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Romanovskyi Oleksandr Oleksiiovych
Doctor of Economic Science, Doctor of Pedagogical Science, Professor, Rector
Ukrainian-American Concordia University,
Kyiv, Ukraine
ORCID ID: 0000-0002-3618-2999
oleksandr.romanovskyi@uacu.edu.ua

Romanovska Yuliia Yuriivna
Candidate of Philology, Professor, Professor of the Department of English Philology
National Pedagogical Dragomanov University,
Kyiv, Ukraine
ORCID ID: 0000-0002-0207-3348
yuliia.romanovska@uacu.edu.ua

Romanovska Oleksandra Oleksandrivna
Candidate of Pedagogical Sciences, Docent, Prorector
Ukrainian-American Concordia University,
Kyiv, Ukraine
ORCID ID: 0000-0003-3614-544X
oleksandra.romanovska@uacu.edu.ua

El Makhdi Mokhamed
Master of Innovation Activity, Project Manager
Ukrainian-American Concordia University,
Kyiv, Ukraine
ORCID ID: 0000-0002-2963-3931
momodeluxe@hotmail.com

TYPES OF INNOVATIONS IN THE SPHERE OF HIGHER EDUCATION

Abstract. The work is devoted to the study of the main types of innovations in the sphere of higher education. The following types of innovations are considered: innovations of technological and organizational type; innovations of educational and pedagogical type; innovations of structural and pedagogical type; innovations of economic and market type. Also analyzed innovative information technologies, information and innovation management, as well as innovative marketing are widely used in the management of innovative activities in education. They are combined into a group of means and tools for managing innovative activities in education. They can occur in almost all types of innovations in the education system, which can lead to innovative changes to achieve new quantitative and qualitative education parameters. The analysis in the article of some types of innovations in the higher education system shows that they can lead to innovative changes. These are organizational-type innovations in the field of higher education; educational and pedagogical innovations in the higher education system; means and tools for managing innovative activities in education; innovations to solve problems of forced or emergency distance learning, etc.

Also are important innovations in higher education related to the protection of life on Earth (environmental, resource-saving and alternative fuels, food security, health care, population control, etc.), as well as new types of innovations in higher education and science caused by global changes, extraordinary and force majeure circumstances.

The authors argue that the prospect of building a knowledge society with an innovation-oriented type of economy in any country requires a profound reform of the national economy humanitarian sphere, innovative development of higher education system, science and scientific-technology activity. This should be done on the basis of reasonable combination of the best foreign experience with national traditions.

The results of the research can be useful both for specialists in the field of higher education and science, as well as for students, postgraduates, and researchers in the field of innovative activity and innovative development.

Keywords: innovations in higher education; innovations of technological and organizational type; innovations of educational and pedagogical type; innovations of structural and pedagogical type; innovations of economic and market type; innovative information technologies; information and innovation management; innovative marketing.

I. INTRODUCTION

This article analyzes types of innovations in the higher education system that can lead to innovative changes.

The impetus for the development of progressive innovations and outstanding inventions was the Bay-Dole (Patents and Trademarks Amendment Act). Act passed by the government of US on December 12, 1980. This began an era of rapid economic growth in the country. The Bayh-Dole Act, one of the finest statutes in US law, “allows universities, nonprofit research institutions, and small businesses to own, patent, and commercialize inventions developed through federally funded research programs within their organizations.” [1].

Earlier higher education and science belonged to the non-commercial sphere of intellectual activity of the society and were called upon to find, generate and disseminate knowledge for the benefit of all mankind. Further, under the conditions of academic capitalism, higher education institutions and scientific institutions have turned from "temples of knowledge" into participants in the market of educational and scientific services with strict market economic rules.

The study and analysis of useful information about the emergence and dissemination of innovative activities in the field of higher education and science made it possible to identify the main types of innovations. Innovations in higher education lead to transformational innovative changes in this area and allow both qualitatively improving its activities and significantly increasing its efficiency.

2. ACTUALITY OF THE TOPIC

It is widely known that all processes, types, stages, levels, methods of education and methodology of teaching need innovations**.**

The publication of F. Altbach [2] presents the integrated role of universities in the period of globalization. In his work, universities are defined as “engines of socio-economic development of society and as national institutions” [2, pp. 1-2]. Universities fulfill a “central academic role” in society, in the multiplication, “preservation and dissemination of knowledge” [2, p. 2]. Universities are defined as “intellectual centers” [2, p. 2] and “international institutions” [2, p. 3]. Author also underlined that: 1). Universities should ensure that higher education is accessible and that educational services are provided fairly by modern higher education institutions. 2). Universities should solve the problems of general education. 3). Universities should develop economic science and academic entrepreneurship, as well as implement their historical prospects for further development and improvement [2, pp. 4-10]. It is the broad and purposeful introduction of innovations, advanced methods, methodologies and technologies in the field of higher education and science that should ensure the implementation of the integrated role of universities in the globalization period.

The authors of this article argue that the “prospect of building a knowledge society with an innovation-oriented type of economy in any country requires a profound reform of the national economy humanitarian sphere, innovative development of higher education system, science and scientific-technology activity. This should be done on the basis of reasonable combination of the best foreign experience with national traditions” [3]. Also, according to the authors of the study, “the activation of all types of entrepreneurship is both a priority of state policy in the field of

innovative development of the higher education sector, the introduction of innovative entrepreneurship of various types and legal forms, as well as the basis of economic reforms and the main lever in the new model of the national economy." This includes: "innovative academic or university entrepreneurship, which is an integrated social-economic process; accelerated development of both national science and higher education, as well as innovative processes, technologies, and innovative entrepreneurship, which is especially relevant in the period of searching for new economic models and strategies that contribute to the accelerated development of the national production sector and the economic system. Further improvement of the legal and institutional environment for innovation in the state, disclosure and development of the country's entrepreneurial potential as the main institutional resource of the market economy, achievement of higher competitiveness, and raising social standards is clearly necessary" [3].

3. FORMULATION OF THE PROBLEM

Based on the study and analysis of the theory and practice of innovative development of higher education and science systems in the leading countries of the world, it is necessary to develop the principles, directions and tasks of innovative development of higher education and science in Ukraine – in order to create and implement national programs for transformational changes in this area.

