

ACADEMIC CAPITALISM AS A DRIVER OF TRANSFORMATIONAL CHANGE IN THE COMPLEX SYSTEM OF HIGHER EDUCATION AND SCIENCE

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Abstract. The purpose of the work is to study the complex essence of higher education as an integral part of the anthroposphere (technosphere); to define the main fundamental tasks of innovative academic (university) entrepreneurship; to study the main types of innovations initiated by academic capitalism in the higher education system, which can lead to innovative changes and its classification; to determine 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; to study the types of innovations in the higher education system. Innovative transformations in the sphere of higher education and science are considered by the authors as objectively conditioned transformational changes caused by the environment of academic capitalism. The core of the study is academic or university entrepreneurship based on the market relations spread by academic capitalism in the sphere of scientific and educational activities of universities, research institutes and other institutions and organizations of this field. An important basis of scientific work is the application to national conditions of the Triple helix model of innovation of N. Etzkowitz on the innovative development of society. Scientific novelty consists of the following: the world experience of innovative transformations in the sphere of higher education and science occurring under conditions of academic capitalism is studied; theoretical data for new approaches in understanding of innovative transformations in the sphere of higher education and science which are economic categories and occur under market laws are formulated and offered; new approaches for further innovative reformation of higher education and science under conditions of academic capitalism are offered. 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, the types of innovations initiated by academic capitalism in higher education that can lead to innovative changes, and their classification of both theoretical and practical importance for the development of domestic science and higher education are proposed. The main objects of innovative activity in the sphere of higher education and science, the corresponding directions of further innovative development of higher education in Ukraine, as well as the types of innovations in higher education that can lead to innovative changes are also defined.

Key words: academic capitalism, entrepreneurial university, innovations, higher education and science, technosphere.

JEL Classification: I21, I25

1. Introduction

The environment of academic capitalism, which covers virtually the entire sphere of science and higher education, has had both positive and negative effects on them. Academic capitalism has sharply

accelerated the commercialization of applied research and development results of universities and research institutes and has allowed these organizations and institutions to significantly capitalize their intellectual capital. This has given rise to progressive innovations

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and outstanding inventions. For example, there is an intensive innovative development in the higher education system, which can certainly be attributed to the positive influence of academic capitalism on the development of the material, technical, scientific and engineering potential of universities and colleges. On the other hand, the pursuit of 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 decrease 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 fundamental knowledge and inhibits the intellectual development of society and leads to a legitimate criticism of the influence of academic capitalism on science and higher education. The excessive entrepreneurial activity of universities in the direction of profits from the development and commercialization of applied research instead of pure science and fundamental 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 institutes) that continue to conduct the kind of basic research that is difficult to commercialize, but which constitutes true "scientific knowledge", or in other words, human knowledge.

This article analyzes innovative changes in the system of higher education and science, an integral part of the anthroposphere (technosphere), caused by the spread of academic capitalism. Possible directions and essence of innovative transformations in the sphere of higher education and science are investigated, and the negative influence of academic capitalism on this sphere of public activity is analyzed.

The relevance of the topic is related to the need to implement innovative transformations in the system of higher education and science to improve its level, as well as for efficiency and further integration into the European and world system of higher education and science.

On the basis of study and analysis of the theory and practice of innovative development of higher education and science systems of the leading countries in the world it is necessary to develop principles, directions and objectives for innovative development of higher education and science in Ukraine to create and implement national programs of change in this field.

2. Analysis of the main results of previous research and used literature (core sources) on the topic of work

The period of "academic capitalism", caused by the commercialization of the results of budgetary and many other types of university research, began after

World War II. The impetus for the rapid development of entrepreneurship in science and education came from one of the best pieces of U.S. legislation, the Bayh-Dole Act, commonly known as the Patent and Trademark Law Amendments Act (a federal law enacted in 1980). As S. Ezell points out, this law "allows universities, nonprofit research institutions, and small businesses to own, patent, and commercialize inventions developed as part of federally funded research programs in their organizations" (Ezell, 2019). This was the beginning of the rapid development of applied research, the results of which could be turned into new developments and technologies for further commercialization. Historically, academic capitalism emerged in the United States as a particular intellectual subtype (milieu) of the capitalist system. It is characterized by the extension of the laws and rules of the market economy to higher education and science. Previously, higher education and science belonged to the non-profit sphere of intellectual activity and were designed to find, generate and disseminate knowledge for the benefit of all mankind. Higher education institutions (HEIs) and scientific institutions (SIs) were transformed from "temples of knowledge" into participants in the market of educational and scientific services with its inherent strict economic rules.

