

Universities innovative development under the globalization conditions

Desenvolvimento inovador das universidades nas condições da globalização

Desarrollo innovador de las universidades bajo las condiciones de la globalización

Kostiantyn Shaposhnykov¹ , Svitlana Filyppova² , Volodymyr Lagodiienko³ ,
Denys Krylov⁴ , Hanna Svinarova² 

¹ State Scientific Institution «Institute of Education Content Modernization», Kyiv, Ukraine.

² Institute of Business, Economics and Information Technology of Odessa Polytechnic National University, Odessa, Ukraine.

³ Odessa National University of Technology, Odessa, Ukraine.

⁴ Zaporizhzhia National University, Zaporizhzhia, Ukraine.

Corresponding author:

Kostiantyn Shaposhnykov

Email: k.s.shaposhnykov@gmail.com

How to cite: Shaposhnykov, K., Filyppova, S., Lagodiienko, V., Krylov, D., & Svinarova, H. (2022). Universities innovative development under the globalization conditions. *Revista Tempos e Espaços em Educação*, 15(34), e17608. <http://dx.doi.org/10.20952/revtee.v15i34.17608>

ABSTRACT

The article systematizes main directions of improving organizational and economic support of higher education innovative development in the globalization context. One of the main intensification directions of innovative activity in the higher education field is the creation of a national strategy for innovative higher education development, synchronized with existing programs for the development of domestic higher education system and national economy in general. Authors emphasize that the policy of targeted financing of higher education system innovative development requires optimization. Prerequisites for university innovative development are the availability of state support, adequate financial support, lack of bureaucracy, presence of a developed innovation infrastructure, developed innovation culture in society and more. Promising areas for further universities' development are also identified: deepening the relationship between higher education, science and industry, particularly in the direction of scientific research commercialization; ensuring university autonomy (including financial autonomy), flexibility and digitalization of higher education; use of distance learning; regular educational material updating in accordance with business demands and scientific-technological progress latest achievements.

Keywords: Commercialization of innovations. Globalization. Higher education institution. Innovative development. Technology transfer.

RESUMO

O artigo sistematiza as principais direções para melhorar o suporte organizacional e econômico do desenvolvimento inovador da educação superior no contexto da globalização. Uma das principais direções de intensificação da atividade inovadora no campo do ensino superior é o desenvolvimento de uma estratégia nacional de desenvolvimento inovador do ensino superior, sincronizada com os programas existentes para o desenvolvimento do sistema de ensino superior nacional e da economia nacional em geral. Os autores enfatizam que a política de financiamento direcionado ao desenvolvimento inovador do sistema de ensino superior requer otimização. Os pré-requisitos para o desenvolvimento inovador da universidade são a disponibilidade de apoio estatal, apoio financeiro adequado, falta de burocracia, presença de uma infraestrutura de inovação desenvolvida, uma cultura de inovação desenvolvida na sociedade e muito mais. Também são identificadas áreas promissoras para o desenvolvimento das universidades: aprofundamento da relação entre ensino superior, ciência e indústria, em particular na direção da comercialização da pesquisa; garantir a autonomia universitária (incluindo autonomia financeira), flexibilidade e digitalização do ensino superior; utilização do ensino a distância; atualização regular do material educacional de acordo com as demandas dos negócios e as últimas conquistas do progresso científico e tecnológico.

Palavras-chave: Comercialização de inovações. Desenvolvimento inovador. Globalização. Instituição de ensino superior. Transferência de tecnologia.

RESUMEN

El artículo sistematiza las principales direcciones para mejorar el apoyo organizacional y económico del desarrollo innovador de la educación superior en el contexto de la globalización. Una de las direcciones principales de la intensificación de la actividad innovadora en el campo de la educación superior es el desarrollo de una estrategia nacional para el desarrollo innovador de la educación superior, sincronizada con los programas existentes para el desarrollo del sistema nacional de educación superior y la economía nacional en general. Los autores enfatizan que la política de financiamiento focalizado del desarrollo innovador del sistema de educación superior requiere optimización. Los requisitos previos para el desarrollo innovador de la universidad son la disponibilidad de apoyo estatal, apoyo financiero adecuado, falta de burocracia, la presencia de una infraestructura de innovación desarrollada, una cultura de innovación desarrollada en la sociedad y más. También se identifican áreas prometedoras para un mayor desarrollo de las universidades: profundizar la relación entre la educación superior, la ciencia y la industria, en particular en la dirección de la comercialización de la investigación; garantizar la autonomía universitaria (incluida la autonomía financiera), la flexibilidad y la digitalización de la educación superior; uso del aprendizaje a distancia; actualización periódica de material educativo de acuerdo con las demandas de los negocios y los últimos logros del progreso científico y tecnológico.

Palabras clave: Comercialización de innovaciones. Desarrollo innovador. Globalización. Institución de educación superior. Transferencia tecnológica.