According to the authors of the article, "innovation in higher education studies, systematizes and expands interdisciplinary scientific and applied fields in higher education and science.

Innovation in higher education studies the innovative transformations of subjects of higher education and science in the context of academic capitalism" [3].

This study is devoted to the investigation of the processes of innovative development of the higher education system in Ukraine and other countries during the formation of the knowledge society.

"The spread of market mechanisms in all spheres of social, economic and humanitarian activities of mankind, the emergence of the phenomenon of academic entrepreneurship, the commercialization of knowledge and R&D requires the development and scientific substantiation of the theory and practice of innovative development of higher education and science" [3].

The novelty of the research lies in identifying areas of practical implementation of innovative changes, searching, studying, and choosing relevant ways, indicating methods and mechanisms for innovative transformation of the higher education sector as a whole, as well as its constituent parts – HEIs, SIs, organizations, and institutions related to higher education and science sphere.

Of interest is the study of the main types of innovative transformations in the field of higher education and science.

4. THE FUNDAMENTALS OF THE STUDY

The research is based on the conceptual foundations of innovative development of higher education:

- the H. Etzkowitz's concept of innovative development of society by the "triple helix" model [4-9];
- the B. Clark's concept of transformational changes of conventional universities into innovative universities focused on in-house entrepreneurial activities [10-12];
- the theoretical studies in the sphere of higher education innovatics [3; 13].

5. ANALYSIS OF RECENT STUDIES AND PUBLICATIONS

Some of the publications on innovations in higher education seems to be interesting. For example, Eddie Blass and Peter Hayward [14] in the work "Innovation in higher education; will there be a role for "the academe/university" in 2025?" presents five scenarios for the future of higher education underpinned by drivers of funding, the ownership and exploitation of research, the provision of good teaching, and the potential missing link of social innovation development. The authors emphasize that by refocusing on facilitating social innovation, the university can find a new means of adding value to society that will sustain its existence beyond 2025" [14].

In the paper [15] D. Swanger "explores the current state of higher education and the pressures facing colleges. He also explores innovation and some of the challenges to innovation in higher education, as well as some of the successes. This paper will recommend some changes that can be implemented on any campus to improve outcomes and efficiencies".

Very interesting is the full report reference, specially prepared for the 2nd Summit of the Global Education Industry, held on September, 26-27, 2016 in Jerusalem. It's "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" [16, 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." (p. 10). Also, the report underlines that: "Innovation in the public sector in general, and in 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" [16, p. 13].

The important article of P. Serdyukov [17] is devoted to the problem of innovation in American higher education. The paper is based on a literature survey and author research.

In his work of M. Jakovljevic [18] is considered the "institutional innovation and some models of innovation in higher education.

In their book J. Branch et al. [19] are presenting primary examples of innovative teaching and learning practices in higher education in different countries.

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

The book "The International Encyclopedia of Higher Education Systems and Institutions" edited by editors-in-chief P. N. Teixeira and J. C. Shin [20] includes most topics from higher education and is available for comparison with other sources. The book examines the problems of higher education in the twenty-first century, analyzes the changes that have taken place and new challenges that may face future scientists and possible research directions.

D. W. Stoten in his paper which contributes to the discourse on the future of learning in higher education "focuses on the utility of the MBA as a management qualification to those that adopt a more holistic perspective of the development of managerial capability in an uncertain and volatile world." [21, p. 53].

The study of M. J. Mayhew et al. [22] has the purpose "to test the effectiveness of a theoretically developed pedagogical exercise designed to help students develop their innovation capacities during a single-semester course" [22, p. 3]. Researchers "organized the theoretical perspectives and empirical literature base through the use of two broad categories: innovation capacity theory and pedagogical frameworks, respectively" [22, p. 3]. Authors stress that "good teaching is the crucial link between the aspirations of undergraduate education and their subsequent realizations; between collegiate environments and desired outcomes" [22. p. 17].

The big number of publications are devoted to the problems of organization the distance learning education process in non-standard, epidemiological and other force majeure conditions: in the publications of Grajek [23], and Hodges et al. [24] the authors study the information, communication, organizational and pedagogical problems of organizing distance learning in periods of natural disasters and force majere conditions. Also, one of the noteworthy innovations is Active Learning Classes by Copridge et al. [25], helping teachers and their students "to provide: teacher visibility and presence, better feedback and learning, and personal conversations and student dialogue" [25, p. 205].

6. METHODOLOGY AND THE RESEARCH METHODS

In the course of the study, a thorough literary and documentary search was carried out; the following main areas of search were identified: innovative development of society according to the "triple helix" model of H. Etzkowitz; various innovative models for transforming universities into entrepreneurial corporations (according to B. Clark); directions and ways of implementing innovative transformations in the field of higher education and science.

The study identified the main types and directions of innovation in the field of higher education and science; analyzed and compared with the Ukrainian academic entrepreneurial activity of foreign universities.

The dialectical method is used in the analysis and understanding of the content and features of the innovative development of higher education. Methods of analysis and synthesis are used in studying and formation directions and ways of innovative development of higher education and science.

All drawings presented in the article (Fig. 1 - Fig. 5) were developed by the authors.

7. PRESENTATION OF THE MAIN RESEARCH MATERIAL

It is known that innovations in higher education and science can lead to innovative change. These can be innovations of the different types [13] (Fig. 1).

