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STRATEGIC IMPACT OF INNOVATIONS ON ENTERPRISES FINANCIAL STATE

Abstract. Building a highly efficient national innovation system involves the development of state-owned scientific activity and the innovation activity of industrial enterprises. The purpose of the study is to determine the impact of innovation on the growth of financial resources of enterprises. A review of the literature has shown that enterprises that innovate to improve their processes and differentiate their goods and services are far ahead of competitors in terms of market share, quality, flexibility of production and service processes.

In order to study the impact of innovation on enterprise profitability, the relationship between generalized indicators of realized innovative products, gross value added, and gross profit of enterprises was investigated. The results of the analysis showed that innovation is an important factor in the economic growth of enterprises. It was found that the production of innovative products contributes to the growth of financial results of the enterprise. In order to analyze the general indicators of innovation performance of Ukrainian enterprises, the dependence of the volume of innovative products sold on the overall financing of innovations was analyzed, and the low level of innovation efficiency of Ukrainian enterprises was identified, which is a negative factor holding back the financial growth of enterprises. The analysis of industrial enterprises activity engaged in innovation makes it possible to conclude that significant changes have taken place in the structure of innovative directions. An important task of industrial enterprises innovative development today is the introduction of new production and storage technologies that allow to create quality and safe products. In order to attract foreign investment, it is important for enterprises to develop innovations that solve global economic, industrial, and social problems.

***Keywords*:** innovations, innovative development, financial resources, innovative products, innovation activity, strategy.

Formulas: 0; fig.: 3; tabl.: 3; bibl.: 12.

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СТРАТЕГІЧНИЙ ВПЛИВ ІННОВАЦІЙ НА ФІНАНСОВИЙ СТАН ПІДПРИЄМСТВ

Анотація. Побудова високоефективної національної інноваційної системи передбачає розвиток державної наукової діяльності та інноваційної діяльності промислових підприємств. Мета дослідження — визначити вплив упровадження інновацій на зростання фінансових ресурсів підприємств. Розгляд літературних джерел засвідчив, що підприємства, які впроваджують інновації з метою вдосконалення своїх процесів та диференціації своїх товарів і послуг, значно випереджають конкурентів за ринковою часткою, якістю, гнучкістю процесів виробництва та обслуговування.

З метою всебічного вивчення впливу інноваційної діяльності на прибутковість підприємств було досліджено взаємозв'язок між узагальненими показниками реалізованої інноваційної продукції, валовою доданою вартістю і валовим прибутком підприємств. Результати проведеного аналізу показали, що інноваційна діяльність є важливим фактором економічного зростання підприємств. Було встановлено, що виробництво інноваційної продукції сприяє зростанню фінансових результатів підприємства. Для аналізу загальних показників ефективності інноваційної діяльності підприємств України було також проаналізовано залежність обсягу реалізованої інноваційної продукції від загального фінансування інновацій, було виявлено низький рівень ефективності інноваційної діяльності українських підприємств, що є негативним фактором, який стримує фінансове зростання підприємств. Аналіз діяльності промислових підприємств, які здійснювали інноваційну діяльність, дозволяє зробити висновок, що у структурі діяльності інноваційних напрямів відбулися значні зміни. Важливим завданням інноваційного розвитку промислових підприємств сьогодні є впровадження нових технологій виробництва і зберігання, що дають змогу створювати якісну та безпечну продукцію. Для залучення іноземних інвестицій підприємствам важливо розвивати інновації, які розв'язують глобальні економічні, промислові, соціальні проблеми.

***Ключові слова*:** інновації, інноваційний розвиток, фінансові ресурси, інноваційна продукція, інноваційна діяльність, стратегія.

Формул: 0; рис.: 3; табл.: 3; бібл.: 12.

Introduction. One of the effective economic development priorities in the conditions of transformation processes, among the strategic directions of industrial enterprises competitiveness and profitability increasing is to develop the innovation system. The fulfillment of this important task is possible in the case of the national economy financing and structural and innovation restructuring. Innovative activity of the enterprise is one of the important factors ensuring the competitiveness of modern enterprise, and therefore its profitability, creation of added value, financial growth.

The most important part of economic system is production relations which determine a deep layer of each production mode. The degree of society productive forces development — the level of manufacturers' qualification and technological expansion — defines the efficiency and effectiveness of economic system, the level of labor productivity and ultimately prosperity of population [1, p. 77]. The priority directions of sustainable development of the national economy and long-term strategic goals provide an opportunity to outline ways to increase financing for innovation activities. Innovation is associated with higher productivity and is dependent on interactions with other private and public actors. It is found to be a powerful force of growth in

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developed and developing countries both [2]. Bessant and Pavitt point out that companies which implement innovations are significantly ahead of their competition in terms of market share, profitability, companies' growth, and net income [3]. Another organization's motivation for innovation appears in multiple forms, for instance: acquisition of a new market, improving product quality, enlarging the product range, replacing outdated products, reducing the impact on environment [4]. The study done by Han et al. found that business competitiveness will increase through improvements in four dimensions i.e.: quality, cost, delivery, and flexibility. Innovations have impact at all of these dimensions [5, p. 116].