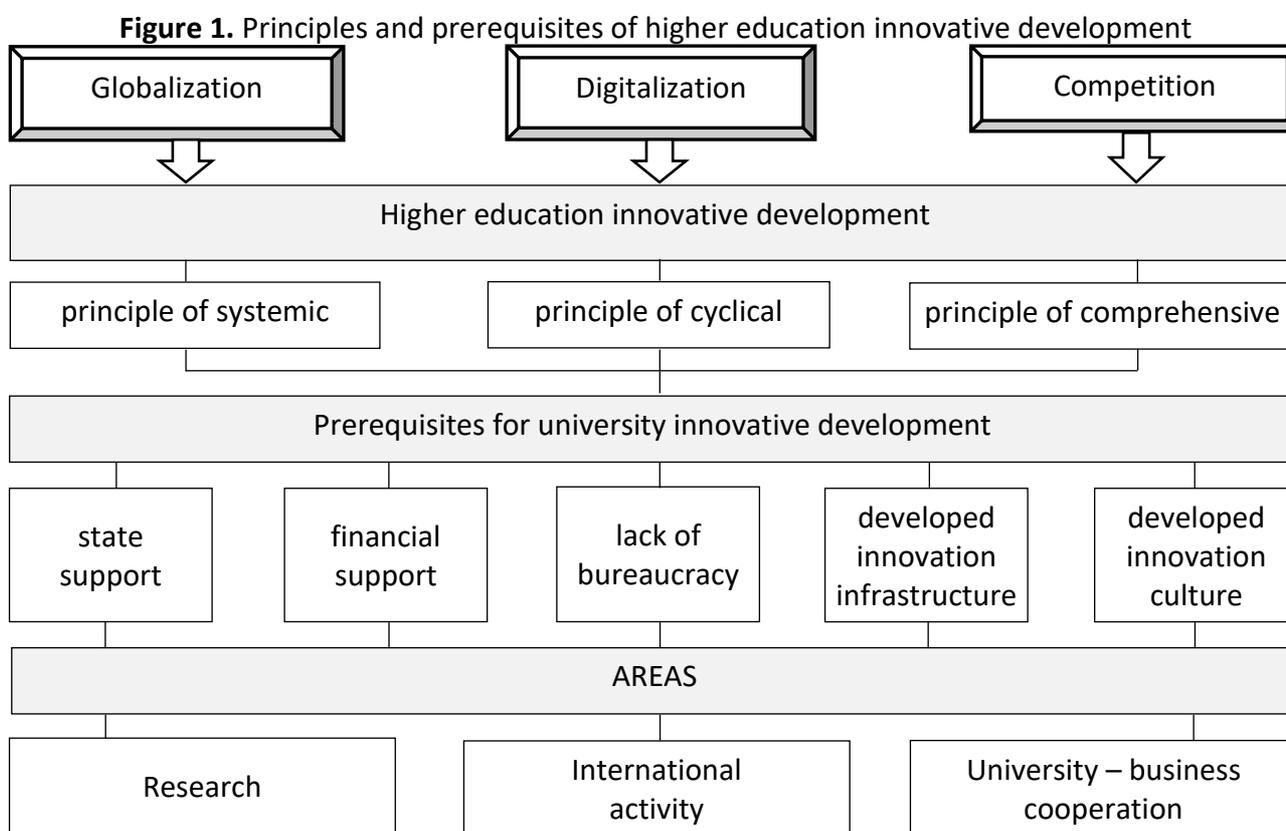
INTRODUCTION

Absolute urgency in current conditions of society knowledge formation, intensification of globalization processes, intensification of competition in educational services market is the need to develop higher education on an innovative basis. Ensuring a strong country competitive position on the world stage requires awareness of the unique role of education in socio-economic, innovative, humanitarian, moral-ethical and spiritual society development.

Typical for post-Soviet countries higher education system weaknesses, which hinder its innovative development, are insufficient funding, low level of innovative infrastructure and culture development, intellectual migration, shortcomings of innovation management. Minimizing the manifestation of these trends requires the development of scientifically sound recommendations

for improving organizational and economic aspects of national higher education system innovative development.

Successful innovative development of higher education system is possible only on the principles of systemic, cyclical and comprehensive. Common prerequisites for innovative development are decentralization and flexibility of management, democratization, digitalization and informatization of higher education (Fig. 1).



In general, it is appropriate to talk about stimulating the innovative development of educational and methodological, researching, financial and economic, educational and international activities of higher education institutions. In particular, educational and methodological activities should be focused on constant updating in accordance with changes in the external environment in order to transfer to students only relevant knowledge. Innovative development of financial and economic activities should be aimed at finding new funding sources for higher education institutions to ensure appropriate material and technical conditions for students' training.

Main guidelines in the development of higher education institutions' scientific activities are invention, development of unique innovations. The educational activities development in the system of higher education primarily involves the formation of a full-fledged personality, capable of innovative thinking and acting in today's changing conditions. In our opinion, the need to find innovative forms of international activities development of higher education institutions, as well as the development of cooperation with business structures, has become especially important today.

LITERATURE REVIEW

Globalization can be represented as a set of processes that differ from each other in origin, scope, mechanisms and consequences, which have different effects on the state of the world economic system, taking into account economic development (Kolot, 2014; Popelo, 2017; Moreno, 2017). Different types of economic development will produce different results in terms of economic

growth tempo and sustainability, productivity and living standards of the country. The country's rating on the world market is determined by the nature of used technologies (production, management, information). First of all, countries differ in the level of technological development they have achieved or are able to achieve (Zatonatska et al., 2019; Sandal et al., 2020). The higher is the technology level, the greater opportunities for market management they create. The country economic power grows during the change of direction from the production of simple goods to the production of innovative goods and creation of new, unique production technologies.