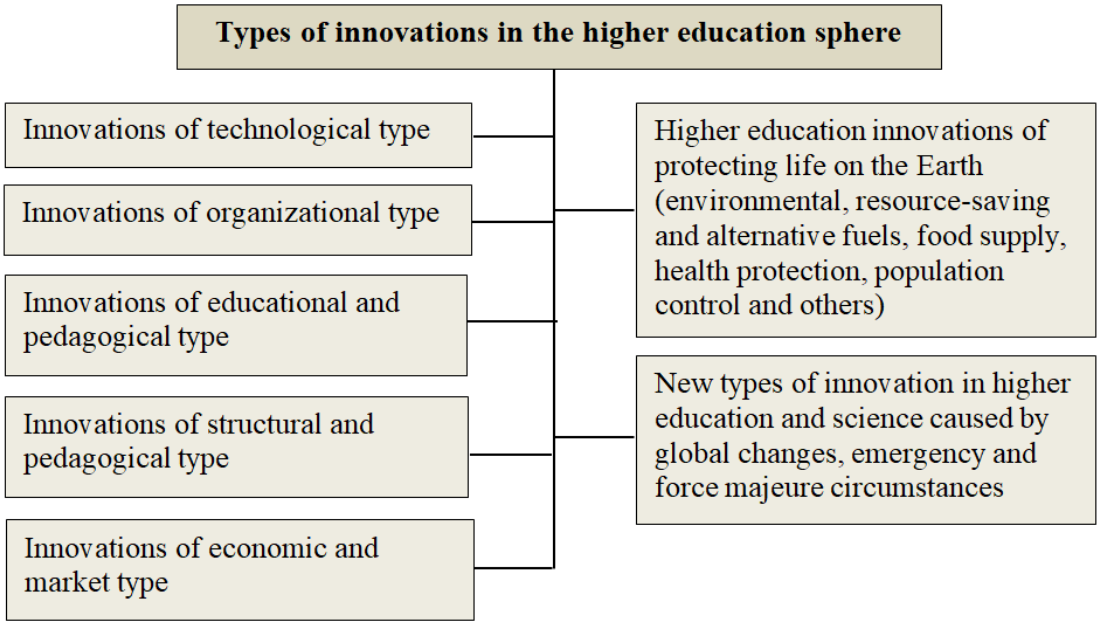

Fig. 1. Types of innovations in the higher education system that can lead to innovative changes

Consider some types of these innovations.

The authors emphasize that "***Innovations of technological type*** are innovations in the system of education and pedagogical activities caused by the development of science and technology, search and acquisition of new knowledge, dissemination (transfer) and introduction of new knowledge and new technologies, application of innovative information technologies, computer equipment, remote forms of training, web design, use of information and communication networks, Internet and Intranet, information and innovation management, as well as innovation marketing (*innovations of scientific and technological progress*).

Innovations of organizational type are shown on fig. 2.

They cen be:

- planned, systematic, periodic, urgent, sudden, spontaneous, random innovations (innovations in the way they are implemented);
- innovations local, mass, global, etc. (innovations in the scope of innovative solutions and activities);

– innovations that correct, modify, improve, modernize, radical, revolutionary, etc. (innovations according to the degree of predicted changes).

Innovations of educational and pedagogical type are shown on fig. 3.

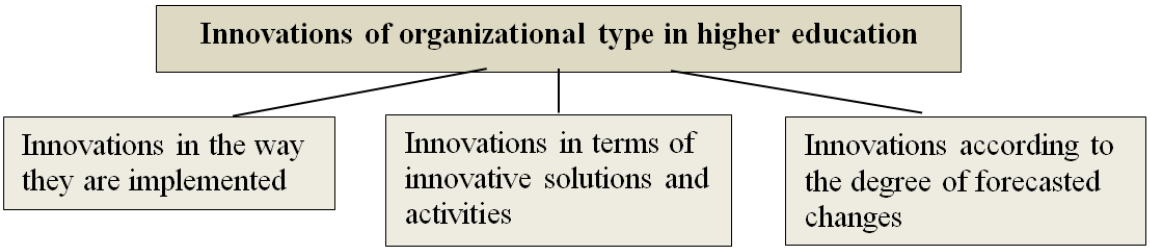

Fig. 2. Innovations of organizational type in the higher education system

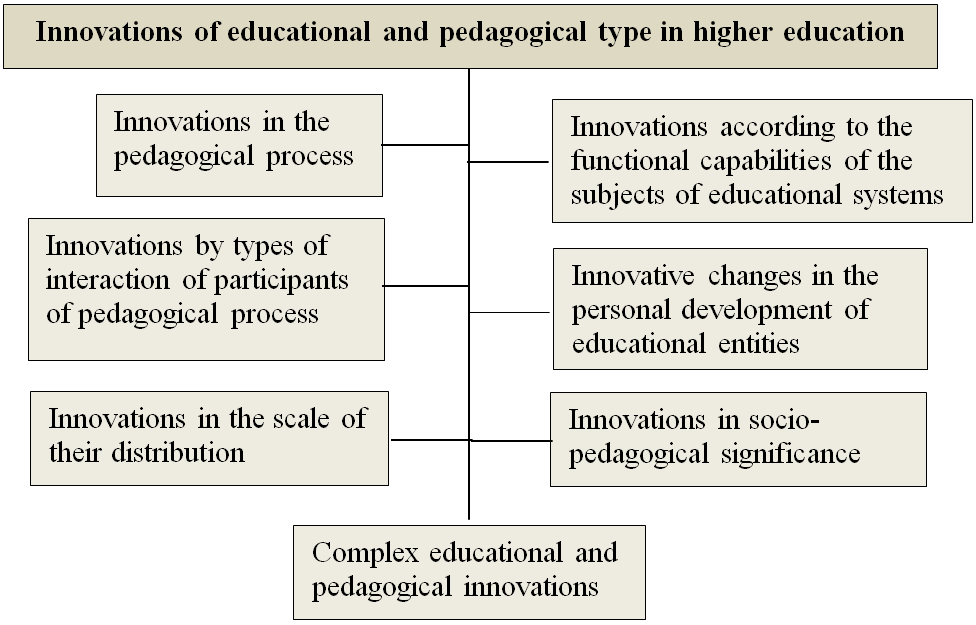

Fig. 3. Innovations of educational and pedagogical type in the system of higher education [26]

They cen be:

– innovations in the educational process, training course, in the field of education, at the level of the education system, in the management of the educational process (education), etc. (innovations in the pedagogical process);
– innovations in collective and group education, in individual types of education (under the guidance of a teacher), tutoring, alternative, family education, etc. (innovations by types of interaction of participants in the pedagogical process);
– innovations in the development of certain abilities of students, teachers, educators, namely: development and improvement of their knowledge, skills, abilities, competencies, etc. (innovative changes in the personal development of educational entities);
– innovations-conditions that ensure the renewal of the educational environment, socio-cultural conditions, etc.; innovations-educational products (pedagogical tools, projects, technologies, etc.); managerial innovations – new solutions in the structure of educational systems and management procedures that ensure their functioning (innovations in the functionality of the subjects of educational systems);

- innovations in the activities of one teacher, methodological association of teachers, at school, in a group of schools, in the region, at the state level, at the international level, etc. Innovations in the activity of one HEI teacher, faculty and of all HEI, all HEI of the region, state, at the level of the system of international higher education (innovations on the scale of their distribution);
- innovations that combine different types of pedagogical innovations in the education system and are innovations in educational institutions of a certain type, for specific professional and typological groups of teachers (innovations in socio-pedagogical significance);
- innovations that combine different types of pedagogical innovations in the education system (comprehensive educational and pedagogical innovations).

