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INNOVATION IN UNIVERSITY EDUCATION AS A FACTOR OF SUSTAINABLE DEVELOPMENT OF UKRAINE. THEORETICAL APPROACH

Sustainable development as known to be an approach to economic planning that seeks to promote economic growth while maintaining the quality of the environment for future generations.

Sustainable socio-economic development of society implies the acceleration and expansion of entrepreneurial activity of its members. Academic or university entrepreneurship is the accelerator of scientific and technological progress and innovative development of the knowledge society.

Authors propose to introduce a new scientific direction in the sphere of higher education with a new scientific term – "Innovatics of higher education" / "higher education innovatics".

*The theoretical foundations and practical provisions of the new scientific direction in the sphere of higher education – the **innovatics in higher education** includes a complex of innovative changes in such inherent in higher education types of activities as: teaching, training, study; scientific and R&D activities, new technic and technologies development, construction and design creativity; cultural and moral development, upbringing of human values; education of honesty and justice, patriotism and peacefulness; instilling love and tolerance for one's neighbor, mercy and charity, compassion; 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 or university entrepreneurship; sports, recreational, festive and extracurricular activities; and other types of activities of universities, colleges and other institutions related / involved / associated with higher education.*

Thus, innovatics in higher education (as the complex of innovations in the whole sphere of higher education) includes innovative changes in almost all areas of higher education to enhance and/or improve the quality training of professionally prepared and responsible citizens of the modern community and for development of university R&D. These can be useful for reforming the national higher education system of Ukraine and for the development of a new scientific direction in the field of higher education.

The unique essence (characteristic) of higher education is that it is: 1) an educational process - providing by higher education institutions or scientific institutions to citizens of their and other countries and the new knowledge (transfer of knowledge) and nurturing in them the qualities necessary for society; 2) the process of searching for new knowledge (scientific activity), applied use of knowledge and technology transfer (scientific and technical activity); 3) the sphere of human activity; 4) the branch of national economy; 5) an open educational, scientific and cultural system that has its structure, purpose, characteristics and principles of functioning and which exists and develops under the influence of the external environment (society); 6) subsystem (component) of the general system of humanitarian policy and non-material activity of society; 7) the engine of innovative socio-economic development of society.

Many years of experience of economically developed countries of the world testify to the decisive complex socio-economic role of higher education and science in the process of extended reproduction, including - reproduction of industrial relations between people in this field, its specific patterns, as well as a direct impact on the economic growth of society.

Keywords: *sustainable development; innovation in university education; academic or university entrepreneurship; innovative development of a knowledge society.*

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It is known that a *sustainable development* is an approach to economic planning that attempts to foster economic growth while is preserving the quality of the environment for future generations [1].

Sustainable socio-economic development of society implies acceleration and expansion of entrepreneurial activity of its members. Academic or university entrepreneurship is an accelerator of scientific and technological progress, and innovative development of a knowledge society.

The authors have developed the theoretical foundations and practical provisions of the scientific direction – higher education innovations that may be useful for reforming the national higher education system of Ukraine.

It should be noted that in Ukraine the concept and understanding of a the term "higher school" is equivalent to system or sphere of "higher education" and implies university education, including university preparatory educational programs, bachelor's, master's, postgraduate and doctoral programs, but not a completed education, received in the last (or senior) classes and final grades of secondary school (as usually in some other countries). Thus, in Ukraine, the term "higher school" is an equivalent to the term "higher education" and means the level of university education and that is why both terms are use simultaneously. Therefore, in the article, the terms "higher school" and "higher education", related to the Ukrainian system (sphere) of education and will mean precisely university level education. In this paper, we consider some provisions that could characterize the directions and approaches of innovative development of the education sector, which is a key element in the search for new knowledge, technologies, and the development of socio-economic systems.

Because of the conducted research, identification and analysis of economic mechanisms of innovative development of higher education, which are the effective factor in improving the efficiency and management of the national, in our case – Ukrainian economy – the authors would like to make the following theoretical conclusions.

○ Innovative development of higher education is a state-oriented restructuring and implementation of qualitatively new transformational changes in higher education and science in the humanitarian system of a single national economic complex – the Joint national economy complexes of Ukraine (JNECU) based on effective activation and stimulation of innovative activity in this sphere.

2. The essence of innovative development of higher education is a social systemic technical and economic process, characterized by the following features:

- Purpose – innovative reform of higher education;
- Object – educational and scientific branch of the humanitarian sphere of the national economy, which includes innovative universities, oriented towards university (academic) entrepreneurship;
- Implementation of:
 - establishing innovative business-type universities; enhancing the role of intellectual entrepreneurship in higher education as a driver of economic growth on the basis of the spread of academic (university) entrepreneurship;
 - innovative economic mechanisms development;
 - the necessary conditions of public support and favorable legislative framework for innovative academic (university) entrepreneurship;
 - availability of scientific and pedagogical, engineering and technical staff and students ready for business.

At the same time, innovations in higher education are complex and have the characteristics of product, technologies, market and organization.

3. The theoretical foundations of state-oriented innovation development of higher education are:

- economic science;
- theory of entrepreneurship and economic development;
- theory of innovative development;
- theory of market economy;
- theory of public administration;
- theory of state management of 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";
- the theory of "academic (university) entrepreneurship" and theoretical substantiation of the role of innovative research-oriented entrepreneurial universities as accelerators of economic growth.

The organizational and methodological foundations of innovative development of higher education based on widespread introduction of university entrepreneurship, as the main moderator of innovative transformations in the humanitarian policy and non-industrial – nonmaterial sphere are:

- state policy in the field of innovation development of the branches of the JNECU;
- state, regional and local legislative regulations and rules for higher education and entrepreneurship systems (as a component of all four sectors of the country's economy);
- development and implementation of innovative models of entrepreneurship, including university (academic) entrepreneurship and granting the rights of universities and research institutes to commercialize the results of R&D performed at the expense of budget financing;
- financial and tax incentives for the development of university (academic) entrepreneurship;
- definition of directions of development of universities and their tasks in the socio-economic development of countries, regions and local communities;
- organizational and methodological decisions of university owners and staff regarding participation in academic business activity;
- social factors influence.

A very important step is uniting activities of universities and research institutions of the National Academy of Sciences (NAS) of Ukraine, sectoral research institutes and scientific laboratories on the basis of merging into educational and scientific-industrial complexes (techno-parks) with the formation of scientific-industrial techno-polis. The JNECU has a certain structure, which presupposes the presence of components and connections between them. Its main components are two spheres: the *productive sphere* in which material goods are produced, and the *service sector* (non-productive sphere), which mostly provides services to the population.

The conceptual foundations of innovative development of higher education comprise on:

- H. Etzkowitz's concept of innovative development of society by the "triple helix" model [2-5], which is successfully used in many developed countries (USA, UK, Canada, Australia, Japan, Germany, Sweden and many other countries of the EU) and in the developing world (China, Russia, Brazil, some other South American countries, etc.);

- B. Clark's concept of transformational changes of conventional universities into innovative universities focused on in-house entrepreneurial activities ("business universities") [6-8], which has been validated in higher education systems in many countries of different continents (North and South America, the United States of America, Western Europe, Japan, Africa).

