphere (technosphere); definition of the main fundamental tasks of innovative academic (university) entrepreneurship; studying the main types of innovations initiated by academic capitalism in the higher education system, which can lead to innovative changes and their classification; determination of the main objects of innovation activity in the field of higher education and science and expedient directions of further innovative development of higher education in Ukraine; studying the types of innovations in the higher education system.

The authors consider innovative transformations in the field of higher education and science as objectively conditioned transformational changes caused by the environment of academic capitalism. The core of the study is academic or university entrepreneurship, based on market relations spread by academic capitalism in the field of scientific and educational activities of higher education institutions,

research institutions, and other institutions and organizations in this field. An important basis of scientific work is the application for national conditions of the theory of triple helix Etskowitz's innovative development of society.

The scientific novelty is that the authors: studied the world experience of innovative changes in higher education and science taking place in the environment of academic capitalism; formulated and proposed theoretical data for new approaches in understanding the innovative transformations in the field of higher education and science, which are economic categories and occur according to the laws of the market; proposed new approaches for further innovative reform of higher education and science in the context of academic capitalism. A new scientific term of "innovatics of higher education" has been put into circulation.

Provisions on the uniqueness of the essence of higher education, the main fundamental tasks of innovative academic (university) entrepreneurship, types of innovations initiated by academic capitalism in higher education, which can lead to innovative changes, and their classification as theoretical, and practical significance for the development of domestic science and higher education are proposed. Also the main objects of innovative activity in the field of higher education and science, appropriate areas for further innovative development of higher education in Ukraine, as well as types of innovations in higher education that can lead to innovative changes are identified.

Keywords: innovative academic entrepreneurship; entrepreneurial university; innovations in higher education and science; technosphere; higher education innovatics.

I. INTRODUCTION

The environment of academic capitalism, which has covered almost the entire field of science and higher education, has both positive and negative effects on them. Academic capitalism has sharply accelerated the commercialization of the results of applied research and development of universities and research institutes and has allowed these organizations and institutions to significantly capitalize on their intellectual capital. This gave impetus to the development of progressive innovations and outstanding inventions. For example, in the system of higher education, there is an intensive innovative development, which, of course, can be attributed to the positive impact of academic capitalism on the development of the logistical, scientific, and engineering potential of universities and colleges. On the other hand, the desire to make a profit and the general search for opportunities to commercialize R&D results, mainly the results of applied research and experimental development, leads to a significant reduction in demand and attention to the development of basic science and the search for basic scientific values. This leads to a slowdown in the production of new basic fundamental knowledge and restraint of the intellectual development of society and causes a natural criticism of the impact of academic capitalism on science and higher education. Excessive entrepreneurial activity of universities in the direction of making a profit from the development and commercialization of applied research instead of purely scientific activity and basic research leads to the loss of the position of universities and colleges as "temples of science". However, there are still many truly academic institutions – higher education institutions and research institutions – that continue to conduct such fundamental research that is difficult to commercialize, but that constitutes true "scientific knowledge", or, in other words, human knowledge.

In this paper, innovative changes in the system of higher education and science – an integral part of the anthroposphere (technosphere) caused by the spread of the environment of academic capitalism are analyzed. The possible directions and essence of innovative transformations in the field of higher education and science are studied, as well as the negative impact of academic capitalism on this sphere of social activity is analyzed.

The *relevance* of the study is connected with the need to introduce innovative transformations into the system of higher education and science to increase its level, efficiency, and further integration into European and world systems of higher education and science.

Posing a problem. Based on the study and analysis of the theory and practice of innovative development of higher education and science systems of the leading countries of the world, the problem is how 1) to develop principles, directions, and tasks on innovation development of higher

education and science of Ukraine, and 2) to create and implement national programs for transformational changes in this area.

Analysis of the basic results of previous studies and used literature (source core) on the topic of work. A period of “academic capitalism” caused by the commercialization of budget results and many other university scientific types of research began after the Second World War. The impetus for the rapid development of entrepreneurship in the field of science and education was one of the best legislative acts in the United States – the “Bayh-Dole Act” – widely known as the Patent and Trademark Act Amendments (a federal law enacted in 1980). This act “enables universities, nonprofit research institutions and small businesses to own, patent and commercialize inventions developed under federally funded research programs within their organizations.” [1]. This was the beginning of the rapid development of applied research, the results of which can be turned into new designs and technologies to further commercialization. Historically academic capitalism originated in the United States as a specific intellectual subtype (environment) of the capitalist system. It is characterized by the extension of the laws and rules of the market economy for higher education and science. Previously higher education and science belonged to the non-profit sphere of intellectual activities and was designed to find, generate and disseminate knowledge for the benefit of all mankind. Higher education institutions (HEIs) and scientific institutions (SIs) have turned from “temples of knowledge” into players in the market of educational and scientific services with strict economic rules inherent in the market.

The definition “academic capitalism” was introduced by S. Slaughter and L. Leslie (1997), who proposed the following interpretation: “To maintain or expand resources, faculty increasingly had to compete for external dollars that were tied to market-related research, which was referred to variously as applied, commercial, strategic and targeted research, whether these monies were in the form of research grants and contracts, service contracts, partnerships with industry and government, technology transfer, or the recruitment of more and higher fees-paying students. We call institutional and professorial market or market-like efforts to secure external monies academic capitalism [2, p. 17].”

In books, S. Slaughter and L. Leslie [2] and S. Slaughter and G. Rhoades [3] set out “the innovative transformations in HEIs under the influence of the spread of market relations in humanitarian spheres of society, and the emergence in the second half of the twentieth century a new type of capitalist relations in the scientific, intellectual, technological and educational spheres – academic capitalism. Also, a real opportunity to commercialize R&D results, leading to the rapid development of the university and academic science and technology is shown.”

Market relations in science and education, the possibility of commercialization of the results of intellectual activity of universities and scientific research organizations have led to the spread of academic or university entrepreneurship and the accelerated emergence of favorable innovation climate – the accelerated emergence of innovations and their wide dissemination in many areas of society. The contribution from the use of innovations developed and introduced by universities and scientific organizations, for example, into the US economy has brought billions of dollars and has accelerated the development of applied science and new technologies. Gradually, the influence of academic capitalism began to spread to other countries.

Academic capitalism has transformed the field of higher education and science into an environment of academic innovation. Universities and scientific organizations were transformed from “temples of science” to academic innovative entrepreneurial institutions.