The authors defined that "***Innovations of structural and pedagogical type*** are innovations in the formation of goals, objectives, and content of education (teaching and education), in forms, methods, techniques, in learning technologies, in teaching aids, in the diagnostic system, in control, in the evaluation of results, etc. (innovations in the structural elements of educational systems).

Innovative information technologies, information and innovation management, as well as innovative marketing are widely used in the management of innovation in education and uniting in the group of means and tools for innovation management in education. They are *means and tools for innovation management in education* (Fig. 4).

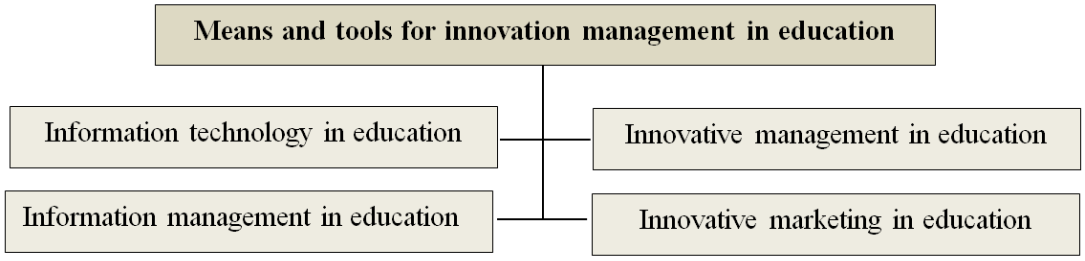

Fig.4. Means and tools for innovation management in education

They can take place in almost all types of the above pedagogical innovations in the education system, which can lead to innovative changes to achieve new quantitative and qualitative parameters of education.

Information technologies in education use computer technology, Internet and Intranet, remote methods of organization and management of educational activities, are used to develop a variety of information retrieval systems and information, advertising, and marketing materials (using web design).

Information management in education, based on the use of information technology, is a subsystem of decision-making and aims to manage the processes of creation, processing, and distribution of information in the field of education. One of the main functions of information management in the field of education is to develop an organizational structure that would provide timely and objective information in the right place, at the right time, and in a convenient way to make effective decisions. The introduction of information management in education is dictated by the following circumstances: scientific and technical development of society, integration and effective use of funds for development, application and effective use of information technology (set of information resources, tools, methods, and technologies that contribute to the effective management of educational activities). including – development and implementation of management decisions in the field of education); the need to integrate all the data that determine the efficiency and effectiveness of the education system as a whole and each of the educational entities (its components).

Innovative management in education is a system of strategic management of innovation processes in order to study the main directions of educational, scientific, technical, and industrial activities and justify a set of measures for the implementation of innovation strategy. Its tasks are:

a) development of plans and programs of innovative activities in the field of education;

b) development and implementation of a unified innovation policy in the field of education;

c) training of scientific and pedagogical specialists and providing all areas of educational activities;

d) providing educational activities with the necessary resources (material, labor, financial, information);

e) planning and selection of the best projects of educational innovations (innovations) and control over its development;

f) creation of special groups of management and control over innovation activities in the field of education at all stages.

Innovative marketing in education ensures the effectiveness of the educational system and educational institutions in the market of innovations in education, aimed at forming or identifying demand for educational services in order to best meet market demands and the needs of society. Innovative marketing is based on the use of new ideas for educational services and technologies that best contribute to achieving the goals of the education system and individual educational institutions.

Innovative marketing in education is a function of innovation management in education. It begins with the search for new ideas for educational services and technologies that can best meet existing and potential demand with their subsequent materialization and commercialization, and ends with the stage of saturating the life cycle of innovation. Carrying out marketing researches is necessary for the purpose: studying a conjuncture of the market of educational services; identification of inquiries, tastes, and preferences of consumers of educational services; forecasting the dynamics of demand for educational innovations; developing a marketing strategy for innovation in education, etc.

The purpose of innovative marketing in the field of education is to achieve the final practical result of innovation. It is focused on: gaining a certain market share of educational innovations in accordance with the long-term goal for which the innovative project was developed; integrating research, production, and marketing activities into the educational management system; the long-term perspective, which requires marketing research, obtaining on their basis innovations that ensure highly efficient economic activity in the field of education, adapting to the requirements of potential consumers of innovation in education with a simultaneous targeted impact on their interests.

Let us consider in more detail the content of innovations of the types discussed above, as well as some possible areas of practical innovation in higher education and science.

Innovations of scientific and technological progress. These may include:

a) use of information technologies in the process of innovation management of the education system (including – HEI as a subject of the higher education system): information and innovation management, as well as innovation marketing;

b) organization of distance learning – implementation of distance courses (disciplines, subjects from the curriculum), automated control of students' knowledge (testing), teleconferences and Internet conferences and seminars based on online information technologies, software platforms such as Blackboard, etc., use of local intranet communication systems, etc.;

c) use of information technology in the educational process: learning web design and the use of IT technology in professional activities, including e-business, automation of research and design, automation of decision-making and production processes, information technology in business, management, marketing, etc.;

d) organization of distance learning courses according to the scheme: invitation of foreign specialists – teachers of foreign HEI for teaching (reading) introductory (instructional) lectures → distance learning of the discipline (course) → remote 3-4 intermediate tests in the presence of a dean's representative → conducting the final exam according to the course (subject) - remotely, in

the presence of the dean (deputy dean) → remote assessment → enrollment (entry) of the assessment in the electronic record book (transcript) of the student;

e) the use of the latest methods and technologies in the implementation of universities and other HEI and research institutes of basic and applied research; search, comprehension, and dissemination of new knowledge; design and construction of new equipment; development and transfer of new advanced technologies; implementation of R&D results for local (local), regional and national socio-economic innovation development;

f) creation and launch of new spin-off and startup companies by research business universities.