- practical principles (and necessary conditions) of innovative development of higher education, which means effective university entrepreneurship, as the main factor of innovative transformations in educational and scientific activity of society is connected with public entrepreneurial mentality and national recognition of the role of universities in economic, scientific and technological development of countries. A favorable legislation to support academic entrepreneurship and commercialization of R&D results is also necessary and very important.

- the willingness and readiness of the teams of research and other types of universities to academic entrepreneurship; the presence of entrepreneurship leaders and employees of the university, the necessary entrepreneurial traits of character, knowledge and skills in the field of entrepreneurship;

- the existence of supply and demand markets in the field of academic (educational, scientific and engineering);

- the awareness of the necessary transformational conditions by the university communities (according to B. Clark), innovation policy and innovation relations, as well as corporate entrepreneurial culture;

- the cooperation of universities with industry and business with the effective support of governments; economic efficiency of university (academic) entrepreneurship;

- the availability of diversified sources of financial revenues to the HEI budget;

- the endowment institute;

- the commercialization of R&D results, transfer of new and introduction of new technologies, creation of spin-offs and start-ups of companies (small enterprises) with the direct participation of employees, students and graduates of universities.

4. The prerequisites for innovative changes in higher education are the formation and development of university entrepreneurship under the influence on:

- the globalization processes of society transformation;
- the new societal challenges to raise the level of education of the labor resources and the quality of their professional qualifications due to the sharp increase in knowledge and significant complication of production and technological processes;
- the reforming higher education systems and changing the paradigm of training specialists in accordance with current socio-economic needs of society and market requirements;
- the reduction of budget funding for universities, colleges and other types of universities;
- the need for competitive financial support for highly qualified university staff, statutory activities of universities, the implementation of fundamental and applied research and development of the material and technical base and necessary infrastructure of universities;
- the extending the mechanisms and foundations of a market economy to humanitarian spheres.

The preconditions for such changes are:

- the new expanded role of universities and other types of universities and the need for their financial independence;
- enhancing the socially beneficial role of entrepreneurship and its extension to all spheres of human activity;
- the improving and disseminating business education and more.

5. The main task of innovative development of higher education in any country is 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 innovation-oriented type of economy of the state.

The main tasks of innovative academic (university) entrepreneurship are:

- production and capitalization of new knowledge;
- quality implementation of R&D with further effective commercialization of the results;
- widespread dissemination (transfer) of new knowledge, R&D results and advanced technologies;
- development of innovation activities of universities;
- development, implementation of concepts and implementation of methods, technologies and techniques of innovative economic and social development of local communities, regions, country;
- contribution to national economic growth, national GDP and the competitiveness of countries' economies; development and dissemination of a new type of entrepreneurial activity in the intellectual sphere – academic entrepreneurship in universities;
- promoting effective entrepreneurship education and entrepreneurship education development;
- promotion of financial self-sufficiency and independence of higher education institutions, raising the level of material support of teaching staff and other employees of higher education institutions.

6. It is advisable to consider the ways to further innovative development of the higher education:

- introduction of the institute of innovative academic (university) entrepreneurship;
- development of a sector focused on academic entrepreneurship of non-profit and for-profit universities with the participation of private capital;
- development of an endowment institute for the financial support of leading research universities in entrepreneurship;
- granting at the legislative level full autonomy of universities for independent choice of development strategies, directions of statutory activity and achievement of financial independence;
- introduction of the institute of state (budgetary) and private (independent) project financing in the field of higher education, organization of state support for cooperation between universities and industry (according to the model of "Triple helix" by H. Etzkowitz).

7. "Academic capitalism" and "university entrepreneurship" can be defined as economic categories that have their own characteristic, related to the capitalization and commercialization of intellectual

products – new knowledge, technologies, teaching methods. "Academic capitalism" is a new economic and social environment in which scientific institutions and systems of higher education and all universities of the world in the late XX – early XXI centuries exist, and which includes "university entrepreneurship" as an intellectual type of entrepreneurial activity of researchers, professors - teaching staff, engineers, technologists, designers and university students.

8. Governments in economically developed countries, especially the United States, as well as other countries, have consistently supported academic (university) entrepreneurship, pursued policies developed in the early 1980s aimed at intensifying technology transfer and small technology business development. Evidence of this is the validity of the laws of these countries regarding the motivation and support of innovative entrepreneurship in universities and research institutions in the implementation of research and technology transfer on a commercial basis.

9. International experience of university entrepreneurship shows that:

9.1. Universities of economically developed countries involved in academic (university) entrepreneurship perform in their countries important socio-economic functions:

- in searching, formation and dissemination of new knowledge (performing basic and applied research);

- in dissemination of the latest technologies for industry (business) and social needs;

- in training highly skilled personnel and increasing the nation's human capital and intelligence;

- in preservation of the academic identity of universities and national cultural heritage;

- in entrepreneurship training for the national economy;

- in development of entrepreneurship as a factor of local, regional and national economic growth, solving problems of self-realization of citizens and their employment, confronting financial crises;

- in formation of social networks;

- in conservation and saving of the environment.

9.2. Active involvement of student youth in research, design and technology development is a prerequisite for successful research universities and the development of university (academic) entrepreneurship.

9.3. The influence of entrepreneurship, entrepreneurship education and business universities on the national economic growth of regions and countries as a whole is certainly a proven fact. In this respect, business universities have an important mission to train entrepreneurs and create an entrepreneurial mindset in today's society.

10. To further reform higher education and accelerate Ukraine's socio-economic development, it should be appropriate to use positive US experience in supporting university entrepreneurship, effective commercialization of R&D results, technology transfer, expanding and improving the efficiency of innovative entrepreneurial universities. Ukrainian universities can receive additional financial income through the effective use of web technologies, distance learning and the organization of various forms of distance education.

11. Important for the further innovative development is the state-oriented policy, which consolidates at the legislative level, and further supports the material interest of all those involved in scientific development and implementation of the R&D results, wide commercialization of the R&D results, design and development accelerations, technological acceleration production for the purpose of their widespread import.

To increase the efficiency of R&D results commercialization Ukraine requires state legislative support for patent-licensed activities and technology transfer of domestic universities and research institutes (institutions), the formation of specialized nationwide and industry organizations for technology transfer, enhancement of motivation for improving science and technology development, inventions, patenting and licensing of R&D relevant to the national economy.

12. It may be useful for national conditions to use the positive experience of applying the concept and model of the "triple helix" of H. Etzkowitz in other countries of the world with a view to possible further creative application of it in the context of Ukrainian realities. It is necessary to take into account the existence in Ukraine of the National Academy of Sciences, other academic institutions, which also affect the economic and social development of our society.