It is known that J. Schumpeter was the first who developed a complete description of innovation processes (he analyzed the “new combinations” of changes in the development of economic systems). Referring to the book by J. Schumpeter [4, p. 65], J. Fagerberg stresses, that “First of all, he added a definition of innovation (or “development” as he initially phrased it) as *new combinations* of new or existing knowledge, resources, equipment and so on. Second, he pointed out that innovation needs to be distinguished from the invention. The reason why Schumpeter stressed this difference is that he saw innovation as specific social activity (function) carried out within the economic sphere and with a commercial purpose, while inventions in principle can be

carried out everywhere and without any intent of commercialization. Thus, for Schumpeter innovations are novel combinations of knowledge, resources, etc. subject to attempts at commercialization (or carried out in practice). This *combinatory* activity he labeled *the entrepreneurial function* and the social agents fulfilling these function *entrepreneurs*.” [5, p. 21]. Later, J. Schumpeter [6] and G. Mensch [7] introduced the term “innovation” into scientific circulation, which was defined as the embodiment of scientific discovery in new technology or product.

There are many publications devoted to both the problems of academic capitalism and the experience of commercialization of innovations in university research activities (R&D). However, a comprehensive study of different types, forms, and directions of innovation activity in the sphere of higher education and science, including HEIs and scientific organizations (SOs) involved in the environment of academic capitalism, has not been performed yet.

The authors of this work conducted a long-term study of the best practices of institutions and organizations’ innovative activities in the sphere of higher education and science in developed countries. As a result, a new interdisciplinary scientific and applied direction – higher education innovatics – was brought up for open discussion by the authors [8].

In this work, the authors propose further development and concretization of the theoretical and practical provisions of the innovation of higher education, the definition of the unique features and functions of higher education in modern society under the conditions of academic capitalism.

The authors suggest that the findings and recommendations of this study are useful for specialists of higher education and science systems both for developed countries, countries with an average level of development, and developing countries.

A background report prepared for the second Global Education Industry Summit held on September 26-27, 2016 in Jerusalem, “covers the available evidence on innovation in education, the impact of digital technologies on teaching and learning, and the role of digital skills and the education industries in the process of innovation, using data from OECD surveys.” [9, p. 9]. “Understanding the education industries better, including their market structures and innovation processes, would help to create a more mature relationship with the education sector. Innovation in the industry – which develops the products and services that could drive innovation in schools – does not happen in isolation from what is happening in the education sector. Only when there is an innovation-friendly culture in education systems, supported by an innovation-friendly business environment and policies, will industries start to engage in risk-intensive research and development. Governments can support this by fostering a climate of entrepreneurship and innovation in education.” [9, p. 10]. Also, the report underlines that: “Innovation in the public sector in general, and education in particular, could be a major driver for significant welfare gains. Governments provide a large number of services in OECD countries and these services account for a considerable share of national income.” [9, p.13].

The important theoretical researches, practical recommendations, and original methodology in the sphere of creating innovative entrepreneurial universities were carried out by a pioneer in this field Burton R. Clark [10-12]. Theoretical and practical approaches to the problems of innovative development of society under the “triple helix model” proposed by Henry Etzkowitz [13-15], Viale and Etzkowitz [16]; Dzisah and Etzkowitz [17], Cadorin et. al. [18], became the fundamental directions of the development of innovative university entrepreneurship, which significantly increased the role of universities in the innovative development of society.

Considering the *latest publications* in foreign literature, it should be noted that S. Graek’s article [19] explores how universities are moving rapidly towards digital transformation.

The following works are devoted to a critical study of the problems of academic capitalism.

In the article “On academic capitalism” B. Jessop [20] is considering “the increasing trend toward academic capitalism and profit-oriented entrepreneurial practices in the fields of education and research discusses in the work. This occurs as universities, in different ways and subject to greater or lesser financial, administrative, and ideological pressures, act less like centers of

disinterested education and research and more like economic enterprises that aim to maximize their revenues and/or advance the economic competitiveness of the spaces in which they operate.”

The article of P. Somers et al. [21] defines “academic capitalism and overview of the research literature, presents the prospects for academic capitalism in the Americas, and discusses the implications of academic capitalism for Latin America. Estimates are given of what is useful in academic capitalism for Brazil.”

In the next article [22] the authors conducted a systematic review of the literature on academic capitalism and proposed two classification schemes based on: a) analytical levels (macrostructural, organizational and individual) and actors, and b) themes and contributions; research and reflection; creating a theoretical framework; themes and applications of research; new trends). This study can help to study not only the features of academic capitalism but also to understand several ways of neoliberal restructuring in universities.

In his work R. Münch [23] describes the most important “features of academic capitalism and their impact on science, as well as on the evolution of scientific knowledge; notes that academic capitalism is located in the intersection of scientific research, economic profit maximization, and innovation policy; examines the institutional conflicts of interest associated with corporate research funding. He argues that academic capitalism is a unique hybrid that combines the scientific search for truth and the economic maximization of profit and turns universities into enterprises competing for capital accumulation, and enterprises into knowledge producers looking for discoveries that can be turned into patents and profitable goods.”

Purpose. The purpose of the work is the study of the complex essence of higher education as an integral part of the anthroposphere (technosphere); definition of the main fundamental tasks of innovative academic (university) entrepreneurship; studying the main types of innovations initiated by academic capitalism in the higher education system, which can lead to innovative changes and their classification; determination of the main objects of innovation activity in the field of higher education and science and expedient directions of further innovative development of higher education in Ukraine; studying the types of innovations in the higher education system that can lead to innovative changes.

2. THEORETICAL BASES OF THE STUDY

The *theoretical foundations* of the research are: economic science; the theory of entrepreneurship and economic development; theory of innovative development; theory of market economy; International Economics; theories of humanitarian development and humanitarian policy of the state; theory and practice of higher education; economics of higher education; the theory of “academic capitalism” and “academic (university) entrepreneurship” by S. Slaughter, L. Leslie and Rhoades, and the theoretical justification of the role of innovative research higher education institutions, oriented towards entrepreneurship and accelerating the economic growth of society. *The conceptual foundations* of this study are: H. Etzkowitz’s concept of innovative development of society according to the “triple spiral” model, which is successfully used in many developed and developing countries of the world; B. Clark’s concept of the transformative transformation of ordinary universities into innovative HEIs focused on intra-university entrepreneurial activity (“entrepreneurial universities”), the effectiveness of which has been confirmed in the higher education systems of many countries on different continents. The *organizational and methodological foundations* of this study are the laws of Ukraine and governmental legislative and regulatory acts regarding the further development of higher education and science and the innovative development of society.

3. RESEARCH METHODOLOGY

This study used such *research methods*, as: dialectical approach for analyzing and comprehending the content and special characteristics of the innovative development of higher education on the basis of new phenomena of academic capitalism, university (academic)

entrepreneurship, as economic categories in the system of socio-economic relations and relations of the holistic economic system of the modern knowledge society; abstraction methods, system-structural and theoretical-informational approaches will be used to investigate the conditions of formation of new innovative forms of university (academic) entrepreneurship, peculiarities and essence of university business activity and its influence on the financial stability of higher education institutions; the methods of analysis and synthesis will be used to investigate individual innovative approaches and technologies in higher education and to form a holistic picture of the complex innovation activity of the subjects, objects and system of higher education as a whole. The **research methodology** included a critical study and awareness of the concept of innovation in higher education; analysis of literary sources, including electronic and computer aids; comparing and checking the feasibility or necessity of introducing different types of innovations, analyzing their effectiveness and the possibility of dissemination and implementation to objects and subjects of the higher education system; forecasting ways of formation of new innovative approaches, methods and technologies; integration of research results and formation of scientific theoretical, methodological and practical provisions of the new direction – the higher education innovatics.