Innovations in the structural elements of educational systems. The main purpose of such innovations is the training (education and upbringing) of a modern specialist of international level, who: is fluent in the national, state (Ukrainian) language, foreign languages – English and second (European or Eastern), Russian; has the necessary professional knowledge and skills; is able to use a computer, information technology, and software; is able to work in a team; has high moral and ethical principles and humanistic beliefs; focused on a healthy lifestyle and environmental behavior; patriotic and ready for integration into the international community.

The following new progressive tendencies in forms, methods, receptions, and technologies of training are important for improvement and increase of efficiency of experts training:

a) organization of included training – study abroad: study of courses according to the curricula of American or other foreign HEI, theoretical and practical (industrial) internship in foreign (abroad) and joint (with foreign and Ukrainian capital) companies, firms, corporations, financial institutions, enterprises;

b) organization of international theoretical and practical seminars for students, scientists, teachers, and staff on business management, the role of leadership in socio-political life, and economic activity of the world with the invitation of foreign experts;

c) invitation of specialists from foreign countries to deliver individual lectures, lecture series, and teach courses according to the curriculum in English or other languages.

The practice of combining different types of HEI in training, research and production complexes, and technology parks is also very important for the integration of scientific, pedagogical and logistical potential, and the introduction of innovations in education, science, and technology, development of new technologies, and new knowledge.

The authors also highlight innovations related to the pedagogical and educational processes.

Innovations in the pedagogical process. Such innovations include:

a) introduction of a system of credit-module training, intermediate (3-4 times during the semester) testing for each course (discipline) with the issuance of an integrated assessment for the entire passed (mastered) course (discipline); b) maintaining an electronic transcript (transcript) of each student, abandonment of the practice of *rearranging* unsatisfactory grades (scores) from exams (exams, tests, tests) with the right to re-listen to the course (discipline); c) organization of the educational process on the principles of interdisciplinarity and multidisciplinarity. This allows HEI students to plan their workload and time in such a way as to gain more useful knowledge, to choose at will those additional courses (disciplines) in which there is a need, to receive (if necessary) a related (second) profession (specialization).

Innovations by types of interaction of participants of the pedagogical process. The use of the latest information technologies, Internet and Intranet networks, distance learning systems in HEI lead to the reformatting of the division of students from academic study groups, courses (in their usual sense) into virtual temporary units (individual choice of students). Depending on the students' choice, they can study remotely or individually (individually) or in a group (collectively). You can study remotely both at HEI and at home.

Innovative changes in the personal development of educational entities. This type of innovation includes new forms and methods of testing the knowledge, skills, and abilities of pupils, students, teachers; continuous improvement of knowledge of HEI graduates, employees, and teachers through continuous training and professional development throughout life; organization of

systematic exchange of students and teachers between domestic and foreign HEI, as well as – exchange of HEI experience of different countries; invitations for teaching activities – lectures, seminars and workshops of famous scientists, specialists in various fields of economics, successful entrepreneurs; organization of theoretical and practical training of students in real conditions of economics, research and economic activity.

Innovations in the functionality of educational systems. Innovations-conditions that ensure the renewal of the educational environment, socio-cultural conditions, innovations-educational products, and management innovations may include:

a) organization of the educational process according to the curricula of leading HEI economically developed countries. From business – entrepreneurship, marketing, and management (including management in the field of international business) – primarily in the American BBA and MBA programs, as well as curricula and HEI programs of other countries (UK, Germany, France, Spain, Scandinavia countries, Benelux countries, etc.);

b) combining Ukrainian standard curricula with the curricula of leading foreign HEIs in order to integrate the best achievements of domestic and foreign higher education systems in a specific field of knowledge, science, and technology;

c) democratization of the educational process, providing students with greater opportunities for free choice of disciplines from the curriculum, expanding the list of disciplines of free choice of students and HEI in the curriculum;

d) involvement of student assets of HEI and the public in the process of improving the educational process and statutory activities of the institution.

Innovations in the scale of their distribution. It is desirable to innovate in the activities of each individual teacher of a particular educational institution, and all educational institutions: in the region, at the state level, at the international level (innovations and innovations in the activities of each HEI teacher, faculty, all HEI, all HEI region, state, at the level of the international higher education system).

Innovations in socio-pedagogical significance. Important at the present stage of globalization of the world economy and social globalization processes is the creation of innovative international temporary teams of teachers. This primarily applies to Ukrainian HEIs. Invitation of well-known specialists in various fields of knowledge, science, and technology will improve the quality of the educational process, encourage students to learn English (international language of business, science, and technology) and other foreign languages, allow them to communicate freely with colleagues from abroad, read foreign literature in the original, independently study the world's scientific and technological achievements.

The complex or *comprehensive educational and pedagogical innovations* that combine different types of pedagogical innovations in the education system include: creation of innovative educational institutions: virtual HEI; open HEI; international (joint) institutions, including – institutions of international education; creation of international education programs, based on a combination of foreign and domestic curricula and programs with teaching disciplines in both native, national language and foreign (English or other) language; creation of innovative educational programs based on interdisciplinary and multidisciplinary curricula, new information technologies, distance and open learning, individualization and intensification of learning.

Innovations in the way they are implemented. It is advisable to carry out planned, systematic, and periodic educational innovations, namely:

a) introduce new technologies, develop new and improve basic educational technologies, organize the educational process and research activities in HEI;

b) develop new forms, methods, and content of education, respond flexibly to the demands of social development, the market of educational services, the requirements of economics and production.

The following innovations are also important.

Innovations in terms of innovative solutions and activities. Innovations should take place both in individual departments of educational institutions and in educational institutions as a whole.

Innovations in public, municipal, and private HEIs contribute to the spread of innovations throughout the education system.

As for *innovations according to the degree of forecasted changes*, all types of innovations that lead to the further development of science and technology, the formation of a modern specialist of international level are necessary.

It is also worth emphasizing that these innovations can be of the following types:

a) radical (basic) innovations – revolutionary changes in the development of technology and society, the formation of new industries;

b) increasing, modifying innovations – improving the properties of existing equipment, technologies, and services.