13. In order to systematically identify, analyze and form a complex of scientific-theoretical foundations, methodology and organization of innovative activity in the field of higher education and science, it is advisable to create a new scientific direction of research – innovation of higher education.

14. The results of the research are advisable to us in:

- the development of state and sectoral policy on innovative development in the sphere of higher education and science, concepts and real measures to support intellectual academic entrepreneurship and entrepreneurial universities in Ukraine, first of all – research universities;
- the development of a regulatory framework for the organization to use commercially R&D results of universities and research institutions, which were financed by the state budget of Ukraine;
- the formation of a number of state and sectoral measures for further expansion of entrepreneurship education, increasing the efficiency of training entrepreneurs, maximizing the involvement of relevant population in independent industrial enterprises in order to shape and enhance the role of the secondary economy in Ukraine;
- the further study and application in the national context of the concept and model of H. Etzkowitz "Triple helix" for innovative development of Ukraine under the condition of effective cooperation of the triad "universities-industry-state";
- the preparation of lectures, materials for seminars and practical classes, as well as educational and methodological developments in entrepreneurship, innovative entrepreneurship, state management of the national economy, using it as a basis for further studying the problems of academic entrepreneurship, organizational and economic foundations of entrepreneurial universities operating and socio-economic development of the state.

15. The following directions and questions for further exploration may be important:

- a detailed study of the features of the "triple helix" concept for use in national contexts;
- an analysis of the effectiveness of innovation development of higher education;
- the necessary conditions and possible ways of introducing university (academic) entrepreneurship in Ukraine.

16. A significant problem for Ukraine is the weak involvement of university students in research at the institutes of the National Academy of Sciences. The lack of close cooperation between universities and the NAS is a drawback from the Soviet history of Ukraine. During the Soviet period, most of the research institutes of the National Academy of Sciences of Ukraine carried out orders and tasks of the military-industrial complex. That is why the wide access of university students to such works was not possible. During the period of Independence of Ukraine, the situation did not change much for the better and now universities and institutes of the National Academy of Sciences do develop significant research collaboration, instead they develop competition for state budget research financial support. Moreover, the weak participation of students in the scientific activity of the NAS does not contribute to the scientific growth of Ukrainian student youth. Universities research traditionally lags behind the NAS in the availability of special equipment, the necessary conditions and amounts of funding. This problem continues to exist and for almost last tree decades and that is why sharply reduces the scientific potential of Ukraine and slows down the development of university education.

17. Sustainable development of Ukraine in the period of its independence is hampering by a very high level of corruption. The Corruption perceptions index 2018 of Ukraine, given by Transparency International, is very poor (120) [9] because of the dependence of economic, industrial and social development on oligarchic groups [10]. Unfortunately, almost three decades of Ukraine Independence are associated more with the birth, development and strengthening of oligarchic clans than with democratic, market and social transformations of the country.

Theoretical provisions, conclusions and recommendations for Ukraine.

The unique essence (characteristic) of higher education in economically developed countries of the world is that it is:

- educational and upbringing process – providing higher education institutions or scientific institutions to citizens of Ukraine new knowledge (transfer of knowledge) and nurturing in them the qualities necessary for society;
- the process of searching for new knowledge (scientific activity), applied use of knowledge and

technology transfer (scientific and technical activity);

- the sphere of human activity;
- the branch of national economy;
- an open educational, scientific and cultural system that has its structure, purpose, characteristics and principles of functioning and which exists and develops under the influence of the external environment (society);
- subsystem (component) of the general system of humanitarian policy of society;
- the engine of innovative socio-economic development of society (See: Fig. 1).

In society, higher education is an industry of the national economic complex, and also - a social socio-economic process that has social and economic components, promotes innovative development of society and directly affects the socio-economic growth of the nation (See: Fig. 2).

The main strategic goal and the desired result of the innovative development of society is the formation and continuous improvement of the knowledge society with an innovation-oriented type of economy.

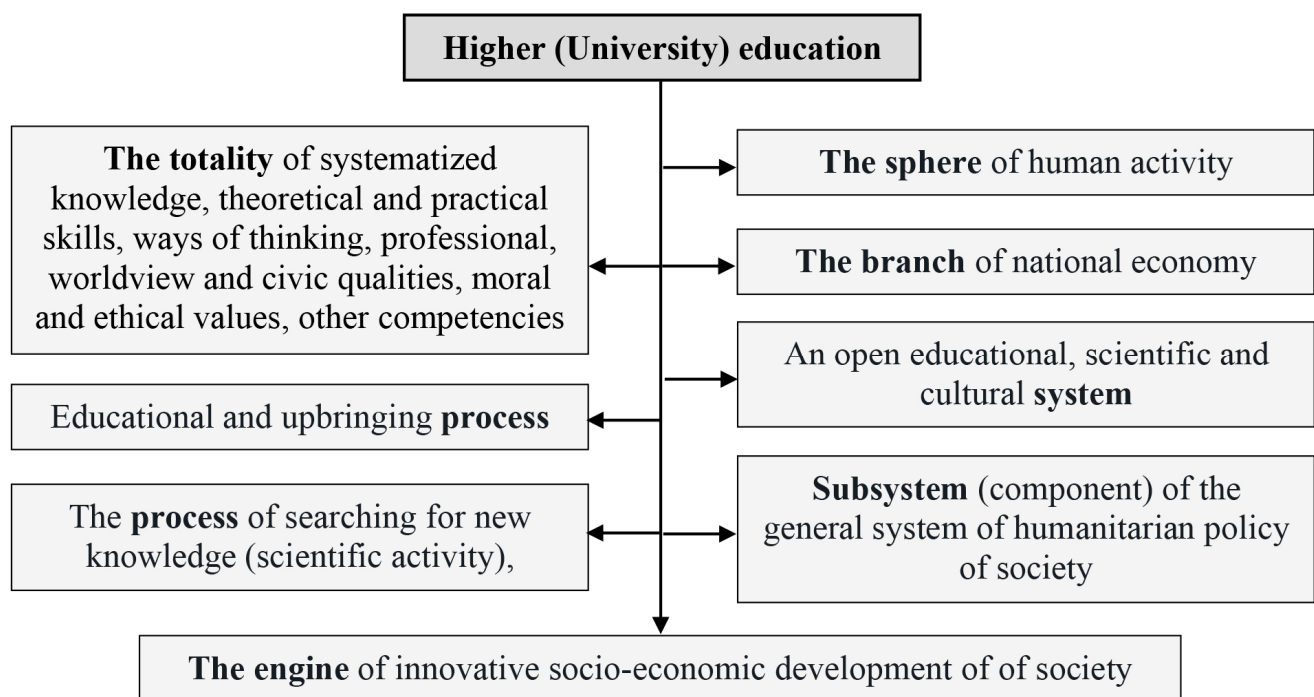


Fig.1. The unique essence (characteristic) of higher education

The economic mechanisms common to all countries operating in the field of higher education and science in the system of humanitarian activity of a JNECU are based on the principles of economic theory, economics of education, economics of non-productive sphere (sphere of immaterial production) and economics of socio-cultural spheres. The higher education and science sector itself applies to the tertiary and quaternary sectors of the economy, but the results of education and research are the basic economic factors of all four sectors.