Ukrainian education system in general, and each university in particular, is responsible for the most important economic development factor - intellectual resources with necessary technological knowledge and skills, the ability to constantly improve competence level (Rodrigues, 2017; Mammadov, 2019; Lim, 2017; Lavrov et al., 2021; Detsiuk, 2020; Kosach et al., 2021;).

Today globalization is accompanied by active digitalization processes of all spheres. Following publications are devoted to the study of various transformation aspects of the higher education institutions in the context of society digitalization processes : Barzman al. (2021), Bazhenkov et al. (2021), Cosmulese et al. (2019), Djakona et al. (2021), Grosu et al. (2021), Kholiavko et al. (2020), Melnychenko et al. (2022), Obushna et al. (2021), Santos et al. (2019), Tkalenko et al. (2017), Tømte et al. (2019), Zhavoronok et al. (2021) and other. Major articles are aimed at studying peculiarities of changing universities' activities, the introduction of innovations based on ICT (Youssef et al., 2008; Shkoda et al., 2008; Ugur, 2020; Toader et al., 2021). Despite the availability of thorough research on the higher education institutions development, improving the organizational and economic support of innovative development, in-depth study requires the identification of priority areas universities innovative development under the globalization conditions.

METHODS

During the study a set of scientific and specific knowledge methods was used. In particular, a method of content analysis was used to determine the essence of innovative development of national higher education system. The usage of analysis and synthesis methods has identified three main areas in which universities should focus in order to intensify the pace of their innovative development. Scientific abstraction and systematization method allowed to form a holistic author's vision of higher education innovative development promising areas in modern conditions of digitalization and globalization of scientific and educational space.

The purpose of an article is to determine main improving directions of innovative development organizational and economic support universities innovative development under the globalization conditions.

RESULTS

First of all, the importance of intensifying state support for higher education system innovative development should be emphasized. In particular, at national level it requires the development and implementation of an effective incentives system for universities and enterprises to organize joint activities to implement innovative projects. Motivation tools in this case can be tax benefits, grants, free consulting services and more. At the same time, public-private partnership development and social responsibility of business become fundamentally important.

Effective innovative development of national higher education system is possible if country has a holistic innovation strategy, consistent with priorities for the development of universities' innovative activities. An equally important area of improving organizational, managerial and economic aspects of higher education modernization on an innovative basis is the formation of a state strategy for targeted funding for higher education institutions innovative development.

Innovative development issues of higher education institutions' international activities cause special scientific interest. This is due to the intensification of globalization processes that have penetrated into all spheres of public life, including higher education. For vast majority of countries around the world, a number of international cooperation educational programs are available, which provide grants for innovative projects implementation. The most popular are the European Union's international educational programs, such as Erasmus +, the United States Grant Program, the Fulbright Program, and many others. Despite specific features of each individual international cooperation educational program, we can identify main vectors of their operation: providing individual study grants (bachelor's, master's and doctoral programs), teaching or conducting research in selected universities around the world; financing of projects for training courses modernization – development and implementation of innovative training courses for highly qualified specialists; financing projects aimed at deepening contacts between higher education institutions and society, labor market, employers, entrepreneurs.

We consider students' mobility and scientific and pedagogical staff of higher education institutions to be an actual and perspective direction of international contacts development in the higher education system. The mobility of scholars abroad and teachers, lecturing at foreign universities, is gradually increasing. It should be noted that there are significant perspectives for enhancing student mobility, but often much more effective is the professors' invitation from foreign universities to give lectures at domestic universities. Thanks to the latter, more students (compared to the number of students studying abroad) will receive new knowledge and advice from a leading lecturer-researcher from abroad.

A very effective form of international cooperation between higher education institutions are universities' consortia, created by combining human and scientific potential of participants to achieve common goals (exchange of students, teachers, scientists; new learning technologies introduction; training courses development; conducting research; development of innovative educational and research projects), attracting private investment, etc. Perspectives for universities' consortia creation and operation is primarily to increase opportunities to attract talented scientists, inventors, lecturers; acquisition of patents, licenses, copyrights; implementation of large-scale innovation projects; attracting sponsorship funds; receiving grants from international organizations and foundations; expansion and renewal of the material base; improving the quality of educational services; improving competitive positions in the international arena, etc. We consider it necessary to emphasize that the creation of university consortia and the opening of higher education institutions branches are completely different forms of educational institutions' international activities, which have become significant over the past few years.

Within the framework of university consortia, students are provided with opportunities for parallel studies in several higher education institutions and, as a result, obtaining double diplomas. Obtaining a diploma from a foreign university is quite prestigious and promising. However, in this context, it is necessary to ensure the efficiency and transparency of the diplomas nostrification procedure of foreign higher education institutions at the national level. In general, obtaining double diplomas (domestic and foreign educational institutions) can increase the competitiveness of educational institutions graduates in both domestic and international labor markets. The latter, in turn, helps to improve the position of the consortium's higher education institutions in international rankings and thus attracts the attention of foreign students, which is especially relevant in today's difficult demographic situation in the European Union and the United States.