From the above, we can conclude that "innovation in higher education is a process of creating, implementing and disseminating in the practice of higher education new ideas, tools, scientific, pedagogical, organizational and managerial and economic methods and technologies, which increase the achievement of structural components of the higher education system and its transition to a qualitatively higher level. This activity is aimed at building a knowledge society with an innovation-oriented type of economy and is related to formation and accumulation of new knowledge; use and commercialization of research and development results; transformation of scientific research and development, other scientific and technological achievements into new or improved products, technologies, services introduced to the market, into new or improved technological processes used in practice, or new approaches to social services; formation of intellectual and formation of human capital; the use of new tools, methods, and technologies to accelerate the economic growth of society.

From this point of view, innovative activities in the field of higher education, science, educational, scientific, and cultural services have a socio-economic essence, combines a set of organizational, economic, and social actions aimed at creating a knowledge society with the innovation-oriented type of economy. Such innovative activity is associated with the formation, capitalization, and commercialization of intellectual products – knowledge, technology, educational and scientific services, etc. and is one that should develop faster, contributing to real reform and renewal of education according to new requirements, demands, and challenges of society and time. One of its most important components is the innovative activity of entrepreneurial universities, which is essentially "academic" or university entrepreneurship, characteristic of the new capitalist environment – "academic capitalism".

Information technologies and information management in higher education and science are the most important components of means and tools for innovation management in education. It is the distance learning methods and online learning technologies implemented with the help of the Internet that allowed all of humanity to maintain the possibility of communication and created the conditions for communication during pandemics. Specialists of the higher education system, science and engineers, and technologists in a short time created and implemented innovative methods of online communication and online management, which saved the world economy and helped the world community to overcome the problems caused by global changes, emergency and force majeure circumstances, and recover.

The authors determined that ***"Innovations of economic and market type*** (Fig. 5) united novations caused by the scientific, technical, industrial, and economic development of society and the spread of market economic relations in all areas of socio-economic activity of mankind, the commercialization of educational and scientific and technical activities of HEI and all higher education (innovations of economic and industrial development, depending on market requirements)" [26].

Economic and market innovations include such innovations that allow to reduce the budget funding for higher education and science to obtain the necessary resources not only for survival but also for the prosperity of HEI. They are:

1. New forms and types of financing of education and crediting of educational services, educational institutions of various types, statutory (including – educational, R&D, technological and

cultural) activity of educational institutions; diversification of funding sources; formation of various funds, grants, endowment institute, etc.

2. Commercialization of educational results (contract forms of education, educational, consulting, expert, and other services), scientific and scientific-technical activities (R&D, transfer of technology) HEI, obtaining additional financial income from extracurricular activities (lease of property, organization of mass activities for local and regional communities, etc.).

3. Participation of HEI in innovative socio-economic local, regional and national development, opening of new directions of business activity, enterprises, and spheres of industry.

4. Close cooperation with industry and business: joint implementation of R&D, targeted training, opening and supporting joint ventures, joint participation in joint-stock companies.

5. Active participation of HEI in business development; education, training and preparation of entrepreneurs of different types and leaders for industry and social sphere; developing and lobbying the necessary regulations for the development and support of entrepreneurship; promoting the competitiveness of the country's industrial and economic potential.

6. Development of academic (university) entrepreneurship - commercialization of R&D results, receipt of financial income from licensing and patent activities, as well as shareholder dividendsfrom the activities of startup (spin-off and spin-out) companies.

7. Active participation of HEI in competition with other HEIs, improvement of own image, quality of educational and scientific services, access to foreign educational markets, wide internationalization of educational and scientific activity, use of international educational standards, etc.