Many years of experience of economically developed countries of the world testify to the decisive complex socio-economic role of higher education and science in the process of extended reproduction, including – reproduction of industrial relations between people in this field, its specific patterns, as well as a direct impact on the economic growth of society.

The objective prerequisites for the decisive integrated socio-economic role of higher education in modern society are, *first*, the formation of the education system as an independent and specific branch of the national economy, which is a factor of human development. *Secondly*, the deployment of the Scientific and Technical Revolution (STR), which led to:

- substantial expansion of education;
- a significant increase in its costs;

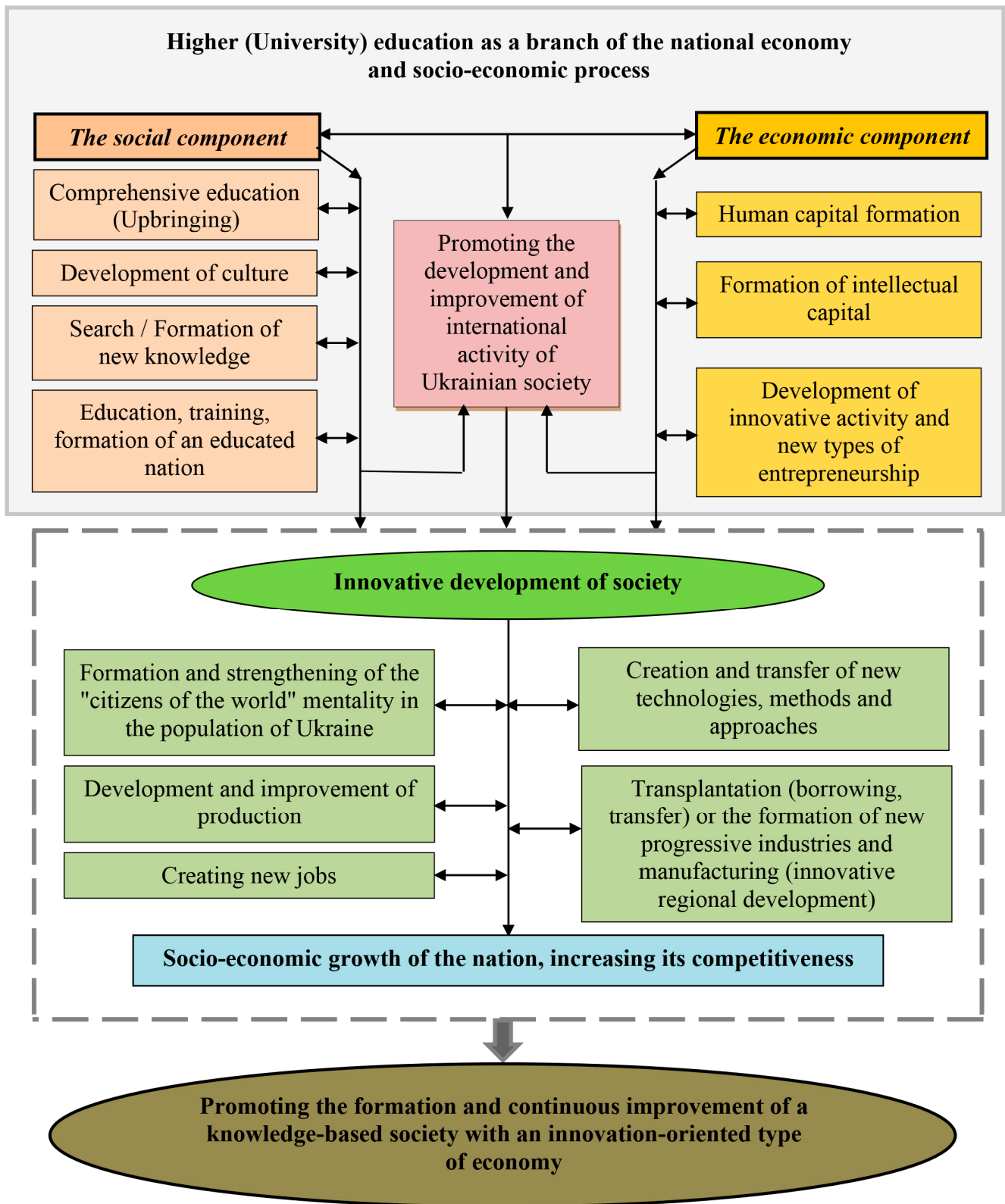


Fig. 2. The function and components of higher education in modern Ukrainian

- increasing the impact of education on the development of economic theory, economic mechanisms of public administration, rates of socio-economic growth, efficiency of individual, collective and social production, differentiation of wages of employees, etc. .;
- efficiency of individual, collective and social production, differentiation of wages of employees, etc.;

- penetration of market economy principles, methods and mechanisms into the sphere of academic activity, rapid commercialization of activities in the educational and scientific sphere, emergence of socio-economic phenomenon of "academic capitalism" and the phenomenon of academic entrepreneurship.

- STR has brought to the fore the qualities of the workforce such as education, qualifications, economic thinking, organizational skills, responsibility and more. In addition, this, in turn, requires a radical reform of the Ukrainian education system, which is a factor of human development and the basis for the socio-economic growth of the nation.

Third, the focus of humanity's efforts on building a knowledge society with an innovation-oriented type of economy that cannot be successfully resolved without highly educated human capital, intellectual capital, new knowledge and innovative technologies. To solve the problems of building a knowledge-based society with an innovation-oriented type of economy, it is necessary to have both a high level of education of contractors – workers and specialists of various branches of economy, science and technology, as well as the presence of active entrepreneurs, qualified managers, organizers and leaders of production and non-production (social) processes, managers at different levels.

At the same time, the innovative development of the education and science sphere should be state-oriented and implemented in the humanitarian policy system of the JNECU based on effective activation and stimulation of innovative activity in this field.

It is imperative that in the current difficult conditions for Ukraine the reform of higher education can exert not only a direct scientifically grounded influence on the further development of the sphere of humanitarian policy (in non-industrial and non-material sphere) of Ukrainian society, but also on counteracting hostile anti-Ukrainian and anti-Independent of Ukraine propaganda. Intensifying the means of resisting humanitarian aggression, promoting and support active truthful public outlook, confirmation of the vital need to integrate an independent Ukraine into the European family of highly developed democratic countries also are very important today and for future.

One of the innovative directions of higher education reform is the introduction and expansion of the use of intellectual and academic (university) entrepreneurship, creation of new organizational and economic forms of interaction of the higher education system with society, further introduction of market mechanisms in the field of higher education. The use of academic entrepreneurship, intellectual and human capital, the commercialization of the maximum number of research results and design of structural developments are important for increasing the return of investment.