Attracting foreign students requires a systematic current demands study of domestic and world labor markets, demands and interests of students, as well as constant information activities to promote national universities abroad, improve their image, increase prestige and position in world rankings. Essential in increasing the interest degree of foreign students in the national higher education system are such means, as regular participation of domestic universities representatives

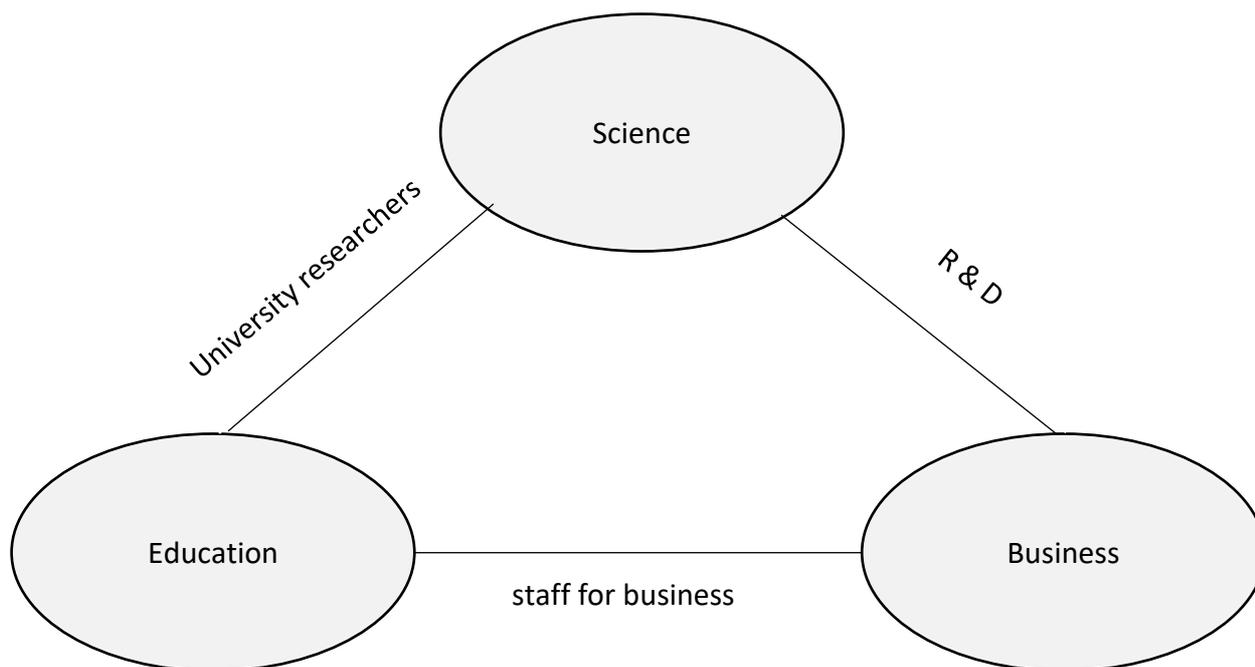
in international exhibitions, fairs, conferences, symposiums, lectures abroad, distribution of advertising materials in the media and the Internet. Increasing the number of foreign students can be achieved by implementing distance learning programs, developing the practice of obtaining double degrees, minimizing bureaucratic moments in the nostrification of foreign universities diplomas, organizing training in English, French and German at the student's choice, establishing branches or training centers abroad and etc.

Modernization of higher education system in the modern globalization context raises the issue of creating world-class universities. After researching this issue, J. Selmi concludes that there are three main strategic approaches to the formation of world-class universities: - modernization of existing higher education institutions; unification of existing higher education institutions; new universities creation. World-class universities will in the future be clear leaders in the market of educational services (carry out training of highly qualified specialists, competitive on the labor market), including the world market (attract the largest number of foreign students); leaders in the field of scientific activity (outstanding scientists, powerful material and technical research base, a complex of fundamental and applied works), innovation activities (a significant share of scientists in the state, significant amounts of innovative developments patenting, large-scale commercialization of innovations), and will gain high rating, communication with business, society and significant funding amounts.

Transformation of higher education institutions' functions, taking into account innovative transformations of national economy, leads to the formation of research universities. Main functions of such entities include conducting basic and applied research, development of innovations, commissioned by domestic and foreign enterprises, commercialization of innovations, technology transfer, research results publication, scientific and practical activities and more. For today, priority research areas at universities in leading countries (United States, Japan, European Union) are: nanotechnologies, information and communication technologies, biotechnologies, environmental protection, space technologies, life sciences, transport, energy, etc. In addition, research universities are engaged in the study, systematization and analysis of world best practices of higher education institutions' innovative activities in order to successfully adapt and test them within the national economy.

We consider regular organization and holding of international scientific events: conferences, seminars, round tables, symposiums, research, exhibitions, etc., to be an important direction in the development of the higher education system on an innovative basis. Modern information and communication technologies allow comparatively profitable (from a financial point of view) to conduct Internet conferences, online lectures, seminars, workshops. In addition to the above, we consider promising the activity to prepare joint publications that reflect general research results. This creates real conditions for new knowledge and achievements exchange, as well as provides an exchange of thoughts and views on the subject of research between scientists from different countries. In general, it stimulates the generation of unique ideas, that form innovative projects basis, the practical implementation of which will make radical changes, significantly modernize higher education system.

In close connection with the intensification of international activities, we consider it appropriate to seek innovative development forms of higher education institutions' scientific activities. The main activity vector in this case is the implementation of measures within the so-called "knowledge triangle" (Fig. 2).