The definition of "academic capitalism" was introduced in 1997 by S. Slaughter and L. Leslie (Slaughter, Leslie, 1997), who offered the following interpretation: "To maintain or expand resources, educators increasingly have to compete for outside money that comes from market research, variously called applied, commercial, strategic, and targeted research, whether that money came in the form of research grants and contracts, service contracts, partnerships with industry and government, technology transfer, or attracting more and more students paying higher fees. It is what the institutional and professorial market or market-like efforts to attract outside money that we have termed academic capitalism" (p. 17).

In their books S. Slaughter and Leslie (Slaughter, Leslie, 1997), S. Slaughter and G. Rhoades (Slaughter, Rhoades, 2009) state the following: "Innovative transformations in universities under the influence of the spread of market relations in the humanities spheres of society and the emergence in the second half of the twentieth century of a new type of capitalist relations in scientific, intellectual, technological and educational spheres – academic capitalism. In addition, there is a real opportunity to commercialize the results of R&D, which leads to the rapid development of the university and academic science and technology".

Market relations in science and education, the ability to commercialize the results of intellectual activities of universities and research organizations have led to the spread of academic or university entrepreneurship and

the accelerated formation of a favorable innovation climate, that is, the accelerated emergence of innovation and its wide spread in many areas of society. The contribution of innovations developed and implemented by universities and research organizations, for example, to the U.S. economy brought billions of dollars and 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 higher education and science into an environment of academic innovation. Universities and scientific organizations were transformed from "temples of science" into academic innovation entrepreneurial institutions.

It is known that J. Schumpeter was the first to develop a complete description of innovation processes (he analyzed "new combinations" of changes in the development of economic systems). Referring to J. Schumpeter's book (Schumpeter, 1934), J. Fagerberg (Fagerberg, 2008) emphasizes as follows: "First of all, he added the definition of innovation (or "development" as he originally formulated it) as new combinations of new or existing knowledge, resources, equipment and so on. Second, he pointed out that innovation must be distinguished from invention. The reason Schumpeter emphasized this distinction is that he viewed innovation as a specific social activity (function) carried out in the economic sphere and having a commercial purpose, while inventions can be carried out everywhere and without the intention of commercialization. Thus, for Schumpeter, innovation is new combinations of knowledge, resources, etc. that are attempted (or put into practice) for commercialization. He called this *combinatorial activity the entrepreneurial function*, and the social agents who perform this function the *entrepreneurs*" (Fagerberg, 2008). Later, J. Schumpeter (Schumpeter, 1976) and H. Mensch (Mensch, 1979) introduced the term "innovation", which was defined as the embodiment of scientific discovery in a new technology or product.

There are many publications devoted both to the problems of academic capitalism and to 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 have conducted a long-term study of the best practices of innovative activities of institutions and organizations in the sphere of higher education and science in developed countries. As a result, a new interdisciplinary scientific and applied direction "innovatics of higher education"

was brought to public discussion by O. Romanovskyi & Yu. Romanovska (Romanovskyi O., Romanovska Yu., 2020; Romanovskyi O., Romanovska Yu., Romanovska O., Makhdi M.E., 2021).

In this paper, the authors offer further development and specification of theoretical and practical provisions of innovative development of higher education, identifying the unique features and functions of higher education in modern society under conditions of academic capitalism.

The authors believe that the findings and recommendations of this study are useful for specialists in higher education and science systems in developed countries, as well as in developing countries.