The main partners and actors that facilitate the innovative development of higher education, as well as the society overall, are the colleges of higher education institutions. According to international experience, the most powerful and successful innovators in the education systems of different countries are, first of all, research universities, focused on academic entrepreneurship in educational and scientific fields, as well as leading universities [11].

Maybe it is necessary to study, summarize experience and describe the theoretical foundations and practical provisions of innovation activity in the field of higher education (we mean – the university education) from the already known innovative activity in the field of higher education. The theoretical foundations and practical provisions of innovation activity in the field of higher (university) education it is advisable to distinguish as a separate scientific direction in the sphere or field (sector) of higher education. Authors propose to introduce a new scientific direction in the sphere or field (sector) of higher education with a new scientific term – "Innovatics of higher education" or "higher education innovatics". The use of the term "higher education innovatics" may be appropriate to designate a separate scientific direction in the field (or system, or field, or sector) of higher education by analogy with the scientific areas "Fundamentals of Higher Education", "Theory and Practice of Higher Education", "Economics higher education". However, at the same time – differ from other scientific areas in the field of innovation (innovative activity).

By definition, the theoretical foundations and practical provisions of the new scientific direction in the sphere of higher education – the **innovatics in higher education** has to include a complex of innovative changes in such inherent in higher education types of activities as:

- teaching, training, study;

- scientific and R & D activities, new technic and technologies development, construction and design creativity;
- cultural and moral development, upbringing of human values;
- education of honesty and justice, patriotism and peacefulness;
- instilling love and tolerance for one's neighbour, mercy and charity, compassion;
- 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 or university entrepreneurship;
- sports, recreational, festive and extracurricular activities;
- and other types of activities of universities, colleges and other institutions related / involved / associated with higher education.

Thus, innovatics in higher education (as the complex of innovations in the whole sphere of higher education) includes innovative changes in almost all areas of higher education to enhance and/or improve the quality training of professionally prepared and responsible citizens of the modern community and for development of university R & D. These can be useful for reforming the national higher education system of Ukraine and for the development of a new scientific direction in the field of higher education.

We have researched and developed the foundations and concepts the "innovatics" in higher education based on general theories of innovation activity of other spheres and fields of human activity. Innovatics in higher education should comprehensively promote the following activities:

- to study the laws of the processes of development and formation of innovations, introducing new solutions to existing problems;
- to research change management mechanisms;
- to study and propose ways to overcome resistance to innovations in the field of higher education, pedagogical, scientific and engineering activities,
- to develop mechanisms for human adaptation to innovative changes,
- to study the use and dissemination of innovative flows,
- to promote and prove the benefits of innovation, the impact of innovation on the development of competition in higher education and science, as well as on accelerating and improving the development of higher education and science in the state as a whole.

Authors think that the subject of higher education innovatics has to be the principles, laws and consistent pattern of innovation processes in higher education and science as a socio-economic system of humanitarian policy of the JNECU. Including models and methods of description, research, organization and management of innovative activities (educational, pedagogical, scientific, technical, organizational and economic) at the macro level (national innovation system of higher education and science), meso level (industry and regional innovation systems and innovation clusters of education and science), and micro levels (strategies for innovative development of individual HEIs, scientific institutions, enterprises and organizations of higher education and science). In higher education, innovatics, as a scientific field, can be distinguished two complementary components: *theoretical innovatics* and *applied*.

Theoretical innovations of higher education should solve problems of creation and development of scientific methodology of innovation in higher education and science, theoretical problems of synthesis of innovatively complex organizational and technical systems (new knowledge, ideas, pedagogical methods, techniques, technologies, inventions, discoveries, etc.). *Applied* higher education innovatics refers to the direction of innovation in solving problems of planning, organizing and implementing innovations in the higher education system. The task of *applied* innovations of higher education should be to solve the organizational and legal issues of innovation, the creation and implementation of innovative projects, etc.

The expected best result of innovative research and its implementation in the field of higher education is the achievement of practical effect for the welfare of the state, humanity as a whole.

The main areas or sections of higher education innovatatics in the field of humanitarian policy of the JNECU including intangible production, which is a sphere of social production in which are produced intangible services: retail, public catering, passenger transport and communication (serving the public), household services, health care, etc., and spiritual values: education, upbringing, culture, art, etc. should be:

- theoretical foundations of pedagogical (pedagogical innovations), scientific and technical (STR innovations) and organizational and economic innovation activity in the higher education system;
- theoretical foundations for the formation of innovative corporate entrepreneurial culture in the higher education system;
- models and modeling (including economic) of innovation processes;
- organization and management of innovation development and innovation activity;
- state regulation of innovation activity;
- management of innovative business, incl. - university or academic entrepreneurship, spin-offs and start-ups;
- management of innovative projects;
- management of investments in innovative projects;
- commercialization of the results of scientific, technical and creative activities;
- human resources management in the process of innovative development of socio-economic system;
- managing risks in innovation;
- Technical marketing (early-stage marketing of a product or technology);
- logistics of innovation processes;
- management of intellectual property.

The innovative development of higher education can be understood as state-directed structural restructuring and the implementation of qualitatively new transformational transformations in the field of higher education and science in the humanitarian policy system of the JNECU based on the effective activation and stimulation of innovative activity in this area.

Transformations can be carried out based on the latest scientific achievements and theoretical and methodological foundations, under the clear legislative and executive control of state and economic bodies, in an effective system of organization and management. The strategy of structural adjustment of the economy of higher education can be based on the principles of self-organization and the application of theoretical and practical achievements of economic science.

Innovative activity in the field of higher education and science is the process of creating, implementing and disseminating in the practice of higher education, scientific and engineering activities of new ideas, means, scientific, engineering, pedagogical, organizational and managerial and economic methods and technologies. Because of which, the achievement indicators of the structural components of the higher education system, scientific and technical activities and scientific services are increased and its transition to a qualitatively higher level takes place.

This activity:

- is based on theoretical and methodological principles of pedagogical, scientific, technical and economic innovation of higher education;
- is aimed at transformational transformations of the higher education system;
- aims at the innovative development of higher education and science;
- is carried out to solve the strategic task of the humanitarian sphere of the JNECU – further building the information society of knowledge with an innovation-oriented type of economy.

Innovations in higher education and science are related to:

- the formation and accumulation of new knowledge;
- the use and commercialization of research and development results;
- the transformation of R&D, other scientific and technological developments into new or improved products, technologies, services introduced on the market, into a new or improved technological process used in practice, or a new approach to social services;
- the formation and accumulation of intellectual capital and the formation of human capital;

- the formation of entrepreneurial mentality and corporate entrepreneurial culture in subjects of innovation activity in the higher education system;
 - the using new tools, methods and technologies to accelerate the economic growth of society.
- The objects of innovation activity in the field of higher education and science are obviously:
- the innovative programs and projects;
 - the new knowledge and intellectual products, educational and scientific services;
 - the infrastructure of higher education and science in the humanitarian system of JNECU, university (academic) and intellectual entrepreneurship;
 - the organizational and technical decisions of an economic, administrative, commercial or other (non-productive) nature that substantially improve the structure and quality of the humanitarian policy of the JNECU (non-production and social sphere);
 - the new experimental designs and innovative solutions of engineering and technical character, innovative technologies for production of new products (services);
 - the mechanisms of formation:
 - the markets for educational and scientific services;
 - the manpower required qualifications,
 - the education of employees of the entrepreneurial mentality and integrated corporate entrepreneurial culture;
 - the cooperation of the triad "University – industry (business) – government (state)".