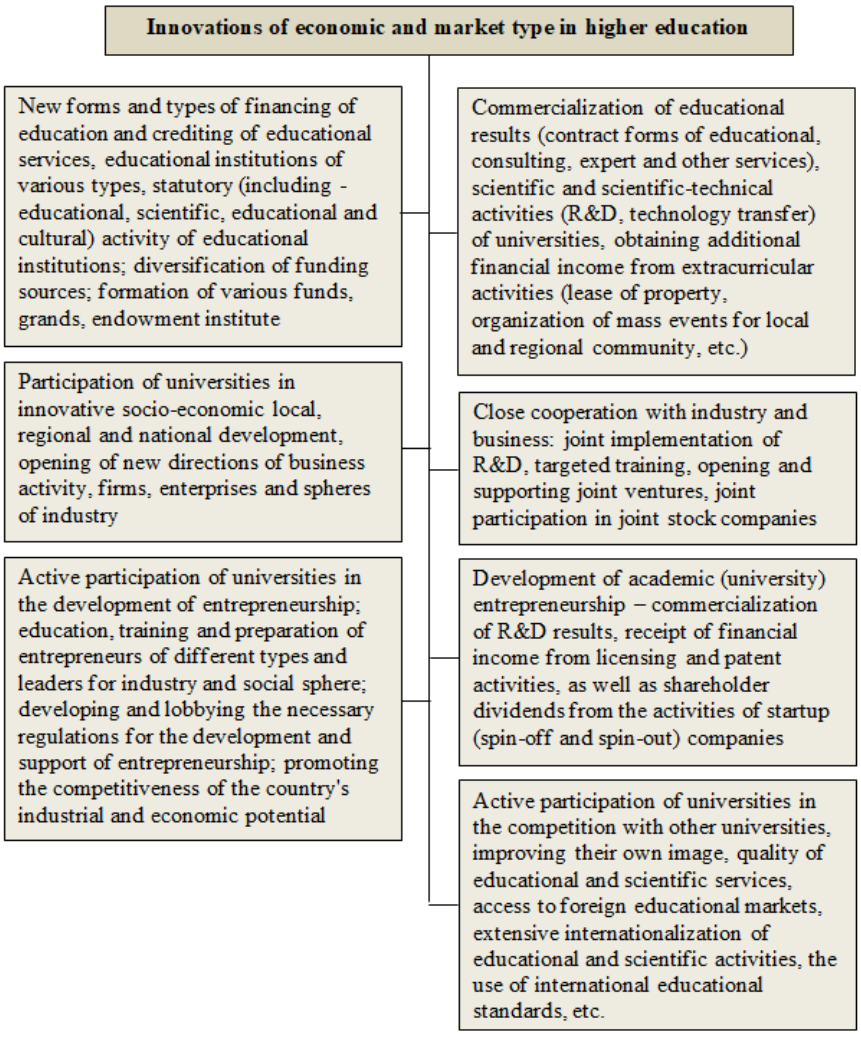

Fig. 5. Innovations of economic and market type in higher education

Note that innovations in economic and industrial development, dependent on market requirements, are the most painful, debatable, and unacceptable for a significant number of educators and scientists. The intrusion of market mechanisms into the academic sphere contradicts in many respects the notion of "pure science and education", which are independent of financial interventions and financial pressure. However, it is also clear that in the context of total commercialization of all spheres of human life, global financial crises, and the constant reduction of funding for science and education (and especially higher education), the question of "to be or not to be" really faces a significant number of HEIs and research institutions, and also a large number of educators and scientists in all countries of the world. In those countries where education and science are supported, the necessary conditions have already been created for their civilized alternative financial support.

It is necessary to mark that study of issues as *higher education innovations of protecting life on the Earth (environmental, resource-saving and alternative fuels, food supply, health protection, population control and others)* and *new types of innovation in higher education and science caused by global changes, emergency and force majeure circumstances* are wery important not for educators and university sciencists but also for all population of the world.

8. CONCLUSIONS AND PERSPECTIVES FOR FURTHER RESEARCH

The innovative development of higher education is critical. The main scientific results of the authors are the proposed main types of innovations and the classification of both theoretical and practical significance for the development of domestic science and higher education. Summing up the results of a comprehensive study of innovation in university education as a factor in the sustainable development of society, it should be noted that innovation in higher education is a complex interdisciplinary scientific field that is directly applied in the field of knowledge and economic activity.

It is necessary to stress that university innovations are the result of the development of academic capitalism and studies mainly both its market innovation processes spreading to the sphere of higher education and their impact on the socio-economic sphere of society.

For further research, it is proposed to deepen the study of the possible impact of innovative development of higher education on the social and public sectors of society, including the use of smart business for health protaction, Also, to investigate and share the results of:

1) Higher education innovations of protecting life on the Earth (environmental, resource-saving and alternative fuels, food supply, health protection, population control and others)

2) New types of innovation in higher education and science caused by global changes, emergency and force majeure circumstances

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 (IFIF), March 4, 2019. URL: https://itif.org/publications/2019/03/04/bayh-dole-acts-vital-importance-us-life-sciences-innovation-system#:~:text=The%20Bayh%2DDole%20Act%2C%20signed,used%20to%20control%20drug%20prices .

[2] Altbach, F. The complex roles of universities in the period of globalization. Higher Education in the World 3, January 2008, pp. 5–14. URL: https://www.researchgate.net/publication/ 277128834 _The_complex_roles_of_universities_in_the_period_of_globalization/stats .

[3] Romanovskyi, O., & Romanovska, Yu. Higher educational innovatics as the newest interdisciplinaryvdirecton of higher school and higher education science. Interdisciplinary Studies of Complex Systems, 2020, Is. 17(2020), pp. 83–101. URL: https://doi.org/10.31392/iscs.2020.17.083 .

[4] Etzkowitz, H. Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. Social Science Information, 2003, Vol. 42, Is. 3, pp. 293-337. URL: https://www.researchgate.net/publication/249733214_Innovation_in_Innovation_The_Triple_Helix_of_University-Industry-Government_Relations .

[5] Etzkowitz, H. The Triple Helix: University-Industry-Government Innovation in Action. New York & London: Routledge, Taylor & Francis Group, 2008, 164 p.