A background report prepared for the second Global Education Industry Summit, held September 26-27, 2016 in Jerusalem, states the following: "Reviews 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 industry in the innovation process, using OECD survey data" (OECD, 2016). "A better understanding of the education industry, including its market structures and innovation processes, will help create a more developed relationship with the education sector. Innovation in the industry which develops products and services that can drive innovation in schools does not happen in isolation from what happens in the education sector. Only when education systems develop an innovation-friendly culture, supported by an innovation-friendly business environment and policies, will industries begin to engage in risky research and development. Governments can support this by fostering a climate of entrepreneurship and innovation in education" (p. 10). In addition, the report emphasizes that: "Innovation in the public sector, and in education in particular, can be a major contributor to significant welfare gains. Governments provide a large number of services in OECD countries, and these services account for a significant share of national income" (p. 13).

Important theoretical studies, as well as practical recommendations and original methodology in the field of creating innovative entrepreneurial universities were carried out by the pioneer in this field Burton R. Clark (Clark, 1998, 2000, 2004). Theoretical and practical approaches to the problems of innovative development of society under the "triple helix model" proposed by Henry Etzkowitz (Etzkowitz, 2003, 2008, 2019), Viale and Etzkowitz (Viale, Etzkowitz, 2010), Dzisah and Etzkowitz (Dzisah, Etzkowitz, 2012), Cadarin et. al. (Cadarin, Klofsten, Albahari, Etzkowitz, 2019), became the fundamental directions of innovative university entrepreneurship development, which significantly increased the role of universities in the innovative development of society.

3. Analysis of recent studies and publications

Considering the *latest publications* in the scientific literature, it should be noted that an article by S. Graek (Grajek, 2020) explores how universities are rapidly moving towards digital transformation.

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

In "On Academic Capitalism", B. Jessop highlights the following: "The growing trend toward academic capitalism and profit-oriented entrepreneurial practices in education and research discussed in the paper. This is happening as universities, in different ways and subject to more or less financial, administrative, and ideological pressure, behave less and less like centers of disinterested education and research and more like economic enterprises that seek to maximize their income and/or increase the economic competitiveness of the environment in which they operate". (Jessop, 2018).

The article of P. Somers et. al. (Somers, Davis, Fry, Jasinski, Lee, 2018) defines "Academic capitalism and a review of the research literature, presents perspectives on academic capitalism in the Americas, and discusses the implications of academic capitalism for Latin America. Estimates of the usefulness of academic capitalism for Brazil are given" (Somers, Davis, Fry, Jasinski, Lee, 2018).

In the following article (Sigahi, T.F.A.C., Saltorato, 2020), the authors conducted a systematic review of the literature on academic capitalism and proposed two classification schemes based on: a) analytical levels (macrostructural, organizational, individual) and actors; b) themes and contributions, research and reflection, building a theoretical framework, research themes and applications, emerging trends. This study can help not only to explore the characteristics of academic capitalism, but also to understand several ways in which neoliberal restructuring in universities.

In his work, R. Münch describes the most important features of academic capitalism and their impact on science as well as on the evolution of scientific knowledge, and notes that "academic capitalism is at the intersection of research, economic profit maximization, and innovation policy", and examines the institutional conflicts of interest associated with corporate funding of research. 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 businesses competing for capital accumulation and businesses into knowledge producers seeking discoveries that can be turned into patents and profitable goods" (Münch, 2020).

The report "Structure of European Educational Systems 2020/21" provides information about the structure of the pan-European educational

systems, from pre-school to higher education, for the academic year 2020/21. It includes national charts and a guideline for reading the charts. It also includes a map illustrating the main organizational models for primary and lower secondary education in Europe: "unified structured education", "provision of a common core curriculum", and "differentiated lower secondary education". Information is available for 43 European education systems, covering 38 countries participating in the EU Erasmus+ program. The content of the report corresponds to the mission of the Eurydice Network (to understand and explain how the different education systems in Europe are organized and how they work) (The structure of the European education systems 2020/21).

The work (Cai, Ma, Chen, 2020) considers higher education as an "engine" of innovation and a "catalyst" of sustainability development. The integration of the roles of "innovation engine" and "sustainability catalyst" is best reflected in the participation of higher education in innovation ecosystems. The theme of this special edition examines this topic from a variety of perspectives. This paper outlines a general concept of the relationship between higher education and the innovation ecosystem. A new definition of the innovation ecosystem is given and the three roles of universities in innovation ecosystems are identified based on a synthesis of relevant literature.