The subjects of innovation activity in the field of higher education and science are individuals or legal entities (HEIs, scientific institutions, structural units of the educational and scientific system), which carry out innovative activity or attract property and intellectual values, invest their own or borrowed funds in the implementation of innovative JNECU humanitarian policy projects.

Innovation in higher education and science is designed to produce an innovative product, new service, innovative technology, methodology or new solution. An innovative product is a research or experimental design development of a new technology (including information technology) or products with the production of experimental designs or experimental batches.

Innovative activities in higher education directly affect the intellectual and socio-economic development of states. The main task of innovative development of the higher education sphere of Ukraine should obviously be considered a direct purposeful organizational-economic, scientific-educational and engineering-technological activity aimed at the formation of a knowledge society with an innovation-oriented type of economy of the state.

This includes:

- Accelerated formation of new knowledge, progressive innovative technologies, innovative resource sources, materials, means of production, forms of consumption and distribution of manufactured products and services.
- Ability to produce innovative products and services using global advanced technologies and advanced techniques (advanced techniques), which is becoming a dominant source of competitive advantage. An innovation-oriented economy is characterized by distinctive (special and distinct) producers and a high share of services in the economy and is sufficiently resistant to external influences. A distinctive feature of countries with an innovation-oriented economy is the production and export of new global knowledge (technologies, methods and techniques) necessary for the development of innovation and further socio-economic growth of countries).

Recall that the innovation-oriented stage of economic development of the state is characterized by an increase in entrepreneurial activity, including – an increase in the role of intellectual entrepreneurship. For over a century, there has been a tendency to increase the intellectual level of economic activity, which has been manifested in almost all industrialized countries, ranging from small firms to large organizations.

- Advance of intellectual capital. The world economic system of the late XX – early XXI centuries is characterized by a new paradigm of economic development based on a significant reduction in the role of material and resource components of social production and an increased role of the intellectual component. Knowledge production, distribution and use now form the basis of a knowledge-based

economy, characterized by the growing interconnection between capital markets and emerging technologies, and the global nature of knowledge creation and use. In new economic conditions, purposeful formation of innovative potential, increase of intellectual capital and their competent use becomes the basis of economic growth.

- Formation of national human capital. The base of the knowledge society is a highly educated nation with specialists of the necessary level at all levels of functioning of the state system.

The main directions of innovative development of the sphere (system) of higher education include:

- Establishment of an "entrepreneurial mentality" in Ukrainian society through active promotion of entrepreneurial activity as a mechanism of self-realization of a person and creation of new jobs. The state support of all types of entrepreneurship as the main factor of economic growth of the state is necessary. Also it is needs a strengthening of economic and entrepreneurial education, teaching the basics of economic knowledge and entrepreneurship vocational training, courses of theoretic and practical training, practical life-long entrepreneurship training..

- Widespread introduction, with the state support of innovative "academic or university entrepreneurship", intellectual entrepreneurship, creation of legislative and regulatory acts to stimulate invention, development of research and development, implementation and commercialization of the results of scientific and technical activities.

- Giving broad (full) autonomy to universities of all types and forms of ownership.

- Strengthening the role of "science" of research universities.

- Integration of university science with academic and sectoral science – for example, on the basis of amalgamation or merger of HEIs with academic and sectoral research institutes, laboratories, etc. with the aim of forming educational and scientific associations, scientific parks and techno parks with the prospect of further cooperation with industry (business) and creation of techno-policies and educational-scientific-industrial entities (associations, scientific-grads, regional innovative educational-scientific-industrial complexes). Creation and development of incubators, spin-offs and start-ups of venture capital companies.

- Strengthening of the role of the state in support of the triad of society "University – Business – Government", where the core of innovation is the university, and each of the three institutions, in addition to its traditional functions, partially begins to fulfill the functions of others. Establishment of independent institutions for licensing and accreditation of HEIs activities. Creating new forms of budget financing for higher education and research, granting grants and public procurement solely on a competitive basis with the involvement of members of the public and the media.

The main stages in the implementation of innovative development of higher education include:

- Formulation and concretization of scientifically grounded innovative changes and directions of their implementation.

- Formation and concretization of scientifically grounded innovative changes and organizational principles of their implementation.

- Science-based calculation of material costs for the introduction of innovative changes.

- Creating the necessary economic and organizational conditions for effective implementation of innovative changes.

- Realization of innovative changes, their constant updating and improvement.

Based on our studies as to world experience, it can be argued that major innovative changes in the higher education system can occur in objectively defined main areas [11]. Next, we look at the main directions in which innovative changes in higher education are taking place and the main (desired) results (See: Fig. 3):

- New content of education: formation of a new content of education aimed at preparing a person for self-realization and independent living in society.

- New learning technologies: development, creation and implementation of innovative learning technologies, general and inclusive entrepreneurial and environmental education.

- New curricula: use of methods, techniques, tools implementation of new curricula and plans.