Figure 2. Principles and prerequisites of higher education innovative development

It is primarily a matter of creating the closest and long-term relationship between the higher education system, science and business. Modern realities dictate new requirements for the activities of universities. One of the priority modernization tasks of the higher education system is the need to minimize the gap between academic education, science and business practice of economic entities.

Convergence of science and practice is possible by ensuring practical orientation of the inventive activity of higher educational institutions' scientists (focus on solving specific local, regional, national or global problems). It is necessary to make a conscious transition from development on the principle of "science for science" to focus on solving pressing problems of the national economy. This is not a complete and absolute focus of scientific activity on solving applied problems in the absence of basic research. Of course, basic scientific works are relatively expensive in terms of their funding, but they are necessary because they form the basis for further development of science, technology and engineering. In addition, the involvement of creative students in research is promising, as they can often bring or discover unique and non-standard aspects of research.

The effectiveness of scientific activity is determined, in particular, by the commercialization level of scientific universities' innovative developments. The spread of globalization processes creates real opportunities for joint research by scientists from several countries in order to implement their results within several countries. A promising direction in the development of universities' scientific activities today is the transfer of innovative technologies, which involves the exchange of advanced knowledge and achievements, as well as promotes the creation of new discoveries based on them.

The development of scientific activity in the short, medium and long term should be carried out in conjunction and coordination with current needs and demands of society. Generating ideas, developing on their basis and further implementation of innovative projects, aimed at solving socially important problems, - one of the priorities for scientific activities' development of higher education institutions.

Given an active dynamism of the environment, it is relevant to ensure the innovative development of educational and methodological activities of the university. It is a question of active introduction in pedagogical practice innovations and approbation of author's methods while

students' training. The administration of higher education (at the micro level) and representatives of the Ministry of Education (at the macro level) should create all favorable conditions that encourage research and teaching staff to generate innovative ideas and develop options for their effective implementation in the educational process. In this case we mean both material (increase in wages, salary increases, bonuses, valuable gifts) and intangible (diplomas, public recognition, gratitude, etc.) incentives for the most successful and active innovators of the educational process.

Important in the modernization of educational process we consider the introduction of an individual approach to each student, providing practice in innovative enterprises, opportunities to implement their ideas in the preparation and writing of dissertations, which will later be implemented in enterprises. This gives senior students a chance to demonstrate their abilities and continue to find successful employment.

Examining innovative development prospects of national higher education system in the direction of improving educational and methodological activities of universities, it should be noted that it should focus on meeting market demands for highly qualified specialists in innovation, as well as providing retraining and advanced training. In addition, it is important to develop and implement curricula, programs, tools, technologies and methods of lifelong learning (especially - specialists in the field of innovation management).

We consider it promising to involve business representatives in the development of key provisions of the lifelong learning concept (lifelong learning). The latter ensures establishment of business contacts between business sector and higher education institutions, the convergence of education system, academic science and industry. In general, the integration of science, education and business by finding new forms of their interaction is one of key areas of higher education innovative development in modern economic conditions.

Educational and methodical activity of higher education institutions in modern conditions is realized under the influence of globalization processes. Promising in this context is the development of innovative curricula and interdisciplinary courses, the introduction of distance learning. Moreover, international educational programs, that operate today, provide grant assistance in the implementation of these activities, as well as often - in the organization, equipment and support of specialized training laboratories. In general, the diversification of types and forms of higher education institutions provide educational services - their strong competitive advantage in domestic and global markets.

Among priorities of expanding the cooperation scale between universities and business, a special place is occupied by the formation of an orders' portfolio from enterprises for scientists to conduct applied research. In recent years, the level of business interest in the results of universities' research activities has increased. This is manifested, inter alia, in the form of licenses acquisition by companies for commercial use, patented inventions introduction into production. We consider the development of enterprises' financing practice to initiate and implement innovative projects, aimed at creating knowledge-intensive products, to be promising in this direction. Cooperation between universities and business is focused on ensuring the commercialization of scientific researches, provided by university scholars, technology transfer. The prerequisites for the above are the broad autonomy of higher education institutions, the development of innovation culture and innovation infrastructure. The autonomy of universities helps to increase their degree of maneuverability, flexibility and freedom in deciding on the choice, setting deadlines and funding for innovation. It is crucial to ensure full coordination of innovative projects with programs and perspectives of all areas of university activities' development.

Effective innovation development is possible only in the presence of appropriate infrastructure, necessary for full implementation of innovation and research activities. Promising in this context is the creation of techno-park structures and business incubators at higher education institutions, which concentrate the innovative potential of scientific, pedagogical and student staff

of universities. Functioning of technopark structures involves continuous improvement of scientific and experimental research base, deepening cooperation between universities, attracting new business partners, potential investors, involving NGOs.

Innovation infrastructure successful functioning is largely determined by the quality characteristics of services provision, led by scientific advisory groups. It is advisable to involve independent highly qualified experts in assessing the effectiveness of innovation in higher education, and in assessing the results of large-scale innovation - the formation of independent expert teams, which include experienced and recognized domestic and foreign experts in innovation management.

The foundation of innovative development is the development of innovative society culture. At the national and micro levels, creative freedom atmosphere for university scientists in their professional activities is of special importance. It is in such conditions that the development of relationships in the chain "education – science – innovation – business" is ensured.