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

Scientific novelty lies in the following: the authors have studied the world experience of innovative transformations in higher education and science occurring under conditions of academic capitalism; formulated and proposed theoretical data for new approaches in understanding of innovative transformations in higher education and science, which are economic categories and occur under the laws of the market; proposed new approaches for further innovative reform of higher education and science in conditions of academic capitalism. A new scientific term of "innovatics of higher education" has been put into circulation.

This study will use **research methods** such as: *dialectical* approach to analyze and comprehend 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 connections of the integral economic system of 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. **Research methodology** included *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 innovation, analysis of their effectiveness and the possibility of spread and implementation on objects and subjects of higher education, predicting ways of forming new innovative approaches, methods and technologies.

4. Presentation of the main research material

Undoubtedly, the well-being of the members of a society depends on the level of development of higher education and science in that society. At the same time, higher education and science, as integral interrelated components of human intelligence and the academic freedom of society, stimulate both mutual development and the development of all humanity. Since higher education also creates human capital and forms human resources, the development of higher education should be continuous, effective and innovative. Thus, the unique characteristics of higher education as an integral part of the anthroposphere (technosphere) can be formulated as follows (Figure 1).



Figure 1. Unique characteristics of higher education

The **novelty** of the work lies in the fact that the innovative changes in the system of higher education and science are investigated from the perspective of market-oriented transformation, covering all areas of the main actors of this system, namely universities and research institutes. The paper emphasizes that it is under the influence of market economic relations under academic capitalism that all changes in the system of higher education and science, including traditional, creative, scientific, educational, cultural and arts functions, take place.

Further consider the types of such innovations in the higher education system that can lead to innovative change, and classify them. Most of them are directly or indirectly initiated by academic capitalism.

Innovations in higher education and science can lead to innovative changes of the following types: economic and market, technological, organizational, structural and pedagogical, educational, moral and environmental, cultural and artistic, other innovations caused by global changes, extraordinary and force majeure circumstances. In the context of academic capitalism, the function of academic or university entrepreneurship, which entrepreneurial universities as well as entrepreneurially oriented research institutes perform, is extremely important.

The main task of innovative development of higher education in any country is to create the necessary conditions for purposeful business, scientific, educational, engineering and technological activities aimed at the formation of knowledge society with innovation-oriented type of state economy. Further, in Figure 2, the authors identified and presented the fundamental objectives of innovative academic (university) entrepreneurship.

The main objects of innovative activity in the field of higher education and science are presented by the authors of this study in Figure 3.

The authors defined that the subjects of innovative activity in the sphere of higher education and science are private individuals or legal entities (universities, SI, structural units of education and science, etc.), which carry out innovative activities, attract property and intellectual values, as well as invest their own or borrowed funds in the implementation of innovative socio-economic, social and humanitarian activities in the sphere of national projects.

In this study it is considered necessary to define the directions of further innovative development of higher education and science in Ukraine and, possibly, in other developing countries. These directions of further innovative development of higher education and science may be as follows (Figure 4):