4. RESEARCH RESULTS

Undoubtedly, the well-being of members of society depends on the level of development of higher education and science in this society. At the same time, higher education and science, which are integral interconnected components of human intelligence and academic freedom of society, stimulate both mutual development and the development of all mankind. Since higher education also creates human capital and forms human resources, the development of higher education must be continuous, efficient, and innovative. The unique characteristics of higher education as an integral part of the creative human activity can be formulated as follows (see Fig. 1).

The **novelty of the work** is that innovative changes in the system of higher education and science are studied from the standpoint of market-oriented transformations, covering all areas of activity of the main actors of this system, namely universities and research institutes. We emphasize that it is under the influence of market economic relations in the environment of academic capitalism that all transformational changes in the system of higher education and science take place, including the traditional creative, scientific, educational, cultural, and artistic functions.

Let's consider further the types of such innovations in the higher education system that can lead to innovative changes and their classification. Most of them are either directly or indirectly initiated by academic capitalism.

Innovations in higher education and science can lead to the innovative change of the following types: economic and market; technological; organizational; structural and pedagogical; educational and pedagogical, moral, ethics and ecological upbringing; cultural and artistic; other innovations caused by global changes, emergency and force majeure circumstances.

In the conditions of academic capitalism, the function of academic or university entrepreneurship, which is performed by entrepreneurial universities, as well as entrepreneurial-oriented research institutions, is extremely important.

The main task of innovative development of higher education in any country is the creation of the necessary conditions for a direct purposeful organizational-economic, scientific-educational, and engineering-technological activity aimed at the formation of a knowledge society with an innovative oriented type of economy of the state.

Further, in Fig. 2, the authors identified and presented the fundamental tasks of innovative academic (university) entrepreneurship.

The main objects of innovative activity in the field of higher education and science are presented by O. Romanovskiy and Y. Romanovskaya [8] in Fig. 3.

The authors determined that “the subjects of innovation activity in the field of higher education and science are individuals or legal entities (HEIs, SIs, structural units of the educational and scientific system, etc.), that carry out an innovative activity, attract property and intellectual

values, invest their own or borrowed funds in the implementation of innovative social-economic, public and humanitarian activity in the sphere of national projects.

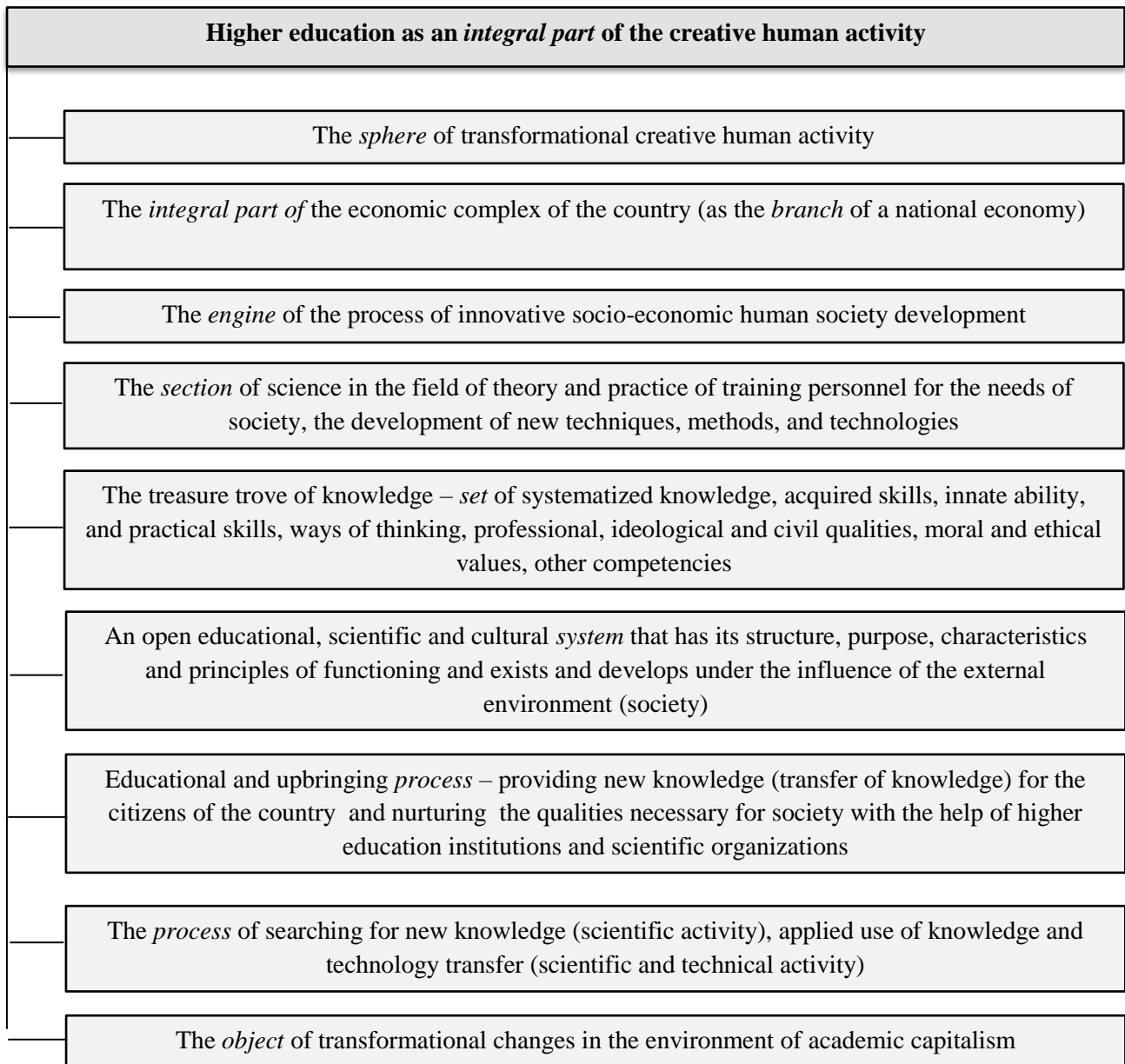


Fig.1. The unique characteristics of higher education

The authors believe it necessary to define the direction of further innovative development of higher education and science in Ukraine and possibly in other developing countries. According to O. Romanovskyi and Yu. Romanovska [8] these directions of further innovative development of higher education and science can be as following ones (see. Fig. 4).

