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FINANCIAL AND ECONOMIC INSTRUMENTS FOR STIMULATING INNOVATION ACTIVITY: A COMPARATIVE ANALYSIS

The development of Ukraine's innovation economy largely depends on the effectiveness of financial and economic mechanisms supporting innovation activities, which have undergone significant transformations in recent years in the context of European integration and wartime challenges. The purpose of the study is a comprehensive analysis of financial instruments for stimulating innovation in Ukraine, an assessment of their actual effectiveness through specific economic indicators, and a comparison with Polish practices to identify opportunities for improving the domestic system of innovation development support. The paper systematizes the main financial and economic mechanisms used in Ukraine to support innovation activities, including state grant programs through the National Research Foundation of Ukraine, tax preferences for innovative enterprises, and venture financing mechanisms with state participation. The conducted analysis demonstrated that the volume of state financing for innovation in Ukraine remains insufficient compared to European standards, amounting to less than one percent of GDP, while in Poland this indicator exceeds one and a half percent. It was revealed that despite the presence of legislatively established tax benefits for innovative enterprises, the mechanisms of their practical application require simplification and increased transparency of administration. The comparative analysis with Polish experience allowed identification of promising directions for improving the Ukrainian system, particularly the introduction of automated mechanisms for providing tax credits for research and development, expansion of co-financing programs for innovative projects, and creation of specialized funds to

support technology startups. The research results can be used by state authorities in forming innovation development policy and improving existing financial mechanisms for stimulating innovation activities in the context of post-war reconstruction and Ukraine's European integration.

Keywords: *innovation activity, financial and economic instruments, state support for innovation, grant financing, tax benefits, venture financing, National Research Foundation of Ukraine, comparative analysis, Poland, innovation development.*

Problem setting. The relevance of the study is due to several important factors that determine the current state of the innovation sphere in Ukraine. First, European integration processes require bringing domestic innovation support mechanisms into line with European standards and practices, which involves not only the formal implementation of legislation, but also a real increase in the efficiency of financial instruments. Second, in the conditions of martial law and future post-war reconstruction, innovative development acquires special importance as a factor of economic resilience and modernization of production capacities. Third, global competition for investments and talents requires the creation of a competitive environment for innovation activities, where financial incentives play a key role. Fourth, the limited budget resources in wartime conditions require the most effective use of available financial mechanisms and the search for optimal models of public-private partnership in the innovation sphere.

Analysis of recent research and publications. The issue of financial support for innovation activities attracts the attention of many domestic and foreign researchers who analyze various aspects of this issue. In particular, the issue of state support for innovation has been studied by such scientists asKovalchuk V., who in his works considered the mechanisms of state regulation of innovative development in the context of European integration [1]. An important contribution to the understanding of the financial aspects of innovative activity was made by Danilov O., studying the features of venture financing in Ukraine [2]. Medinska T., Cherevach R. analyzed tax

instruments for stimulating innovations, drawing attention to the insufficient effectiveness of existing benefits [3]. Crow A. considered institutional mechanisms for supporting innovation activity in the public administration system [4]. At the same time, despite the significant achievements of Ukrainian scientists, the issue of comprehensive assessment of the effectiveness of financial instruments through specific economic indicators remains insufficiently researched, and there is also a lack of thorough comparative studies with the practice of Central European countries, in particular Poland, which demonstrates successful experience in transforming the innovation system after joining the European Union.

Formulation of the article's objectives. The purpose of the article is a comprehensive analysis of financial and economic instruments for stimulating innovation activity in Ukraine, assessing their effectiveness through specific economic indicators and comparing them with the experience of Poland to identify promising areas for improving the domestic system of financial support for innovations.

Presentation of the main research material. Innovation activity as an object of state regulation is characterized by a high degree of uncertainty, long payback periods, and significant risks, which necessitate the use of special financial and economic instruments to stimulate it. The theoretical principles of financial support for innovation are based on the concept of market failures, according to which the private sector tends to underinvest in innovation activity due to externalities, information asymmetry, and high transaction costs. That is why the state should compensate for these failures through various instruments of direct and indirect support, creating conditions for the effective functioning of the national innovation system.

The methodological basis of the study is a systematic approach to the analysis of financial and economic mechanisms for stimulating innovation, which involves considering these mechanisms as interconnected elements of a single system of state innovation policy. The use of a comparative method allows us to identify the features of the functioning of financial support instruments in different national contexts and to identify best practices suitable for adaptation in Ukrainian conditions. Statistical analysis of quantitative indicators of the effectiveness of financial instruments provides

an empirical basis for an objective assessment of the effectiveness of state innovation support programs. The institutional approach allows us to take into account the influence of formal and informal rules, organizational structures, and procedures on the practical application of financial mechanisms for stimulating innovation activity.