Innovation contributes to achieving a competitive advantage in several aspects. The most important characteristics of innovations include: strong relationship between market performance and new products, ability to substitute outdated products (shortening product lifecycles), innovation of processes that lead to production time shortening and speed up new product development in comparison to competitors [6]. Thus, the innovations introduction to the activity of manufacturing enterprises provides many opportunities for increasing their competitiveness and improving production. According to Zemplinerová the expenditures on research, development and introduction of innovations are the determining characteristics for gaining a dominant part of the market [7]. The enterprises in novative activity financing depending on factors such as the type of innovation, the firm life cycle and the characteristics of the credit market [8; 9]. In sufficient level of innovations implementation at domestic enterprises negatively affects their activities performance. The ways for its improvement are using the new sources of innovations financing, developing innovations in products producing process, and searching new ways for products quality improvement.

Literature review and the problem statement. R. Chundakkadan and S. Sasidharan investigated and find a positive correlation between government support and the innovative activities of small-medium enterprises; and the impact is more pronounced in the case of financially unconstrained firms [10, p. 27]. By investment in innovation increases, business management can increase performance. However, it is reasonable to note that the timing of the impact on performance should be considered by management in strategic decisions [11]. Within the scope of this paper, we consider the state of innovative activity according to general indicators of innovations expenses. The methodology of the current research is based on the data collected by State statistics service of Ukraine. This organization investigated enterprises activity, innovation financing and indexes of country economic development. We have constructed regression models to find correlation field and determine the dependence of gross profit and gross value added on the dynamics of innovation activity of enterprises. The objective of analysis is identifying the relationship between dependent and independent variables in order to improve the correctness of prediction of the values of dependent variable. Also, the enterprise innovation activity financing considered as an important factor in the enterprise financial growth. In order to analyze the dependence of the volume innovative products sold from the total innovations financing and formalization of this dependence the regression model was presented. As a result of innovation, we consider the volume of realized innovative products, and as expenses — the cost of innovation activities.

Research results. Considering the role of innovation support, we investgated the dynamics of innovative activity according to general indicators of innovations expenses for 2014—2018 years. The data presented in *Table 1*.

Table 1

Aggregated sources of innovation financing for 2014—2018 in Ukraine

Year	Total costs, mln UAH	Innovation expenses total growth, %	Including the expense of funds							
			Own		State budget		Foreign investors		Other sources	
			mln UAH	%	mln UAH	%	mln UAH	%	mln UAH	%
2014	8 045,5	*	4 775,2	59,4	87,0	1,1	2411,4	30	771,9	9,6
2015	14 333,9	80,30	7 585,6	52,9	149,2	1,0	56,9	0,4	6 542,2	45,6
2016	11 480,6	44,41	7 335,9	63,9	224,3	2,0	994,8	8,7	2 925,6	25,5
2017	9 562,6	20,29	6 973,4	72,9	24,7	0,3	1253,2	7,6	1 311,3	13,7
2018	7 700,0	80,52	6 540,3	85,0	451,7	5,8	146,9	1,9	561,1	7,3

Source: [12].

At the *Table 1* the value of absolute indicators of total expenditures for the financing of innovation activity in Ukraine is given. Expenditures total amount in nominal terms decreased from UAH 9562.6 million in 2017 to UAH 7700.0 million in 2018, or 19.48%. This fact is not sufficient for large-scale innovative shifts and economic growth in the country.

The main source for innovation activity funding is the company's own funds which amounted to UAH 6540.3 million (or 85.0% of the total amount of innovation costs). Other sourcesarethe stateand local budget, foreign investors, credit funds. By type of industrial activity in 2018, funding for innovation in the food, light industry, and chemical industry has increased (SSSU, 2019)

During 2016—2018, the share of enterprises engaged in innovation activity by the types of economic activity amounted to 14.6%, incl. technological innovations — 9.5% (5.2% — food products and 7.2% — process), non-technological ones — 8.6% (4.7% — organizational and 6.4% — marketing).

The ratio of the innovation expenditures to GDP for 2014—2018 in Ukraine is given in *Table 2*. In the developed countries, direct public spending on scientific innovation projects is 1.6—3.7% of GDP.