The authors consider academic capitalism as defined in basic research (Slaughter and Leslie [2]; Slaughter and Rhoades [3]), as well as university entrepreneurship (Clark [10-12]; Etzkowitz [13-18]), as **economic categories** that have their characteristics associated with the capitalization and commercialization of intellectual products, such as new knowledge, technologies, teaching methods.

O. Romanovskyi and Yu. Romanovska [8] also thinks that “it is necessary to study, summarize the experience and describe theoretical foundations and practical provisions of innovation activity in the field of higher education on the bases of the already known innovative activities in this field.

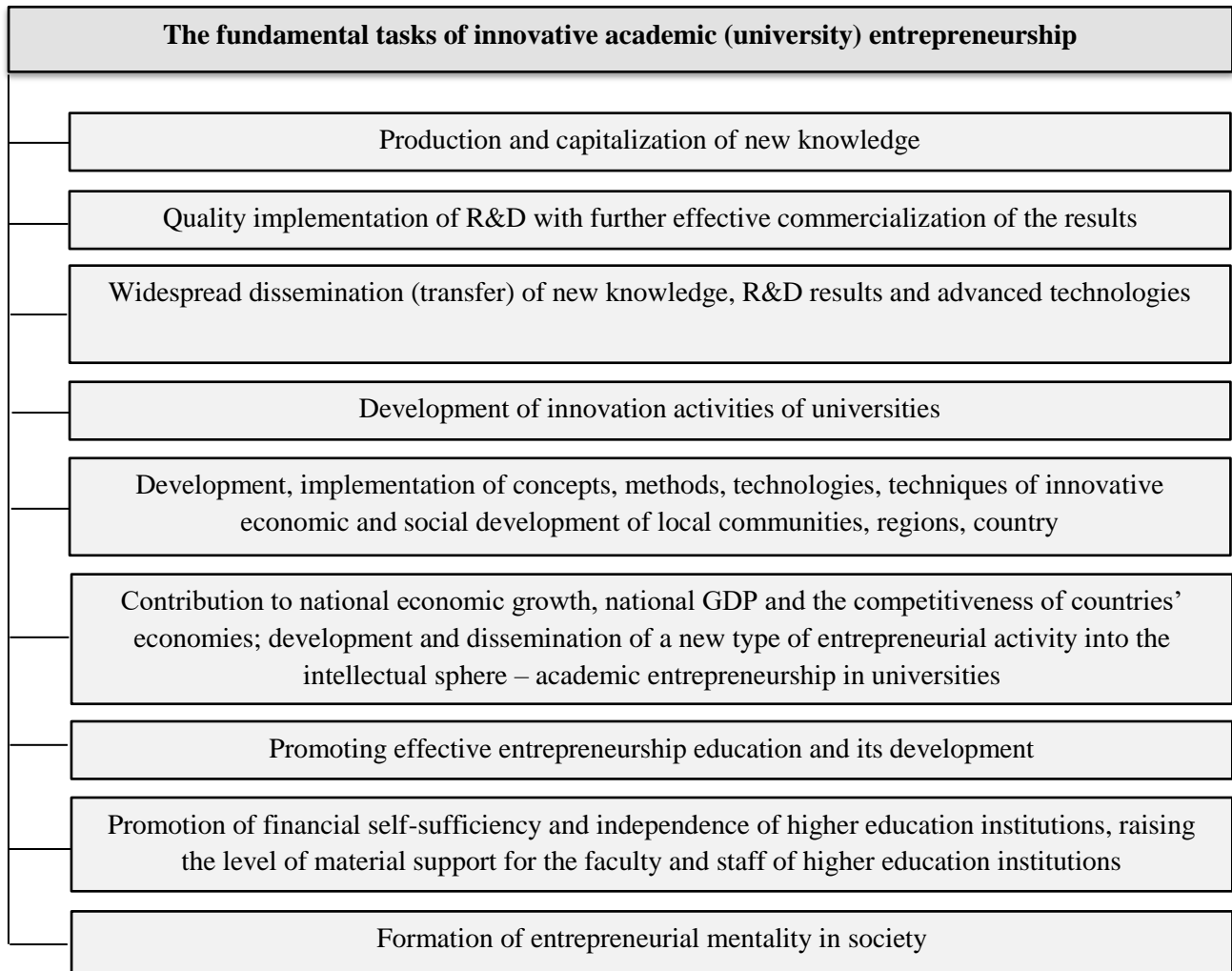


Fig. 2. The main fundamental tasks of innovative academic (university) entrepreneurship

It is advisable to distinguish theoretical foundations and practical provisions of innovation activity in higher education as a separate scientific direction. The authors propose to introduce a new scientific direction in the sphere of higher education with a new scientific term *Innovatics of higher education*. The use of the term *higher education innovatics* is appropriate to designate a separate scientific direction in the system of higher education together with other scientific areas, such as Fundamentals of Higher Education, Theory and Practice of Higher Education, Economics of Higher Education, etc.

By its definition, theoretical foundations and practical provisions of a new scientific direction in the sphere of higher education – the innovatics of higher education – includes a number of innovative changes in the following types of activities inherent in higher education: teaching, training, learning, studying; scientific and R&D activities, new technologies development, construction and design creativity; engineering, technical, informational activities; financial and economic support of the educational process and R&D, operating and business expenses, development and expansion of activities; inventive and patent-licensing activities, technology transfer; academic (university) entrepreneurship; cultural and moral development, upbringing of human values; education of honesty, justice and peacefulness; tolerance, mercy, charity and compassion; sports, recreational, festive and extracurricular activities; and other types of activities of universities, colleges and other institutions related to higher education.