Financial and economic instruments for stimulating innovation can be classified according to various criteria, but the most common is the division into direct and indirect support instruments. Direct support instruments include state grants for research and development work, co-financing programs for innovation projects, direct budget financing of priority research areas, as well as state investments through specialized venture funds. These instruments are characterized by targeted allocation of funds to specific projects or areas of activity, which allows the state to directly influence the structure of innovation activity and support strategically important areas of technological development. Indirect support is implemented mainly through tax mechanisms, in particular, exemption from income tax for enterprises engaged in innovation activities, tax credit for research and development expenses, accelerated depreciation of equipment used in innovation activities, and exemption from import duties on equipment for research and development purposes.

An important characteristic of the effectiveness of financial instruments is their ability to generate a multiplier effect, i.e., to attract additional private investments in the innovation sphere. International experience shows that the greatest efficiency is demonstrated by instruments that combine public funding with mandatory co-financing from the private sector, as this ensures a better selection of projects with high commercial potential and stimulates the responsibility of recipients for the results of the use of budget funds. In addition, mixed financing allows you to increase the total amount of resources directed to innovative development without creating an excessive burden on the state budget.

The effectiveness of financial and economic instruments for stimulating innovation largely depends on the quality of the institutional environment in which they operate. Complex administrative procedures, insufficient transparency of project selection criteria for financing, high transaction costs for processing the necessary

documents, and long decision-making periods can significantly reduce the attractiveness of state support programs for potential beneficiaries. Therefore, the modernization of institutional infrastructure, simplification of procedures, and the introduction of electronic services are no less important tasks than increasing the volume of financing for innovation activities.

Analysis of financing of innovation activity in Ukraine over the past five years demonstrates ambiguous dynamics, reflecting both systemic problems of domestic innovation policy and objective challenges associated with economic instability and martial law. According to the State Statistics Service of Ukraine, the share of innovation expenditures in GDP fluctuated within 0.4-0.7 percent, which is significantly lower than the average European indicator of 2.2 percent and critically insufficient to ensure technological breakthrough. At the same time, the main source of financing of innovations remains the own funds of enterprises, which form about 85 percent of the total volume of innovation expenditures, while the share of the state budget rarely exceeds 5 percent, and foreign investments and loans account for less than 10 percent.

The creation of the National Research Foundation of Ukraine in 2018 was an important step in developing a grant support system for scientific research and innovative developments. The Fund operates on the principles of competitive selection of projects based on international expertise, which should ensure objectivity and transparency in the distribution of funds. During 2020-2023, more than 800 scientific projects were supported through the Fund's mechanisms for a total amount of about 2 billion hryvnias, which indicates a gradual increase in the volume of grant funding [5]. At the same time, the average grant size remains quite modest and is 2-3 million hryvnias, which is often insufficient for the implementation of large-scale innovative projects with high commercial potential. In addition, the application and reporting procedures need to be simplified, as excessive bureaucracy scares off some potential beneficiaries, especially representatives of small and medium-sized businesses.

The system of tax benefits for innovative enterprises in Ukraine is formally quite extensive, but its practical effectiveness raises serious doubts due to the complexity of

obtaining the status of an innovative enterprise and the limited real preferences. According to the Law of Ukraine on Priority Areas of Innovation Activity, enterprises implementing innovations can apply for exemption from import duties on equipment not produced in Ukraine, as well as for inclusion in expenses of double the amount of expenses for the purchase of energy-efficient equipment [6]. However, statistics show that the number of enterprises that have actually taken advantage of these benefits remains meager and does not exceed several dozen per year throughout the country. The reasons for this situation are the complexity of the procedure for obtaining the status of an innovative enterprise, the need to undergo numerous approvals and examinations, as well as the lack of automated mechanisms for applying benefits.

The issue of venture capital financing of innovative projects, which in developed countries is one of the main sources of capital for technological startups, deserves special attention. In Ukraine, the venture capital market remains underdeveloped, and the volume of investments is disproportionate to the potential of the domestic innovation sector. According to estimates by the Ukrainian Association of Venture and Private Capital, the total volume of venture investments in 2019-2022 ranged from 500-800 million US dollars per year, with the bulk of these funds coming from foreign funds and directed to the IT sector [7]. State participation in venture financing is minimal, although in many European countries, state and semi-state venture funds play an important role in supporting innovations at the early stages of development, when private investors are not yet ready to take on high risks.

Poland's experience in the field of financial support for innovation is of considerable interest to Ukraine as an example of the successful transformation of the innovation system in a post-communist country that became a member of the European Union. After joining the EU in 2004, Poland gained access to the Union's structural funds, which allowed it to significantly increase the amount of funding for innovation activities and modernize the institutional infrastructure for supporting innovation. The share of research and development spending in Polish GDP increased from 0.56 percent in 2004 to 1.45 percent in 2022, which indicates a consistent increase in investment in the innovation sector [8]. At the same time, the financing structure is

more balanced compared to Ukraine: the public sector provides about 40 percent of research and development spending, the business sector - about 55 percent, and the rest falls on foreign sources and non-profit organizations.