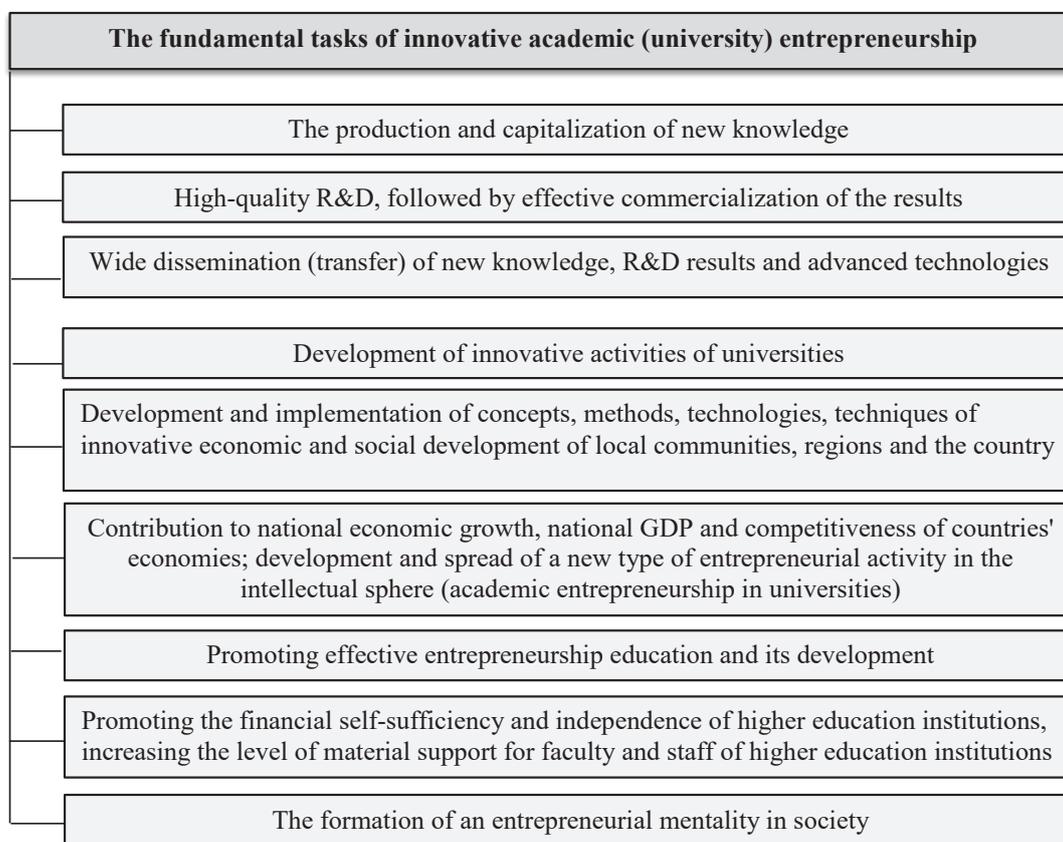


Figure 2. The main fundamental tasks of innovative academic (university) entrepreneurship