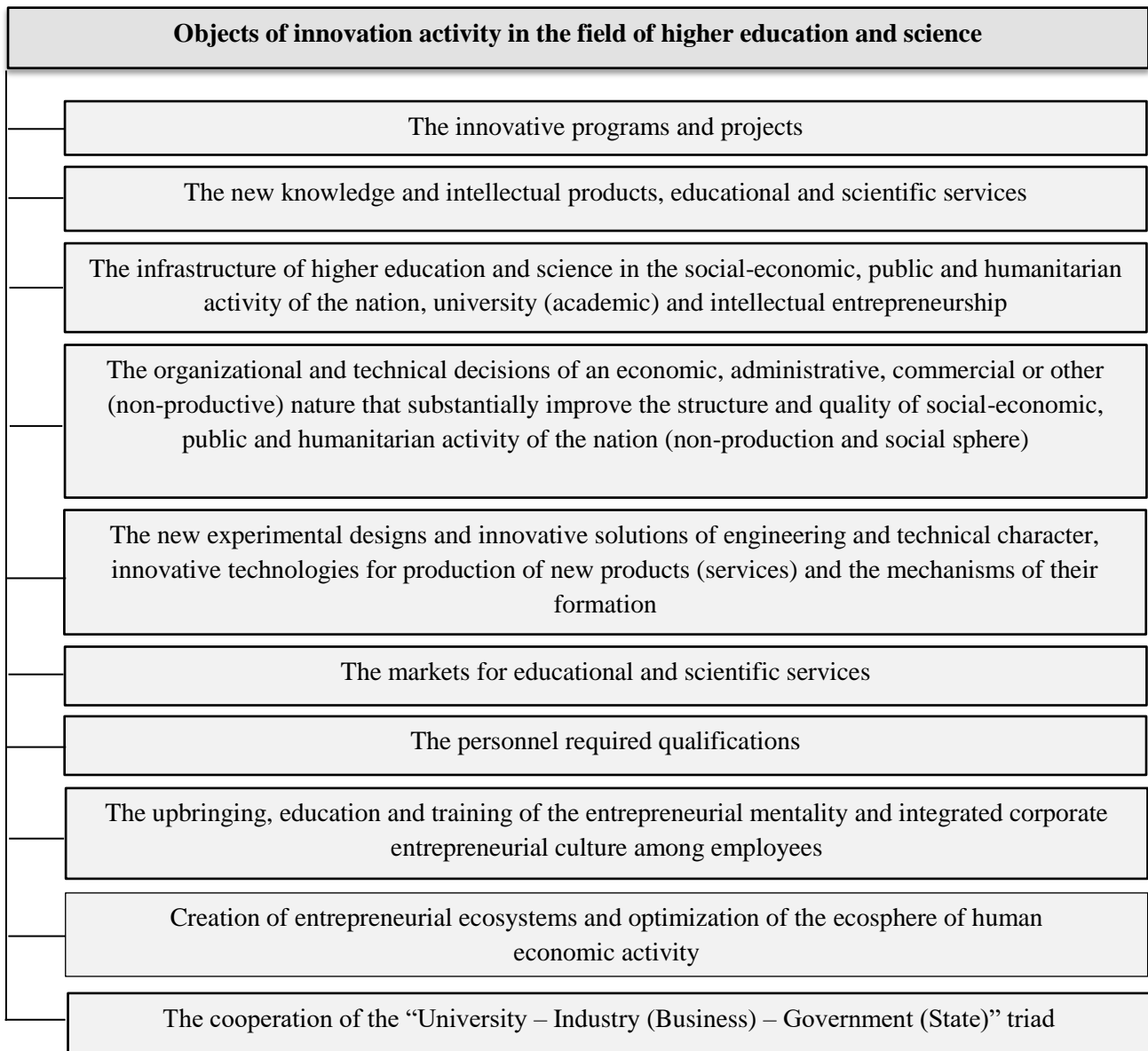


Fig. 3. The main objects of innovation activity in the field of higher education and science

Thus, innovatics of higher education (as a set of innovations in the whole sphere of higher education) include innovative changes in almost all areas of higher education to enhance and improve the quality of professionally trained for modern community responsible citizens and university development. These can be useful for reforming the national higher education system and for the development of new scientific directions in the field of higher education.

We have researched and developed the foundations and concepts for innovatics in higher education based on general theories of innovation activity in other human activities spheres. Innovatics of higher education should comprehensively promote activities shown in Fig. 5.

Summarizing the results of a comprehensive study of the phenomenon of academic (university) entrepreneurship, it should be noted that innovative entrepreneurial universities implement their activities in higher education and science in the current market laws of the economic system, interact with the internal forces of society (respond to its challenges and requests) and are influenced globalization pressure of the world community.

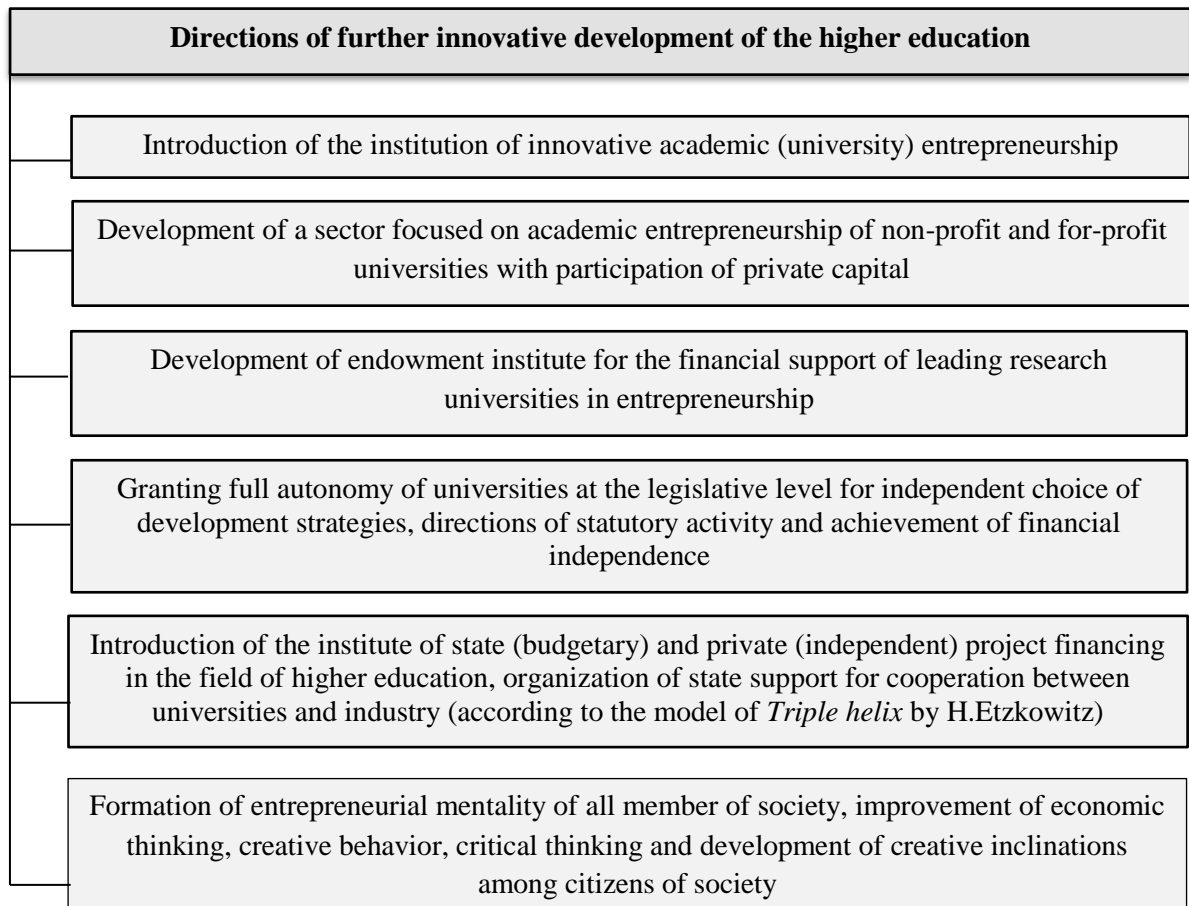


Fig. 4. Advisable directions for further innovative development of the higher education in Ukraine and other developing countries