Carrying out the development analysis of higher education institutions' financial activity, we can allocate its following perspective directions:

- diversification of funding sources;
- intensification of investments inflow from private and foreign sources;
- development of the state targeted financing strategy of higher education system innovative development, which provides for an increase in the share of state funding for higher education institutions' activities;
- development of the patronage support practice of universities (first of all by successful graduates);
- raising funds through the licenses sale for the use of innovative developments of higher education institutions' inventors;
- attracting financial resources through the sale of universities' scientific products;
- intensification of higher education institutions international activities in order to attract grants from international organizations and foundations;
- participation in competitions for scholarships and grants of national and state programs;
- expansion of the state contractual subject of scientific works, ie the scope of signing contracts for research, commissioned by enterprises, etc.

In the studied context, the formation of universities' endowment funds is promising. The fund is filled at the expense of charitable contributions (patrons, graduates of higher educational institutions, etc.). Principal characteristic of the endowment is a clear target orientation - innovative development of the university. In the United States, the practice of endowment funds is quite common (in particular, in funding the country's leading universities - Harvard, Yale, Princeton, Stanford universities). Moreover, financing from the endowment fund is about half of the total budget of these universities.

Financial activities' development of higher education institutions, in our opinion, is inextricably linked with the financial autonomy expansion of universities with optimal, moderate control and regulation by government agencies. It is expedient to focus financial activities on updating and ensuring proper condition of the universities' material and technical base, intensification of student and teaching mobility.

CONCLUSION

Effective management of higher education system's innovative development involves qualified monitoring of the achieved results. We consider the creation of a comprehensive information system of implemented innovations by higher education institutions to be promising. The complexity of this system should be reflected in the provision of comprehensive information about innovations, features of their implementation, quantitative and qualitative composition of

teams, funding, level of support from the state and NGOs, costs, profits or benefits, the degree of achievement. At the same time, given legal restrictions - copyright, intellectual property rights. Providing open access to the information system, promotes dissemination of best practices and encourages the intensification of universities' innovative activities.

Innovative development intensification of the national higher education system should be carried out in three main areas: research, cooperation with business and international activities. Promising areas for the development of higher education institutions' research activities are: the creation of specialized research structures in universities; development and motivation for innovation; technology transfer; development of technopark structures, etc. Priorities for the development of international universities' activities can be identified as follows: mobility activation of students, teachers, scientists and administrative staff of educational institutions; creation and development of functioning practice of university consortia; improving the participation effectiveness in competitions and grant programs of international funds and organizations; implementation of large-scale educational and research projects at the expense of international grants, etc. Deepening the cooperation of higher education institutions with business sector should be implemented by: forming an orders' portfolio for research by university researchers; research results patenting and further sale of licenses for its commercial use; commercialization of innovations, etc.

At the national level, main support areas for the innovative development of higher education are: forming of long-term and specific strategies for the development of education system; supporting universities in creating competitive advantages at the national and global levels; development of innovation infrastructure; development of innovative society culture; mechanisms formation for technology transfer and commercialization of research results; motivation and support of initiatives on financing sources diversification of universities' innovative activity, etc.

Authors' Contributions: Shaposhnykov, K.: conception and design, acquisition of data, analysis and interpretation of data, drafting the article, critical review of important intellectual content; Filyppova, S.: conception and design, acquisition of data, analysis and interpretation of data, drafting the article, critical review of important intellectual content; Lagodiienko, V.: conception and design, acquisition of data, analysis and interpretation of data, drafting the article, critical review of important intellectual content; Krylov, D.: conception and design, acquisition of data, analysis and interpretation of data, drafting the article, critical review of important intellectual content; Svinarova, H.: conception and design, acquisition of data, analysis and interpretation of data, drafting the article, critical review of important intellectual content. The authors have read and approved the final version of the manuscript.

Ethics Approval: Not applicable.

Acknowledgments: This research is carried out with in the frame work of the scientific project "Introduction of university autonomy in the context of decentralization of free economic management, democratization of the educational process" with the support of the Ministry of Education and Science of Ukraine (state registration number 0122U002357).

REFERENCES

Barzman, M., Gerphagnon, M., Aubin-Houzelstein, G., Baron, G.-L, Bénart, A., Bouchet, F., Dibie, J., Gibrat, J.-F., Hodson, S., Lhoste, E., Martin, C., Moulier-Boutang, Y., Perrot, S., Phung, F., Pichot, C., Siné, M., Venin, T., & Mora, O. (2021). Exploring Digital Transformation in Higher Education and Research via Scenarios. *Journal of Futures Studies*, 25(3), 65-78.

Bazhenkov, I., Kholiavko, N., Popelo, O., Shaposhnykova, I., & Sheremet, O. (2021). Information and communication technologies as a tool of strategy for ensuring the higher education adaptation to the digital economy challenge. *International Journal of Computer Science and Network Security*, 21(8), 187-195.
<https://doi.org/10.22937/IJCSNS.2021.21.8.25>

Cosmulese, C. G., Grosu, V., Hlaciuc, E., & Zhavoronok, A. (2019). The Influences of the Digital Revolution on the Educational System of the EU Countries. *Marketing and Management of Innovations*, 3, 242-254.
<https://doi.org/10.21272/mmi.2019.3-18>