The Polish system of grant support for scientific research and innovation projects operates through the National Research and Development Center, which annually announces competitions in various thematic areas with clearly defined selection criteria and transparent procedures for evaluating applications. The amount of funding through grant programs is about 1.5 billion euros per year, which allows supporting several thousand projects of various scales - from fundamental research to applied developments with high commercial potential [9]. An important feature of the Polish model is the presence of specialized programs for different categories of beneficiaries: separately for young scientists, for industrial consortia, for international cooperation and for the commercialization of research results. Such differentiation allows for better taking into account the specific needs of different participants in the innovation process and increasing the overall efficiency of grant mechanisms.

The system of tax incentives for innovation in Poland is based primarily on the mechanism of tax credit for research and development expenses. Companies can reduce their taxable profit by the amount exceeding the actual R&D expenses, applying a coefficient of 1.5 to 2.0, depending on the size of the company and the nature of the expenses. This means that a company that spent PLN 1 million on research can reduce its taxable profit by PLN 1.5-2 million, which creates a powerful incentive for investing in innovation [10]. Importantly, the system works automatically and does not require prior receipt of a special status - it is enough to properly document R&D expenses and include them in the tax return. According to the Polish Ministry of Finance, the number of companies that took advantage of the R&D tax credit increased from 2.5 thousand in 2018 to over 6 thousand in 2022, and the total amount of tax benefits exceeded PLN 4 billion.

An important element of the Polish innovation support system is the active participation of the state in venture capital financing through the Polish Development Fund, which manages several specialized venture funds with a focus on technology

startups at various stages of development. The total assets under management of state and semi-state venture capital structures exceed EUR 2 billion, which allows providing financing to hundreds of innovative companies every year. State venture capital funds often act as catalysts for attracting private capital, investing at early stages, and creating conditions for the further entry of private investors in later rounds of financing.

A comparative analysis of the Ukrainian and Polish experiences reveals several key differences that explain the difference in the effectiveness of financial instruments for stimulating innovation. First, the volume of state funding for innovation activities in Ukraine is significantly lower both in absolute terms and relative to GDP, which limits the possibilities of large-scale support for innovation projects. Second, the Polish system is characterized by greater institutional maturity, transparency of procedures, and automation of processes, which reduces transaction costs for beneficiaries and increases the attractiveness of state support programs. Third, Poland demonstrates a more balanced approach to the use of various financial support instruments, combining grants, tax breaks, and venture financing into a single system, while in Ukraine individual instruments often operate in isolation from each other. Fourth, the Polish experience demonstrates the importance of active state participation in venture financing as a mechanism for overcoming market failures at the early stages of development of innovative companies.

At the same time, it should be recognized that direct copying of the Polish experience is impossible and impractical due to differences in economic conditions, institutional environment, and access to external sources of financing, in particular European Union funds. Ukraine needs to adapt best practices, taking into account the specifics of the national context, existing resource constraints, and priorities of post-war reconstruction. However, the basic principles that ensured the success of Polish reforms - transparency of procedures, automation of support mechanisms, differentiation of instruments for different categories of beneficiaries and the active role of the state as a catalyst for private investment - are universal and can be successfully implemented in Ukrainian conditions.

Conclusions. The conducted study of financial and economic instruments for stimulating innovation activity in Ukraine and a comparative analysis with the Polish experience allow us to formulate a number of important conclusions regarding the state and prospects for the development of the domestic innovation support system. The analysis showed that Ukraine has a basic set of financial instruments for stimulating innovation activity, including grant programs through the National Research Fund, tax breaks for innovative enterprises, and elements of venture financing, but the effectiveness of these mechanisms remains insufficient to ensure dynamic innovation development. The key problem is the chronic underfunding of the innovation sector, when the total share of innovation spending in GDP does not exceed 0.7 percent, which is almost three times lower than the average European level.

Grant support through the National Research Foundation of Ukraine demonstrates positive dynamics, but the average size of grants remains modest, and procedures need to be simplified. The system of tax benefits for innovative enterprises has proven to be ineffective due to the complexity of the procedures for obtaining the status of an innovative enterprise, which is confirmed by the meager number of companies that actually took advantage of these benefits. A comparative analysis with the Polish experience revealed critical differences: Poland demonstrates a significantly higher level of state funding, a more balanced structure of funding sources, and a higher degree of institutional maturity of the innovation support system.

Based on the analysis, specific recommendations can be formulated for improving the Ukrainian system. First, it is advisable to introduce an automated tax credit mechanism for expenses related to research and development, modeled on the Polish model. Second, it is necessary to significantly increase the volume of grant funding and diversify programs to provide support for projects at different stages of the innovation cycle. Third, an important direction is to increase the state's participation in venture financing through the creation of specialized funds that would act as catalysts for attracting private capital. In the context of post-war reconstruction and European integration, the modernization of the system of financial support for

innovations should become one of the priorities of state policy, since it is innovative development that can ensure the competitiveness of the Ukrainian economy.

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