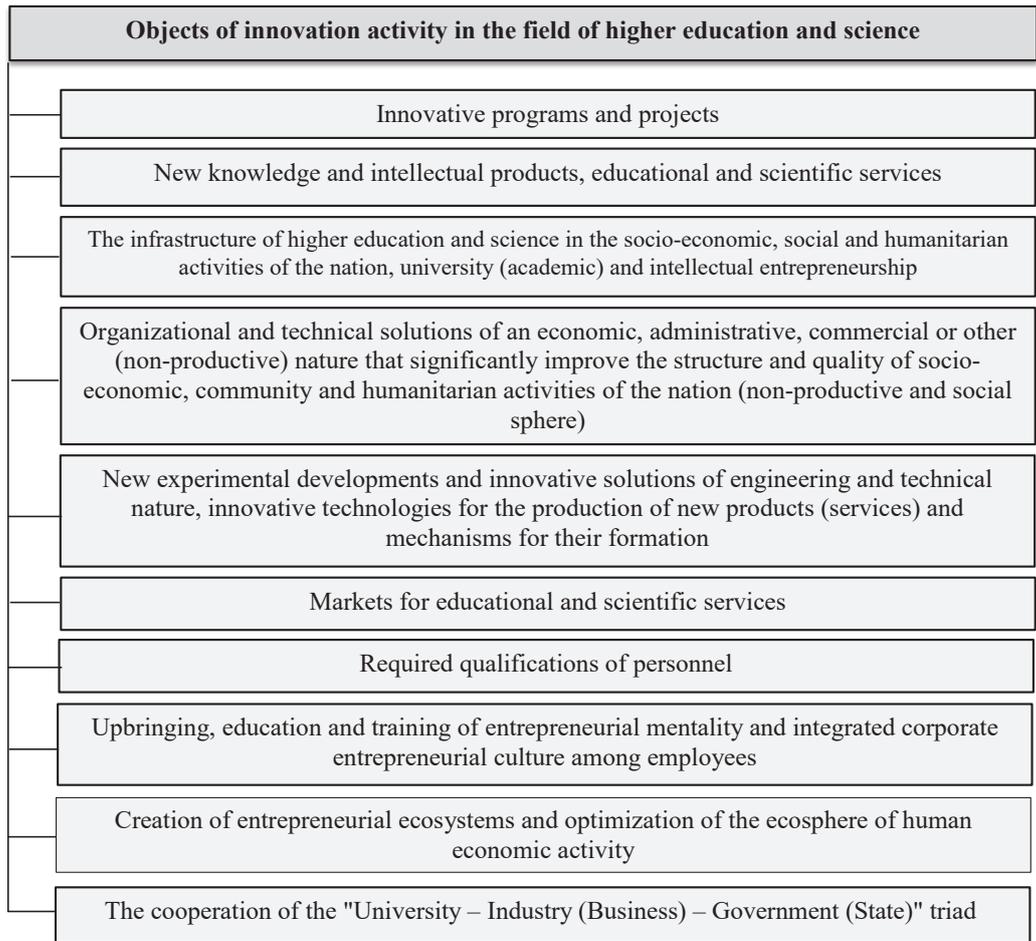


Figure 3. The main objects of innovative activity in the sphere of higher education and science



Figure 4. Recommended directions for further innovative development of higher education in Ukraine and other developing countries

The authors consider academic capitalism, defined in seminal studies by Slaughter and Leslie (Slaughter, Leslie, 1997), Slaughter and Rhoades (Slaughter, Rhoades, 2009), as well as university entrepreneurship (by Burton R. Clark (Clark, 1998, 2000, 2004) and Henry Etzkowitz (Etzkowitz, 2003, 2008, 2019), as economic categories with its own characteristics related to the capitalization and commercialization of intellectual products, such as new knowledge, technology, teaching methods.

It is also considered necessary to study, summarize the experience and describe the theoretical foundations and practical provisions of innovative activity in higher education on the basis of already known innovative activity in this area. It is expedient to allocate theoretical bases and practical provisions of innovative activity in the sphere of 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, a new scientific direction in higher education the innovatics of higher education includes a number of innovative changes in the following types of activities inherent in higher education: 1) teaching,

training, learning, studying; 2) scientific and R&D activities, new technologies development, construction and design creativity; 3) engineering, technical, informational activities; 4) financial and economic support of the educational process and R&D, operating and business expenses, development and expansion of activities; 5) inventive and patent-licensing activities, technology transfer; 6) academic (university) entrepreneurship; 7) cultural and moral development, upbringing of human values; 8) education of honesty, justice and peacefulness; 9) tolerance, mercy, charity and compassion; 10) sports, recreational, festive and extracurricular activities, and other types of activities of universities, colleges and other institutions related to higher education.

Thus, innovatics of higher education (as a set of innovations in the whole sphere of higher education) includes innovative changes in almost all areas of higher education to improve and enhance the quality of professionally prepared for today's community of responsible citizens and university development. They can be useful for the reform of the national system of higher education and for the development of new scientific directions in higher education.

The foundations and concepts of innovatics of higher education were researched and developed on the basis of general theories of innovative activity in other spheres of human activity. Innovatics of higher education should comprehensively promote the activities shown in Figure 5.