- Derhaliuk, M., Popelo, O., Tulchynska, S., Mashenkov, K., Berezovskyi, D. (2021). State policy of the potential-forming space transformation in the context of the regional development intensification. *CUESTIONES POLÍTICAS*, 39(70), 80-93. <https://doi.org/10.46398/cuestpol.3970.04>
- Detsiuk, T., Kholiavko, N., & Tarasenko, O. (2020). Extracurricular activity of engineering students: trends and motives. *Journal of Educational Sciences & Psychology*, X(LXXII), 1, 67-72.
- Djakona, A., Kholiavko, N., Dubyna, M., Zhavoronok, A., & Fedyshyn, M. (2021). Educational dominant of the information economy development: a case of Latvia for Ukraine. *Economic Annals-XXI*, 192(7-8(2)), 108-124. <https://doi.org/10.21003/ea.V192-09>
- Ivanova, N., Popelo, O., Avhustyn, R., Rusak, O., Proshchalykina, A. (2022). Marketing Strategy of the Small Business Adaptation to Quarantine Limitations in the Sphere of Trade Entrepreneurship. *IJCSNS International Journal of Computer Science and Network Security*, 22(1), 149-160. <https://doi.org/10.22937/IJCSNS.2022.22.1.21>
- Filyppova, S., Abramova, A., Vdovenko, N., Kotelevets, D., Lozychenko, O., Malin, O. 2021. Regulatory policy transformation in conditions of nonstationary economy in eastern European countries: practical approach. *International Journal of Computer Science and Network Security*, 21(10), 39-48.
- Filyppova, S., Lagodiienko, V., Duka A., Bulyuk V., Rybalko, S., & Svinarova, H. (2021). Methodological principles of the implementation of the integrated model of the higher education competitiveness in the conditions of digital economy. *Laplage em Revista (International)*, 7(3A), 309-323.
- Fedyshyn, M.F., Marich, M.G., & Abramova, A.S. (2018). The influence of credit factors on the development of the real economic sector in the conditions of economic. *Financial and credit activity: problems of theory and practice*. 2(25), 366-374.
- Grosu, V., Kholiavko, N., Safonov, Yu., Zhavoronok, A., & Cosmulese, C.G. (2021). Quintuple Helix Model: Investment Aspects of Higher Education Impact on Sustainability. *Management Theory and Studies for Rural Business and Infrastructure Development*, 43(1), 111-128.
- Ivashchenko, A. I., Sybirianska, Yu. V., & Polischuk, Ye. A. (2017). Information and Communication Platform as a Complex Approach for Solving Information Asymmetry Problems. *CEUR-WS Conference Proceedings*, 111-127.
- Kalenyuk, I., Grishnova, O., Tsymbal, L., Djakona, A., & Panchenko, E. (2020). Formation of intellectual corporate capital: methods and modern trends. *Bulletin the National academy of sciences of the Republic of Kazakhstan*, 1(383), 182-191. <https://doi.org/10.32014/2020.2518-1467.23>
- Kholiavko, N. I. (2019). Diversification of Financing Sources of Heis in Ukraine. *Financial and credit activity: problems of theory and practice*, 3(30), 510-516.
- Kholiavko, N., Djakona, A., Dubyna, M., Zhavoronok, A., & Lavrov, R. (2020). The higher education adaptability to the digital economy. *Bulletin of the National Academy of sciences of the Republic of Kazakhstan*, 4(386), 294-306. <https://doi.org/10.32014/2020.2518-1467.130>
- Kholiavko, N., Zhavoronok, A., Marych, M., Viknianska, A., Kozlovskiyi. S., Herasymiuk, K. (2020). Countries disposition in the global scientific and educational area: management and clustering. *International Journal of Management*, 11(5), 400-415.
- Kolot, A. (2014). Interdisciplinary approach as a prerequisite for the development of economics and education. *Bulletin of Taras Shevchenko National University of Kyiv. Economy*, 5(158), 18-22.
- Kosach, I., Shaposhnykov, K., Chub, A., Yakushko, I., Kotelevets, D., Lozychenko, O. (2022). Regulatory policy in the context of effective public governance: evidence of Eastern European Countries. *Cuestiones Políticas*, 40(72), 456-473.
- Kovalenko, Yu., Vitrenko, L., Onyshko, S., & Bohrinovtseva, L. (2020). The State Higher Education Institutions Financing in Ukraine. *Proceedings of the 35rd International Business Information Management Association Conference*, 1-2 April 2020 Seville, Spain, 7029-7040.
- Lagodiienko, N., Yakushko, I. (2021). Digital Innovations in Taxation: Bibliometric Analysis. *Marketing and Management of Innovations*, 3, 66-77.
- Lagodiienko, N., Yakushko, I. (2021). Development of the Taxation System in the Conditions of Digital Transformation of the National Economy. *Financial and Credit Activity: Problems of Theory and Practice*, 5(40), 378-388.
- Lavrov, R., Djakona, A., Anisimova, L., Koval, O., Polkhovska, M., Shumaieva, S. (2021). Digital Technologies and Rankings as Tools of the Competitiveness in the Educational Services Market. *International Journal of Computer Science and Network Security*, 21(11), 49-58.