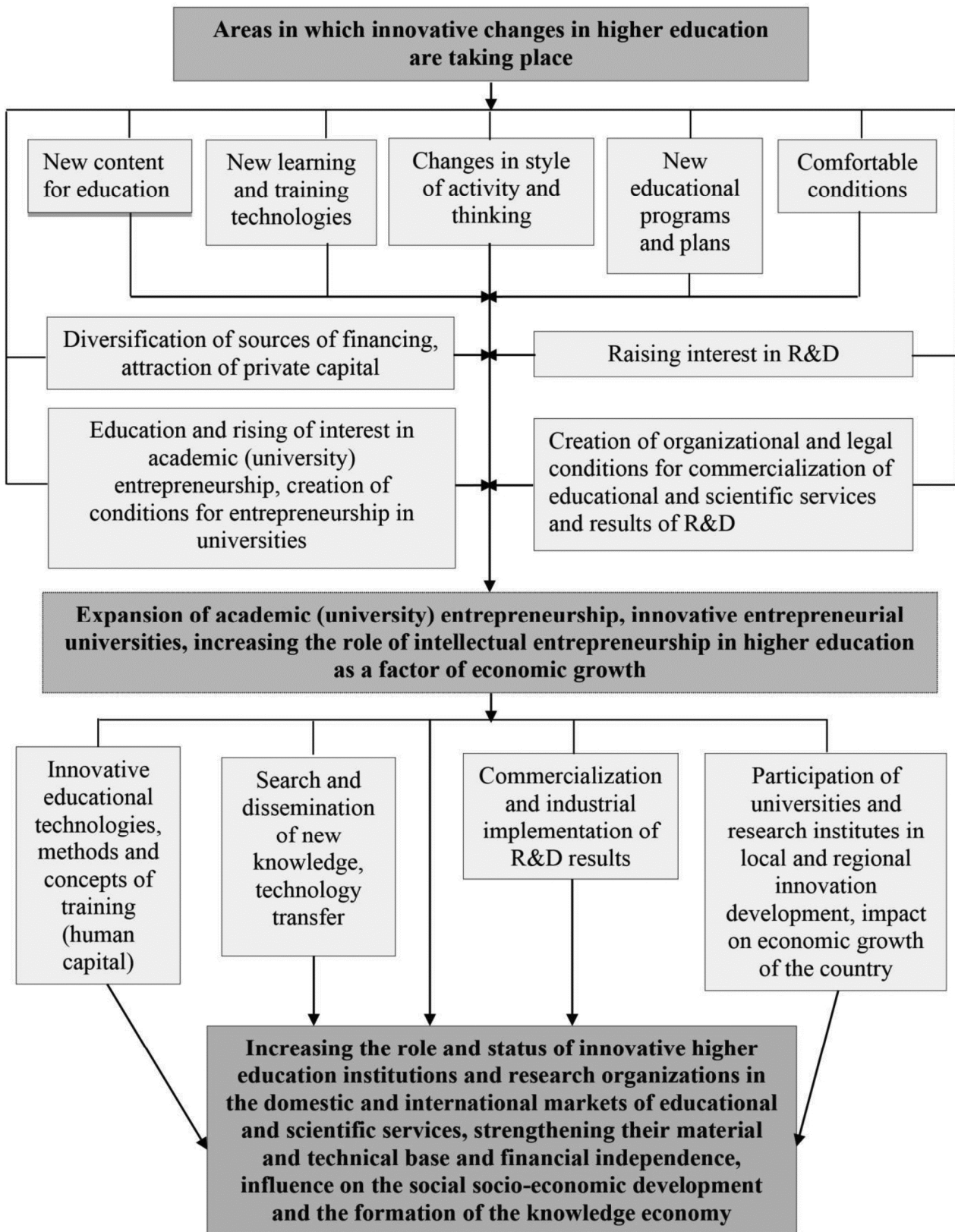


Fig. 3. Areas in which innovative changes in higher education are taking place and the main (desired) results

- Comfortable conditions: creating comfortable conditions for self-determination in the learning process.
- Changes in the way they work and the way they think: Encouraging changes in the way they act

and the way they think about teachers, students and students, changes in the relationship between them, creating and developing innovative teams in educational institutions at all levels.

- Educating interest in R&D: educating young people with an interest in research and development by engaging in scientific and design work, striving for search, inventions and discoveries.

- Diversification of sources of financing, attraction of private capital: diversification of ways and sources of financing, search for new sources of financial support, creation of innovative funds of financial and economic and logistical support for education, wide involvement and use of private capital.

- Education (upbringing) of interest in academic (university) entrepreneurship, creation of conditions for entrepreneurship in HEI: education and stimulation of interest in academic (university) entrepreneurship by all members of the HEI team, commercialization of the results of educational, research and engineering activities, creation of the necessary conditions (logistical, legal, incentive and reward systems) for the motivation and practical implementation of educational, scientific, technical and technological entrepreneurship in HEI.

- Creation of organizational and legal conditions for commercialization of educational and scientific services and R&D results: creation of the necessary legal framework, support at the state level of measures for commercialization of the results of educational and scientific activities in the field of higher education, support of academic entrepreneurship.

- Dissemination of academic (university) entrepreneurship, innovative entrepreneurship-type HEIs, enhancement of the role of intellectual entrepreneurship in higher education as a factor of serious economic growth.

The implementation of such innovative changes and transformational transformations in the higher education system should lead to:

- dissemination and promoting of innovative academic (university) entrepreneurship in the field of higher education;

- creation of innovative HEIs and business-type scientific institutions;

- enhancing the role of innovative intellectual entrepreneurship, linked to the production of innovative products, technologies and services through the use of new knowledge and based on high-level intellectual activity;

- accelerating the economic growth of the country and increase its competitiveness on the world stage.

The result of the active expansion of academic (university) entrepreneurship, the activities of innovative universities of entrepreneurial type, the enhancement of the role and importance of intellectual entrepreneurship in higher education should be:

- Innovative educational technologies, training methods and techniques.

- Search, acquisition and dissemination of new knowledge, technology transfer.

- Commercialization and industrial implementation of R&D results.

- Participation of universities and research institutes in local and regional innovation development influence on the economic growth of the state.

The most important results of such innovations are the enhancement of the role and status of innovative HEIs in the domestic and international markets of educational and scientific services, strengthening of their material and technical base and financial independence, influence on social socio-economic development and formation of the knowledge economy.

Summarizing the results of a comprehensive study of the innovation in university education as a factor of sustainable development of Ukraine it is necessary to note the very slow reform of Ukrainian higher education and the lack of effective innovation. Ukraine needs the development and state legislative support of academic entrepreneurship. It is necessary to strengthen the cooperation of universities with the institutes of the NAS, as well as with business and the manufacturing sector. As to the phenomenon of academic (university) entrepreneurship [2-8], it should be noted that entrepreneurial universities operate in the higher education system under the current market laws of the economic system, interact with the internal forces of the surrounding society (respond to its challenges and requests), are influenced by the globalization pressure of the world community (as schematically shown

in Fig. 4). The biggest threat to Ukraine's higher education and Ukrainian nation is represented by corrupt oligarchic clans who are not interested in educating citizens of the country.

The theoretical foundations and practical provisions of innovation activity in the field of higher (university) education it is advisable to distinguish as a separate scientific direction in the sphere or field (sector) of higher education. Authors propose to introduce a new scientific direction in the sphere or field (sector) of higher education with a new scientific term – "Innovatics of higher education" or "higher education innovatics". By definition, the theoretical foundations and practical provisions of the new scientific direction in the sphere of higher education – the **innovatics in higher education** has to include a complex of innovative changes in such inherent in higher education types of novative activities. The further development and improvement of the innovative scientific direction of higher education – the "innovatics in higher education" is also of interest and scientific sense.