New types of innovation in higher education and science caused by global changes, emergency and force majeure circumstances. Forced or emergency distance learning (F/EDL) is a temporary transition of teaching to an alternative mode due to crisis circumstances [19; 24-26]. This type of training is extraordinary and is characterized by the fact that: first, online learning is becoming the main type of teaching and learning, but not all teachers and students of many universities around the world are ready to constantly work on the internet remotely. Secondly, the educational and methodological support of training courses for use exclusively online has not been massively developed and implemented in the higher education system of many countries. Third, after the end of the crisis circumstances, most universities in the world will return to the usual classroom hybrid full-time and distance learning, which the vast majority of students and teachers dream of. The innovation of F/EDL lies in the instant transition from the usual form of university education, based on direct classroom face-to-face contact between teachers and students, to the remote location of students from teachers and classrooms on university campuses. In addition to an insufficiently developed educational and methodological base, a successful educational process can be hindered by students' lack of control during testing and passing exams online. New technological and methodological developments are needed to solve these problems. The main feature of F/EDL is the difference between the delivery of online courses and distance teaching (training by professors) and distance learning (studying by students) of these courses. For the successful organization of long-term online training, it is necessary to simultaneously solve problems of information and communication nature, organizational, cultural, pedagogical, and methodological nature, as well as problems of ethics and integrity in the process of independent training of students and monitoring their progress (Fig. 6).

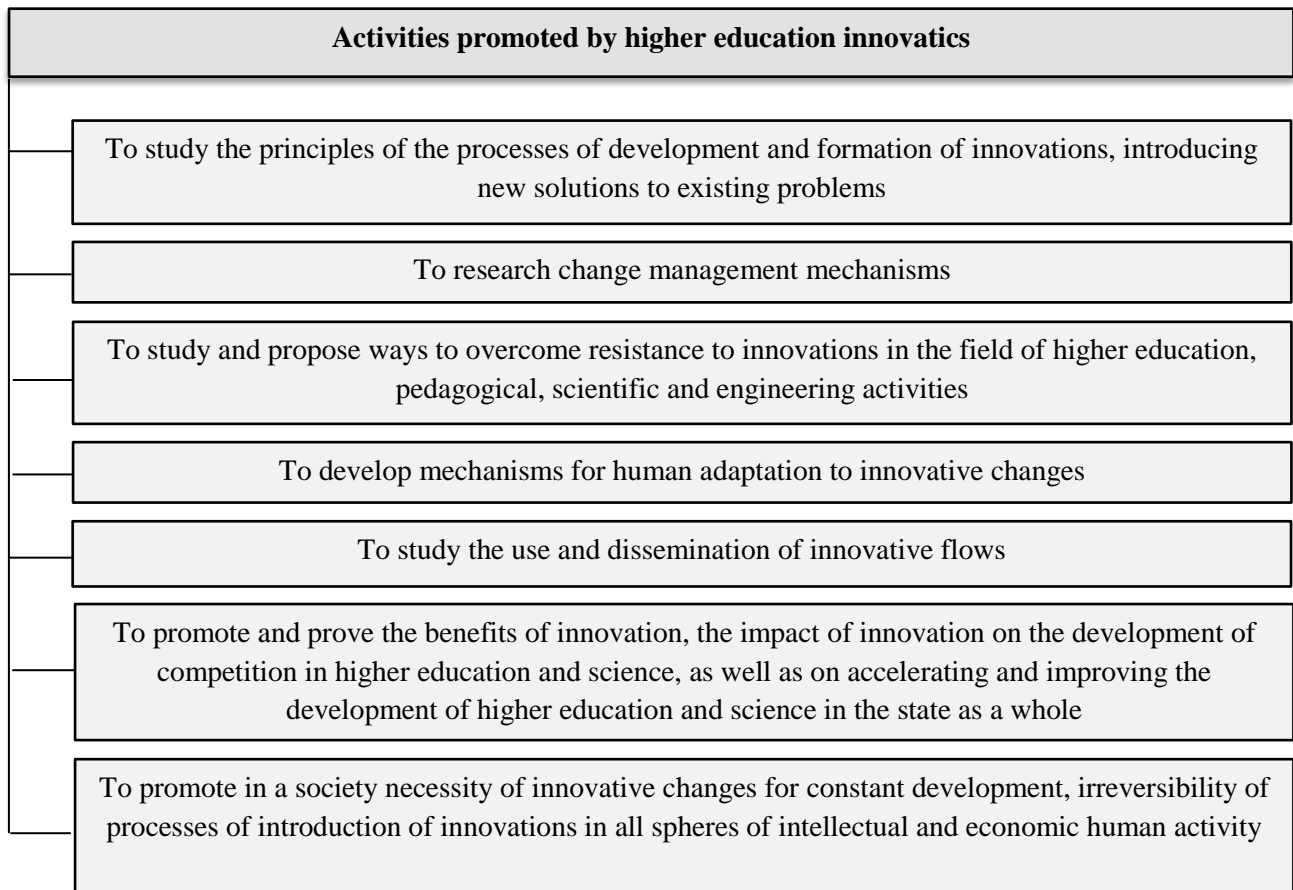


Fig. 5. Activities promoted by higher education innovatics

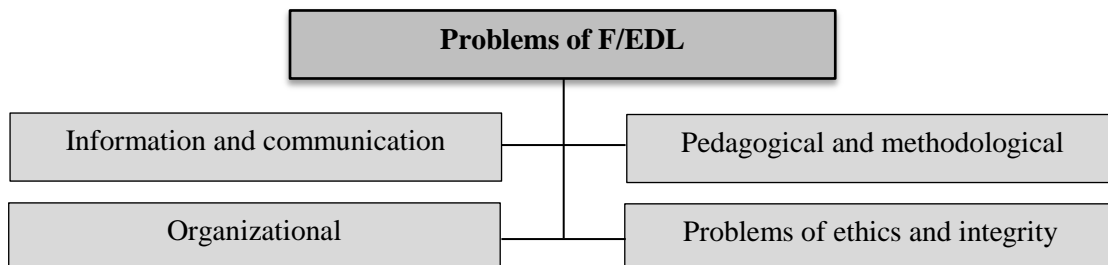


Fig. 6. Problems of the forced or emergency distance learning

Originality. The scientific novelty is that the authors: studied the world experience of innovative changes in higher education and science taking place in the environment of academic capitalism; formulated and proposed theoretical data for new approaches in understanding the innovative transformations in the field of higher education and science, which are economic categories and occur according to the laws of the market; proposed new approaches for further innovative reform of higher education and science in the context of academic capitalism. A new scientific term of “innovatics of higher education” has been put into circulation.