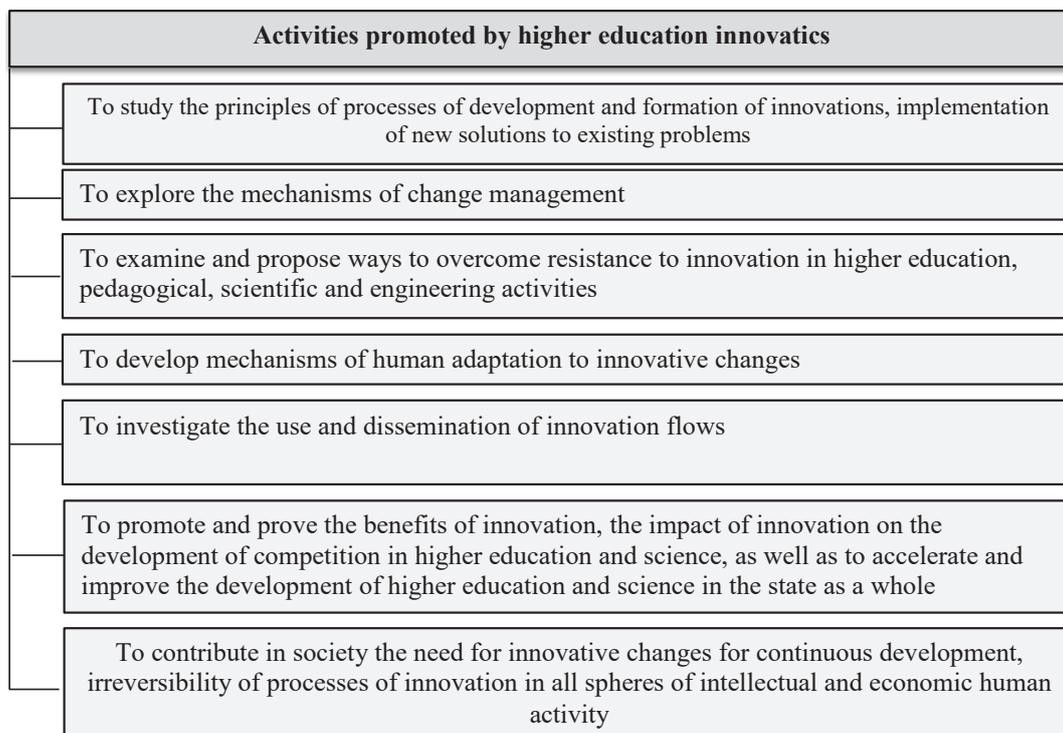


Figure 5. Activities promoted by higher education innovatics

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

The role of the state in the management of innovative activity in the sphere of higher education and science is important. It is necessary for the state to solve the following most important tasks (Figure 6).

1. Identify technological and economic core objectives, and develop a plan for macroeconomic transformation that mobilizes society with a unified focus on innovative development.

2. Creating the necessary conditions that best facilitate the innovation and investment process.

3. Uniting efforts of state bodies and business to support innovative initiatives of universities and subjects of science, stimulation of innovative management in this sphere, as well as spreading of innovations in this industry. Support and practical implementation of H. Etzkowitz's concept of innovative development of society according to the triple helix model [14–19].

4. To use and improve the world's best practices in the field of innovative development of higher education and science.

5. Active promotion of entrepreneurial intelligence and innovative thinking in society.

Innovation management should become a consolidated interaction of mechanisms of the state and business. Creating conditions for achieving harmony between the interests of the state and the employee in the sphere of higher education and scientific-technical activity is the main task of the state level of management. This level becomes strategic, giving tactical and operational control to new innovative individual firms and specialized structures in higher education and science.

At the same time, academic or university entrepreneurship has been noted as one of the main motivators and drivers of innovation in higher education and science sector.

Summarizing the results of a comprehensive study of the phenomenon of academic (university) entrepreneurship, the authors noted that entrepreneurial institutions of higher education carry out their activities in the field of higher education under the current market laws of economic system, interacting with the internal forces of society (with a response to its challenges and demands) under the influence of the globalization pressure of the world community. The authors argue that innovations in the field of higher education and science should be linked in order to lead to innovative changes. It is reasonable to consider innovative activity of higher education institution in the system of higher education as an economic



Figure 6. The most important tasks of the state in managing innovation activity in the sphere of higher education and science

category connected with capitalization and commercialization of intellectual products (knowledge, technologies, educational and scientific services, etc.)

5. Conclusions

Innovative development of higher education is crucial. The main scientific achievements of the authors are put forward positions 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 that can lead to innovative changes, and their classification, both theoretical and practical relevance for the development of domestic science and higher education. The study also identifies the main objects of innovation in higher education and science, appropriate directions for further innovative development of higher education in Ukraine and other developing countries, as well as the types of innovations in higher education that can lead to innovative changes.

A positive result of the work is a formulated and proposed interdisciplinary study in higher education and science (higher education innovation) that collects, summarizes, and classifies best practices of innovation in many higher education systems and leading universities around the world. This applies to universities as well as to all research institutes and organizations associated with higher education. The system of innovative transformation in higher education is interesting and practically useful for both developed and developing countries. Summarizing the comprehensive study of innovation in university education as a factor of sustainable development of society, it should be noted that innovation in higher education is a complex interdisciplinary scientific field, applied directly to the field of knowledge and economic activity.

For further research, it is suggested to further explore the possible impact of academic university entrepreneurship not only in the field of economics, but also to extend to the social and public sectors of society, including the use of smart business for healthcare in the COVID-19 pandemic.

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