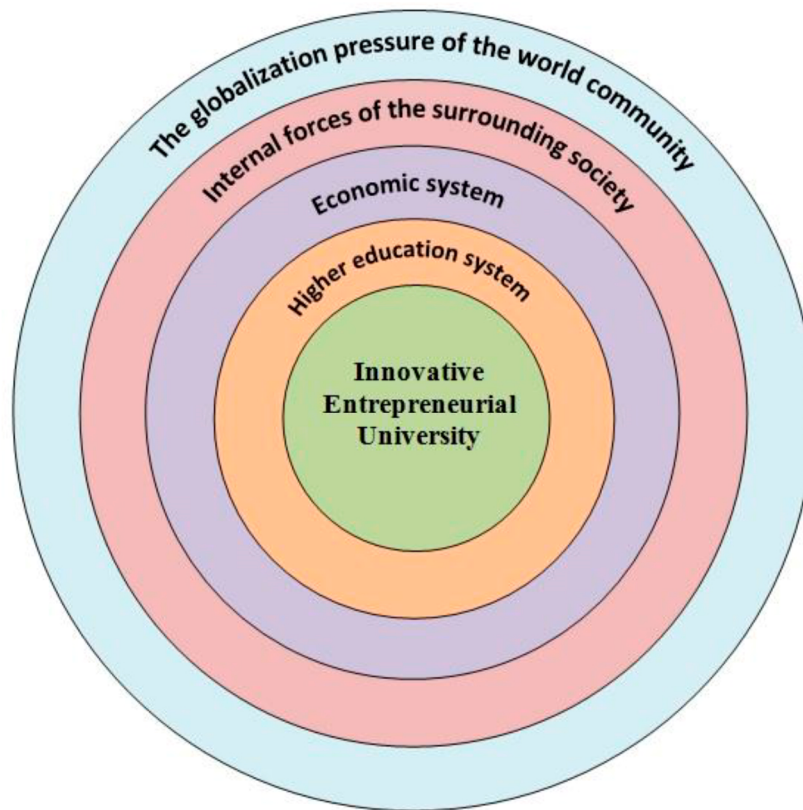


Fig. 4. The innovative entrepreneurial university in the environment

References:

1. Environmental law | Britanika com. URL: <https://www.britannica.com/topic/environmental-law/Sustainable-development> (Retrieved September 10, 2019).
2. *Etzkowitz H. (2008). The Triple Helix: University-Industry-Government Innovation in Action* /H. Etzkowitz. – New York & London : Routledge, Taylor & Francis Group. – 164 p.
3. *Etzkowitz H. (2003). Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. Social Science Information, 42 (3), pp.293-337.*
4. *The Age of Knowledge: The Dynamics of Universities, Science and Societies. (2012). Ed. (H. Etzkowitz with Dzisah). Leiden: Brill. – 360 p.*
5. *The Capitalization of Knowledge: A Triple Helix of University-Industry-Government. Ed. (H. Etzkowitz with Viale). (2011). Studies in Higher Education, 36(6), pp. 746–747.*
6. *Clark Burton R. (1998). Creating Entrepreneurial Universities: Organizational Pathways of Transformations* / Clark Burton R. – Oxford : Pergamon-Elsevier Science. – 180 p.
7. *Clark Burton R. Collegial Entrepreneurialism in Proactive Universities: Lessons from Europe* / Clark Burton R. // *Change*. – Jan/Feb, 2000. – P. 10-19.

8. Clark Burton R. (2004). Sustaining Change in Universities. Continuities in Case Studies and Concepts. The Society for Research into Higher Education & Open University Press / Clark Burton R.; SL6 2QL. – England : McGraw-Hill. – 232 p.
9. The Corruption perceptions index 2018. URL: <https://www.transparency.org/cpi2018> (Retrieved September 11, 2019).
10. Chernenko, Demid (2018). Capital Structure and Oligarch Ownership. State Hydrographic Service of Ukraine URL: https://mpr.ub.uni-muenchen.de/83641/1/MPRA_paper_83641.pdf (Retrieved September 12, 2019).
11. Romanovska, O.O., Romanovska, Yu. Yu. & Romanovskyi, O. O. (2018) *Dosvid vyshchoi osvity Spoluchenykh Shtativ Ameryky XX-XXI stolittia. Knyha 3. Osoblyvosti innovatsiinoho rozvytku sfery vyshchoi osvity SShA druhoi polovyny XX – pochatku XXI stolittia* [The experience of higher education in the United States of the XX-XXI century. Book 3. Features of the innovative development of higher education in the United States of the second half of the 20th – early 21st centuries], a training manual, Publishing House of NPU named after M.P. Drahomanov, Kyiv, Ukraine. ISBN 978-966-931-165-8, URL: <https://play.google.com/store/books/details?id=xJ9DwAAQBAJ> (Retrieved September 27, 2019).

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Інноваційність в університетній освіті як фактор стійкого розвитку України. Теоретичний підхід

Відомо, що стійкий розвиток - це підхід до економічного планування, який намагається сприяти економічному зростанню, зберігаючи якість навколишнього середовища для майбутніх поколінь. Стійкий соціально-економічний розвиток суспільства передбачає прискорення та розширення підприємницької діяльності його членів. Академічне або університетське підприємництво – це прискорювач науково-технічного прогресу та інноваційного розвитку суспільства знань.

Показано теоретичні основи та практичні положення наукового напрямку – інноватики вищої освіти, які можуть бути корисними для реформування національної системи вищої освіти України. Унікальна сутність (характеристика) вищої освіти економічно розвинутих країн світу полягає в тому, що вона є: 1) освітньо-виховним процесом – надання вищими навчальними закладами або науковими установами громадянам України нових знань (передача знань) і виховання в них необхідних для суспільства якостей; 2) процесом пошуку нових знань (наукова діяльність), прикладного використання знань і трансферу технологій (науково-технічна діяльність); 3) сферою людської діяльності та галуззю народного господарства; 4) відкритою освітньо-науково-культурною системою, що має свою будову, мету, характерні ознаки та принципи функціонування і яка існує та розвивається під впливом зовнішнього середовища (суспільства); 5) підсистемою (складовою) загальної системи гуманітарної діяльності суспільства; 6) двигуном інноваційного соціально-економічного розвитку суспільства.

Багаторічний досвід економічно розвинених країн світу засвідчує вирішальну комплексну соціально-економічну роль вищої освіти і науки в процесі розширеного відтворення, у т.ч. – відтворення виробничих відносин між людьми у цій сфері, властивих їй специфічних закономірностей, а також безпосередній вплив на економічне зростання суспільства.

Об'єктивними передумовами вирішальної комплексної соціально-економічної ролі вищої освіти в сучасному суспільстві є, по-перше, становлення системи освіти як самостійної та специфічної галузі народного господарства, що є чинником людського розвитку. По-друге, розгортання науково-технічної революції, що зумовила: 1) істотне розширення масштабів освіти та значне збільшення витрат на неї; 2) посилення впливу освіти на розвиток економічної теорії, економічних механізмів державного управління, темпи і якість соціально-економічного зростання, ефективність індивідуального, колективного і суспільного виробництва, диференціацію заробітної плати найманих працівників тощо; 3) ефективність індивідуального, колективного і суспільного виробництва, диференціацію заробітної плати найманих працівників, а також проникнення принципів, методів і механізмів ринкової економіки до сфери академічної діяльності, стрімка комерціалізація діяльності в освітній і науковій сфері, виникнення соціально-економічного явища «академічного капіталізму» та феномену академічного підприємництва.

Ключові слова: *стійкий розвиток; інноваційність в університетській освіті; інноватика вищої освіти; академічне або університетське підприємництво; інноваційний розвиток суспільства знань.соціально-економічний розвиток України.*