[6] Etzkowitz, H. Is Silicon Valley a global model or unique anomaly? Industry and Higher Education, 2019, Vol 33, Is. (2), pp. 83-95. URL: https://doi.org/10.1177/095042221881773 .
[7] Viale, R., & Etzkowitz, H. The Capitalization of Knowledge. A Triple Helix of University–Industry–Government. Edward Elgar Publishing, 2010, 368 p.
[8] Dzisah, J., & Etzkowitz, H. The Age of Knowledge: The Dynamics of Universities, Science and Societies. Leiden-Boston, Brill, 2012, 360 p.
[9] Cadorin, E., Klofsten,M., Albahari, A., & Etzkowitz, H. Science Parks and the Attraction of Talents: Activities and Challenges / Eduardo Cadorin, Magnus Klofsten, Alberto Albahari, Henry Etzkowitz // Triple Helix Journal, September 2019, Pp.: 1-33. URL: https://www.researchgate.net/ publication/ 336278817_Science_Parks_and_the_Attraction_of_Talents_Activities_and_Challenges .
[10] Clark, B.R. Creating Entrepreneurial Universities: Organizational Pathways of Transformations. Oxford, Pergamon-Elsevier Science, 1998, 180 p.
[11] Clark, B.R. Collegial Entrepreneurialism in Proactive Universities: Lessons from Europe. Change: The Magazine of Higher Learning, 2000. Vol. 32, Is. 1, pp. 10-19. URL: https://www. tandfonline.com/doi/abs/10.1080/00091380009602704 .
[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 p.
[13] Romanovskyi, O. O., Romanovska, Y. Y., Romanovska, O. O., & Makhdi, M. E. Higher education innovatics: management of innovation in the sphere of higher education and science. Journal of Social Transformation and Education, 2021, Vol. 2, Is. 2, pp. 47-76. URL: https://doi.org/10.54480/ jste. v2i2.37 .
[14] Blass, E., & Hayward, P. Innovation in education; will there be a role for "the academe/university" in 2025? European Journal of Futures Research, Decembe 2014, Vol. 2, Is. 1, 9 p. URL: DOI: 10.1007/s40309-014-0041-x.
[15] Swanger, D. Innovation in Higher Education: Can Colleges Really Change? Fulton-Montgomery Community College, NY, 2016, 58 p. URL:
[16] https://www.fmcc.edu/about/files/2016/06/Innovation-in-Higher-Education.pdf .
[17] OECD Innovating Education and Educating for Innovation: The Power of Digital Technologies and Skills, OECD Publishing, Paris, 2016, 150 p. URL: http://www.oecd.org/education/ceri/GEIS2016-Background-document.pdf .
[18] Serdyukov, P. Innovation in education: what works, what doesn't, and what to do about it? Journal of Research in Innovative Teaching & Learning, 2017, Vol. 10, Is. 1, pp. 4-33. URL: https://www. emerald.com/insight/content/doi/10.1108/JRIT-10-2016-0007/full/pdf?title=innovation-in-education-what-works-what-doesnt-and-what-to-do-about-it .
[19] Jakovljevic, M. A model for innovation in higher education. South African Journal of Higher Education, 2018. Vol. 32, Is. 4, pp. 109-131. URL: https://www.journals.ac.za/index. php/sajhe /article/view/2432.
[20] Branch, J., Hørsted, A., & Nygaard, C. New Innovations in Teaching and Learning in Higher Education (Learning in Higher Education series). Libri Publishing, 2018, 480 p.
[21] Teixeira, P.N., & Shin, J.C. The International Encyclopedia of Higher Education Systems and Institutions, 2020. URL: https://doi.org/10.1007/978-94-017-8905-9 .
[22] Stoten, D.W. Educating for future complexities in management – a vision for the future MBA. Innovative Practice in Higher Education, 2021, Vol. 4, Is. 2, pp. 153-179
[23] Mayhew, M.J, Selznick, B., Zhang, L., Barnes, A., & Mangia, S. Teaching Innovation Capacities in Undergraduate Leadership Courses: The Influence of a Short-Term Pedagogical Intervention. The Journal of Higher Education, 2021, Vol. 92, Is. 6. URL. https:// doi.org/ 10.1080/ 00221546.2021. 1876480 .
[24] Grajek, S. How Colleges and Universities Are Driving to Digital Transformation Today / by Susan Grajek, EDUCAUSE Review Special Report (January 27, 2020) URL: https://er.educause. edu/articles/2020/1/how-colleges-and-universities-are-driving-to-digital-transformation-today .
[25] Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. The Difference Between Emergency Remote Teaching and Online Learning. EDUCAUSE Review. March 27, 2020. URL: https:// er.educause.edu/articles/2020/3/the-difference-between-emergency-remote-teaching-and-online-learning .
[26] Copridge, K.W., Uttamchandani, S., & Birdwell, T. (2021) Faculty Reflections of Pedagogical Transformation in Active Learning Classrooms. Innovative Higher Education, 2021, Vol. 46, Is. 2, pp. 205-221. URL: https://link.springer.com/article/10.1007/s10755-021-09544-y .
[27] Romanovskii, A. Types and features of the innovations in the system of higher education The Kazakh-American Free University Academic Journal, 2012, Vol. 4, pp. 43-57. URL: http://www.kafu-academic-journal.info/journal/4/ .

ТИПИ ІННОВАЦІЙ У СФЕРІ ВИЩОЇ ОСВІТИ

Романовський Олександр Олексійович
доктор економічних наук, доктор педагогічних наук, професор,
ректор Українсько-американського університету Конкордія,
м. Київ, Україна
ORCID ID: 0000-0002-3618-2999
oleksandr.romanovskyi@uacu.edu.ua

Романовська Юлія Юріївна
кандидат філологічних наук, професор, професор кафедри англійської філології,
Національний педагогічний університет імені М. П. Драгоманова,
м. Київ, Україна
ORCID ID: 0000-0002-0207-3348
yuliia.romanovska@uacu.edu.ua

Романовська Олександра Олександрівна
кандидат педагогічних наук, доцент, проректор,
Українсько-американський університет Конкордія,
м. Київ, Україна
ORCID ID: 0000-0003-3614-544X
oleksandra.romanovska@uacu.edu.ua

Ель Махді Мохамед
магістр інноваційної діяльності, керівник проектів,
Українсько-американський університет Конкордія,
м. Київ, Україна
ORCID ID: 0000-0002-2963-3931
momodeluxe@hotmail.com

Анотація. Робота присвячена дослідженню основних типів інновацій у сфері вищої освіти.
Розглянуто наступні види інновацій: інновації технологічного та організаційного типу; інновації навчально-педагогічного типу; інновації структурно-педагогічного типу; інновації економіко-ринкового типу. Також проаналізовано інноваційні інформаційні технології, інформаційно-інноваційний менеджмент, а також інноваційний маркетинг широко використовуються в управлінні інноваційною діяльністю в освіті. Вони об'єднані в групу засобів та інструментів управління інноваційною діяльністю в освіті. Вони можуть виникати майже у всіх типах інновацій у системі освіти, які можуть призвести до інноваційних змін для досягнення нових кількісних та якісних параметрів освіти. Проведений у статті аналіз деяких типів інновацій у системі вищої освіти показує, що вони можуть призвести до інноваційних змін. Це інновації організаційного типу у сфері вищої освіти; освітньо-педагогічні інновації в системі вищої освіти; засоби та інструменти управління інноваційною діяльністю в освіті; інновації для вирішення проблем вимушеного чи екстреного дистанційного навчання тощо.
Також важливими є інновації у вищій освіті, пов'язані із захистом життя на Землі (екологічні, ресурсозберігаючі та з альтернативних видів палива, з продовольчої безпеки, охорони здоров'я, контролю за чиседбністю населення тощо), а також нові типи інновацій у вищій освіті та науці. викликані глобальними змінами, надзвичайними та форс-мажорними обставинами.
Автори стверджують, що перспектива побудови суспільства знань з інноваційно-орієнтованим типом економіки в будь-якій країні вимагає глибокого реформування гуманітарної сфери національної економіки, інноваційного розвитку системи вищої освіти, науки і науково-технічної діяльності. Це має відбуватися на основі розумного поєднання кращого зарубіжного досвіду з національними традиціями.
Результати дослідження можуть бути корисними як для фахівців у сфері вищої освіти та науки, так і для студентів, аспірантів, науковців у сфері інноваційної діяльності та інноваційного розвитку.

Ключові слова: інновації у вищій освіті; інновації технологічного та організаційного типу; інновації навчально-педагогічного типу; інновації структурно-педагогічного типу; інновації економіко-ринкового типу; інноваційні інформаційні технології, інформаційно-інноваційний менеджмент; інноваційний маркетинг.