5. CONCLUSIONS AND PERSPECTIVES FOR FURTHER RESEARCH

Innovative development of higher education is crucial. The main scientific achievements of the authors are the proposed provisions on the uniqueness of the essence of higher education, the main fundamental tasks of innovative academic (university) entrepreneurship, types of innovations

initiated by academic capitalism in higher education, which can lead to innovative changes, and their classification as theoretical, and practical significance for the development of domestic science and higher education. The authors also identify the main objects of innovative activity in the field of higher education and science, appropriate areas for further innovative development of higher education in Ukraine and other developing countries, as well as types of innovations in higher education that can lead to innovative changes.

A positive result of the work is formulated and proposed interdisciplinary research in the field of higher education and science – innovation of higher education, which collects, summarizes, and classifies best practices of innovation in many higher education systems and leading universities in the world. The same applies to HEIs and all research institutes and organizations related to higher education. The system of innovative transformations in the field of higher education is interesting and practically useful both for developed countries and for developing countries. Summing up the results of a comprehensive study of innovations in university education as a factor of sustainable development of society, it should be noted that innovations in higher education are a complex interdisciplinary scientific field, applied directly in the field of knowledge and economic activity.

For further research, it is proposed to deepen the study on the possible impact of academic university entrepreneurship not only in the field of economics but also to spread to the social and public sectors of the community, including the use of smart business for health in the COVID-19 pandemic.

References (TRANSLATED AND TRANSLITERATED)

- [1] Ezell S. The Bayh-Dole Act's Vital Importance to the U.S. Life-Sciences Innovation System. Information Technology and Innovation Foundation (ITIF), 2019 (March 4). URL: <https://itif.org/publications/2019/03/04/bayh-dole-acts-vital-importance-us-life-sciences-innovation-system#:~:text=The%20Bayh%20Dole%20Act%2C%20signed,used%20to%20control%20drug%20prices> . Retrieved 22.02.2021.
- [2] Slaughter S., Leslie, L. Academic capitalism. Politics, Policies, and the Entrepreneurial University. Baltimore, MA, The John Hopkins University Press, 1997. 276 c.
- [3] Slaughter S., Rhoades G. Academic Capitalism and the New Economy. Markets, State and Higher Education. The Johns Hopkins University Press, 2009. 384 c.
- [4] Schumpeter J.A. Capitalism, Socialism and Democracy. Routledge, 1976. 437 c.
- [5] Fagerberg J. A. Guide to Schumpeter, 2008. Pp. 20-22. URL: https://www.researchgate.net/publication/270794018_A_Guide_to_Schumpeter . Retrieved 22.02.2021.
- [6] Schumpeter J.A. The Theory of Economic Development: An Inquiry into Profits, Capital, Credits, Interest, and the Business Cycle. Transaction Publishers, Piscataway, 1934. 255 c.
- [7] Mensch G. Stalemate in technology : innovations overcome the depression. Cambridge, Mass.: Ballinger Pub. Co., 1979. 241 p.
- [8] Romanovskiy O., Romanovska Yu. Higher educational innovatics as the newest interdisciplinary direction of higher school and higher education science. Interdisciplinary Studies of Complex Systems, 2020. № 17 (2020), 83–101. URL: <http://iscs-journal.npu.edu.ua/article/view/216975> Retrieved 22.02.2021.
- [9] OECD. Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills. OECD Publishing, Paris, 2016. 150 c. URL: <https://www.oecd.org/education/cei/GEIS2016-Background-document.pdf> Retrieved 22.02.2021.
- [10] Clark B.R. Creating Entrepreneurial Universities: Organizational Pathways of Transformations. Oxford, Pergamon-Elsevier Science, 1998. 180 c.
- [11] Clark B.R. Collegial Entrepreneurialism in Proactive Universities: Lessons from Europe. Change: The Magazine of Higher Learning, 2000. № 32 (1), 10-19. URL: <https://www.tandfonline.com/doi/abs/10.1080/00091380009602704> Retrieved 22.02.2021.
- [12] Clark B.R. Sustaining Change in Universities. Continuities in Case Studies and Concepts. The Society for Research into Higher Education & Open University Press. England, McGraw-Hill, 2004. 232 c.
- [13] Etzkowitz H. Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. Social Science Information, 2003. № 42 (3), 293-337. URL: <https://doi.org/10.1177/05390184030423002> Retrieved 22.07.2021.
- [14] Etzkowitz H. The Triple Helix: University-Industry-Government Innovation in Action. New York & London: Routledge, Taylor & Francis Group, 2008. 164 c.
- [15] Etzkowitz H. Is Silicon Valley a global model or unique anomaly? // Industry and Higher Education, 2019. № 33 (2). Pp. 83-95. URL: <https://doi.org/10.1177/0950422218817734> Retrieved 20.05.2021.

- [16] Viale R., Etkowitz H. The Capitalization of Knowledge. A Triple Helix of University–Industry–Government. Edward Elgar Publishing, 2010. – 368 с.
- [17] Dzisah J., Etkowitz H. The Age of Knowledge: The Dynamics of Universities, Science and Societies. –Leiden-Boston, Brill, 2012. –360 с.
- [18] Cadorin E. at el.Science Parks and the Attraction of Talents: Activities and Challenges / Eduardo Cadorin, Magnus Klofsten, Alberto Albahari, Henry Etkowitz. Triple Helix Journal, 2019. № 6. Pp . 36-68. URL: <https://doi.org/10.1163/21971927-00601002> Retrieved 22.02.2021.
- [19] Grajek S. How Colleges and Universities Are Driving to Digital Transformation Today / by Susan Grajek // EDUCAUSE Review – Special Report (2020, January 27). URL: <https://er.educause.edu/articles/2020/1/how-colleges-and-universities-are-driving-to-digital-transformation-today> Retrieved 22.11.2020.
- [20] Jessop B. On academic capitalism. // Critical Policy Studies, 2018. – № 12 (1) – С. 104-109. URL: <https://www.tandfonline.com/doi/pdf/10.1080/19460171.2017.1403342?needAccess=true> Retrieved 20.12.2020.
- [21] Somers P. та ін. Academic capitalism and the entrepreneurial university: some perspectives from the Americas // Rotoero, Joaçoba, 2018. № 43 (1), 21-42. URL: <https://doi.org/10.18593/r.v43i1.13088> Retrieved 19.12.2020.
- [22] Sigahi T.F.A.C., Saltorato P. Academic capitalism: distinguishing without disjoining through classification schemes. High Education, 2020, 80, 95–117. URL: <https://doi.org/10.1007/s10734-019-00467-4> Retrieved 05.03.2021.
- [23] Münch R. Academic Capitalism. Oxford University Press, 2020. URL: <https://doi.org/10.1093/acrefore/9780190228637.013.15> Retrieved 29.11.2020.
- [24] Coronavirus and Higher Education Resources (2020) Bryan Alexander blog, March 17. URL: <https://bryanalexander.org/coronavirus/coronavirus-and-higher-education-resources/> . Retrieved 30.11.2020.
- [25] Guidance for Interruptions of Study Related to Coronavirus (COVID-19) (2020) Federal Student Aid, Information for Financial Aid Professionals (IFAP), March 20. URL: <https://ifap.ed.gov/electronic-announcements/030520Guidance4interruptionsrelated2CoronavirusCOVID19> . Retrieved 29.11.2020.
- [26] Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020) The Difference Between Emergency Remote Teaching and Online Learning. EDUCAUSE Review. March 27. URL: <https://er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning> Retrieved 29.11.2020.