- Lim, W. (2017) Improving Student Engagement in Higher Education through Mobile-Based Interactive Teaching Model Using Socrative. *IEEE Glob. Eng. Conf.*, 404-412.
- Mammadov, N. S. oglu, Sokolova, S., & Kholiavko, N. (2019). Development of students' foreign language communicative competence in context of internationalisation and informatisation of higher education. *Advanced Education*, 6(11), 22-29.
- Melnychenko, A., Kholiavko, N., Popelo, O., Derhaliuk, M., & Grynevych, L. (2022). The Role of Higher Education in the Digital Economy Development. *Revista Tempos E Espaços Em Educação*, 15(34), e16773. <https://doi.org/10.20952/revtee.v15i34.16773>
- Moreno, V., Cavazotte, F., & Alves, I. (2017). Explaining university students' effective use of e-learning platforms. *Br. J. Educ. Technol.*, 48 (4), 995-1009.
- Obushna, N., Djakona, A., Iegorov, B., Tkachuk, I., Ostrovska, N., Popova, L. (2021). Development of Competitive Advantages of the National Higher Education System in the Digitalization Conditions. *International Journal of Computer Science and Network Security*, 21(10), 13-20.
- Polishchuk, Y., Kornyluk, A., Britchenko, I. (2019). University as a core of e-learning ecosystem. *E-learning: Unlocking the Gate to Education around the Globe 14th conference reader*, Prague: Center for Higher Education Studies Location: Microsoft, Prague, Czech Republic Date: JUN 20-21, 309-319.
- Popelo, O. V. (2017). Methodological approaches to modernization processes of the productive forces in the conditions of Eurointegration. *Scientific Bulletin of Polissia*, 1(1(9)), 218-224.
- Popelo, O., Kholiavko, N., & Tulchynska, S. (2021) Priority directions of increasing the adaptivity of universities to the conditions of the digital economy. *Revista Tempos E Espaços Em Educação*, 14(33), e16383. <https://doi.org/10.20952/revtee.v14i33.16383>
- Rodrigues, L. S. (2017). Challenges of digital transformation in higher education institutions: A brief discussion; Proceedings of the 30th International Business Information Management Association Conference, *IBIMA 2017—Vision 2020: Sustainable Economic Development, Innovation Management, and Global Growth*.
- Sandal, Ja.-U., Detsiuk, T., & Kholiavko, N. (2020). Developing foreign language communicative competence of engineering students within university extracurricular activities. *Advanced education*, 14, 19-28. <https://doi.org/10.20535/2410-8286.192411>
- Santos, H., Batista, J., & Marques, P. (2019). Digital transformation in higher education: the use of communication technologies by students. *Procedia Computer Science*, 164, 123-130.
- Shkarlet, S., Ivanova, N., Popelo, O., Dubyna, M., Zhuk, O. (2020). Infrastructural and Regional Development: Theoretical Aspects and Practical Issues. *Studies of Applied Economics*, 38-3(1).
- Shkoda, T., Tepluk, M., & Sahaidak, M. (2020). Intellectual Potential Management in Forming Strategic Partnership of Science-Business-Education. *Baltic Journal of Economic Studies*, 6(5), 221-232. <https://doi.org/10.30525/2256-0742/2020-6-5-221-232>
- Tkalenko, N., Kholiavko, N., & Hnedina, K. (2017). Vectors of Higher Education Sector Transformation in Conditions of the Information Economy Formation. *Scientific bulletin of Polissia*, 4(12), 1, 44-49.
- Toader, T., Safta, M., Titirisca, C., & Firtescu, B. (2021). Effects of Digitalisation on Higher Education in a Sustainable Development Framework – Online Learning Challenges during the COVID-19 Pandemic. *Sustainability*, 13, 6444. <https://doi.org/10.3390/su13116444>
- Tømte, C., Fosslund, T., Aamodt, O., Degn, L. (2019). Digitalisation in higher education: mapping institutional approaches for teaching and learning. *Quality in Higher Education*, 25:1, 98-114.
- Tulchynska, S., Popelo, O., Tulchynckiy, R., Khanin, S., Hrechko, A. (2021). Modeling and forecasting of the integrated index of innovation activity of regions. Management Theory and Studies for Rural Business and Infrastructure Development, 43(2), 307-315. DOI: <https://doi.org/10.15544/mts.2021.27>
- Ugur, N. G. (2020). Digitalization in higher education: A qualitative approach. *International Journal of Technology in Education and Science*, 4(1), 18-25.
- Youssef, A.B., & Dahmani, M. (2008). The impact of ICT on student performance in higher education: Direct effects. *Indirect Effects and Organisational Change Revista de Universidad y Sociedad del Conocimiento*, 5(1), 45-56.
- Zatonatska, T. H., Rozhko, O. D., Lyutyty, I. O., Tkachenko, N. V., & Anisimova, O. Y. (2019). Global Practices of Higher Education Financing: Approaches and Models. *Khazar Journal of Humanities and Social Sciences*, 22(4), 95-112.

<https://doi.org/10.5782/2223-2621.2019.22.4.95>

Zhavoronok, A., Chub, A., Yakushko, I., Kotelevets, D., Lozychenko, O., Kupchyshyna, O. (2022). Regulatory Policy: Bibliometric Analysis Using the VOSviewer Program. *International Journal of Computer Science and Network Security*, 22(1), 39-48.

Zhavoronok, A., Shaposhnykov, K., Kholiavko, N., Krylov, D., Morozova, L., & Babiak, N. (2021). Integrated Model of the Higher Education Financing Under the Quadruple Helix Concept. *International Journal of Computer Science and Network Security*, 21(7), 125-132.

Received: 31 January 2022 | **Accepted:** 28 March 2022 | **Published:** 18 June 2022



This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.