ІННОВАЦІЙНЕ АКАДЕМІЧНЕ ПІДПРИЄМНИЦТВО ЯК РУШІЙ ТРАНСФОРМАЦІЙНИХ ЗМІН У ВИЩІЙ ОСВІТІ ТА НАУЦІ

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Анотація. Роботу присвячено дослідженню комплексної сутності вищої освіти як невід'ємної частини антропосфери (техносфери); визначення основних фундаментальних завдань інноваційного академічного (університетського) підприємництва; вивчення основних видів інновацій, започаткованих академічним капіталізмом у системі вищої освіти, що можуть призвести до інноваційних змін, та їх класифікація; визначення основних об'єктів інноваційної діяльності у сфері вищої освіти та науки та доцільних напрямків подальшого інноваційного розвитку вищої освіти України; вивчення видів інновацій у системі вищої освіти.

Автори розглядають інноваційні перетворення у сфері вищої освіти та науки як об'єктивно обумовлені трансформаційні зміни, спричинені середовищем академічного капіталізму. Ядром дослідження є академічне або університетське підприємництво, яке ґрунтується на ринкових відносинах, поширюваних академічним капіталізмом у сфері наукової та освітньої діяльності вищих навчальних закладів, науково-дослідних установ та інших організацій у цій галузі.

Важливою основою наукової роботи є застосування у національних умовах теорії потрібної спіралі Г. Іцковіца інноваційного розвитку суспільства. Наукова новизна полягає в тому, що автори: вивчили світовий досвід інноваційних змін у вищій школі та науці, що відбуваються в середовищі академічного капіталізму; сформулювали та запропонували теоретичні дані для нових підходів у розумінні інноваційних перетворень у сфері вищої освіти та науки, які є економічними категоріями та відбуваються згідно із законами ринку; запропонували підходи для подальшої інноваційної реформи вищої освіти та науки в контексті академічного капіталізму. Введено в обіг новий науковий термін «інноватика вищої освіти».

Запропоновано положення про унікальність сутності вищої освіти, основні фундаментальні завдання інноваційного академічного (університетського) підприємництва, види інновацій, започаткованих академічним капіталізмом у вищій школі. Розроблено їх класифікацію, що має як теоретичне, так і практичне значення для розвитку вітчизняної науки та вищої освіти. Також визначено основні об'єкти інноваційної діяльності у сфері вищої освіти та науки, відповідні сфери для подальшого інноваційного розвитку вищої освіти в Україні, а також види інновацій у вищій школі, які можуть призвести до кардинальних інноваційних змін.

Ключові слова: інноваційне академічне підприємництво; підприємницький університет; інновації в системі вищої освіти і науки; інноватика вищої освіти.

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ВИКОРИСТАННЯ ЗАСОБІВ ДОПОВНЕНОЇ РЕАЛЬНОСТІ У ПІДГОТОВЦІ ПЕДАГОГА НА ПРИКЛАДІ КОМПЛЕКСНОГО КУРСУ «СТВОРЕННЯ ПРОГРАМНОГО ЗАБЕЗПЕЧЕННЯ AR»

Анотація. У статті представлено авторське бачення можливостей використання засобів доповненої реальності у підготовці педагога на основі аналізу досліджень вітчизняних та зарубіжних науковців, які розглядають AR як сучасний засіб навчання. Висвітлено проблеми впровадження засобів доповненої реальності в освітній процес підготовки педагога в закладах вищої освіти (ЗВО), зокрема, проблема підвищення ефективності мотивації та навчання здобувачів освіти через використання AR-додатків на мобільних пристроях; формування інформаційної культури засобами AR-технології, тощо. Також авторами окреслено перспективи використання в освітньому процесі закладів вищої освіти засобів доповненої реальності. У процесі дослідження даної проблеми охарактеризовано поняття, необхідні для однозначного розуміння представлених результатів: розширена реальність, змішана реальність, віртуальна реальність, доповнена реальність, віртуальний і доповнений метавесвіт. Увагу дослідників зосереджено на використанні технологій доповненої реальності в освітньому процесі: ігрової діяльності, змішаної та розширеної реальності.

Автори дослідження переконані, що застосування засобів AR у освітньому процесі ЗВО позитивно впливають на емоційно-вольову сферу здобувачів освіти, підвищують мотивацію до пізнання нового, активізують інтерес студентів до вивчення нових тем, розвивають емоційний інтелект і творче мислення, сприяють якісним змінам в організації освітнього процесу.

У статті описується збільшення (доповнення) візуальних можливостей електронних (цифрових) підручників шляхом використання інтерактивних об'єктів доповненої реальності, що впливає на якість формування готовності майбутніх педагогів до використання та впровадження технологій та засобів AR. Досліджено програмне забезпечення для створення та використання освітнього цифрового контенту, зокрема й з елементами доповненої реальності для підготовки здобувачів вищої освіти за спеціальністю 014.09 Середня освіта (Інформатика).

Ключові слова: Засоби доповненого навчання; освітній процес; технології AR, цифрові технології, віртуальна реальність, ІКТ.

1. ВСТУП

Актуальність впровадження технологій доповненої реальності в освітній процес підготовки педагога полягає в тому, що використання настільки інноваційного засобу підвищує мотивацію здобувачів освіти щодо навчальних дисциплін та рівень засвоєння інформації, синтезуючи різні форми її сприйняття.

На сучасному етапі розвитку вищої освіти спостерігається тенденція до більш широкого використання цифрових технологій для навчання та підготовки здобувачів вищої освіти. При побудові освітнього процесу можуть використовуватись пізнавальні та дидактичні комп'ютерні ігри, вправи, віртуальні освітні подорожі, розвивальні відеоролики. Інноваційним засобом когнітивного розвитку здобувачів освіти є доповнена реальність (AR) - доповнення фізичного світу цифровими даними в реальному часі. Це технологія накладання віртуальної реальності на об'єкти фізичного світу. До таких продуктів належать ігри з додатками AR, ігри-подорожі, інтерактивні книжки, енциклопедії й художні книги українських і зарубіжних авторів. Використання такої технології у вищих навчальних закладах сприяє кращому навчанню через інтерактивність та презентацію в 3D, покращує пізнавальну активність, допомагає бути більш уважнішим, розвиває творче мислення і уяву. Педагоги мають підтримувати та заохочувати пізнавальні інтереси студентів, для цього використовувати сучасні цифрові технології, готувати майбутнього педагога до використання додатків доповненої реальності в освітньому процесі різноманітних закладів