Table 2

Ratio of innovation expenditures to GDP in Ukraine for 2014—2018

Year	GDP, billion UAH	Total expenditures on innovations, mln UAH	Incl. expenses for research and development, mln UAH	The share of innovation expenditures in GDP,%	Share of research and development expenses in GDP, %
2014	1 082,6	8 045,5	996,4	0,74	0,09
2015	1 302,1	14 333,9	1079,9	1,10	0,08
2016	1 411,2	11 480,6	1196,3	0,81	0,08
2017	1 454,9	9 562,6	1638,5	0,66	0,11
2018	1 518,00	7 700,0	1755,6	0,51	0,12

Source: State statistics service of Ukraine.

In 2018, 1609 enterprises engaged to innovation activity, or 16,1% of surveyed industrial enterprises. 905 enterprises sold innovative products at UAH 25.7 billion, or 2,5% of the total volume of industrial products sold.Innovative products were implemented by 600 enterprises, the number of such species was 3661 names, of which 1314 were new types of machinery, equipment, devices, apparatus, etc. Organizational innovations were carried out by 125 enterprises, marketing innovationsby 157 [12].

According to the data (*Table 3*) about innovation activity and the main financial indicators of Ukrainian enterprises for the period 2008—2017, we investigated the relationship between these phenomena.

Table 3

Input data for determining the dependence of gross profit and gross value added on the volumes of innovative products sold

Year	Innovative products sold, UAH mln (X_1)	Gross value added, UAH mln ($У_1$)	Gross profit, UAH mln ($У_2$)	Total amount of innovations financing, UAH mln	Industrial enterprises own capital, UAH mln
2008	19 624,41	89 065	28 535	4 534,6	-
2009	22 674,66	119 971	43 282	5 751,6	258 910,2
2010	27 676,55	150 090	59 289	6 160	310 325
2011	36 004,3	198 368	85 440	10 821	363 110,4
2012	42 417,52	247 872	113 422	11 994,2	397 952,6
2013	28 414,34	214 358	90 569	7 949,9	410 801,9
2014	40 502,32	992 175	68 933,1	8 045,5	424 868,9
2015	50 611,73	1 166 900	106 688,2	14 333,9	526 118,5
2016	46 350,61	1 262 157	86 504,1	11 480,6	680 359,3
2017	48 490,31	1 325 781	80 526,1	9 562,6	1 076 630,4

Note: State statistics service of Ukraine.

The construction and implementation of the innovation-invasive scenario of sustainable socio-economic growth is a permanent, but still unattainable strategic imperative in Ukraine, which

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in future should be the basis for strategic planning and development long-term macroeconomic policy of the state (Steciuk, 2009).

In order to comprehensively study the influence of innovation activity on the profitability of enterprises, the relationship between the generalized indicators ofinnovative products sold, gross value added and gross profit of Ukrainian enterprises was nanalyzed (*Fig. 1*). According to the results of our research, we have constructed regression models for the dependence of gross profit and gross value added on the dynamics of innovation activity of enterprises.

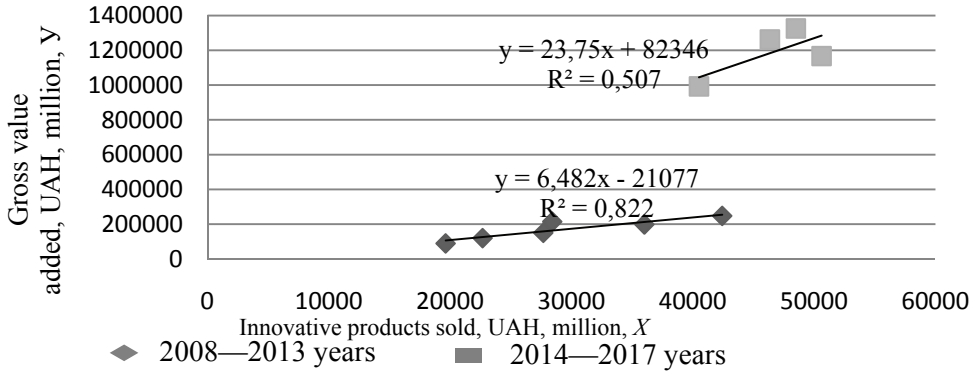

Fig. 1. **Correlation field and dependence models of gross value added from innovation products sold by Ukrainian enterprises (2008—2017).**

Note: authors research.

Based on the graphical analysis of the correlation field of innovative productssold indicators, gross value added and gross profit of Ukrainian enterprises, the period from 2008 to 2017 is divided into two: the first — from 2008 to 2013, the second — from 2014 to 2017. In the first period, the dependence of the gross value added of Ukrainian enterprises on the sales of innovative products is described by the regression model $y_1 = 6{,}4825x$ — 21 077 ($R^2 = 0{,}82$). In the second period, a similar dependence is described by the regression model $y_2 = 23{,}756x + 82\ 346$ ($R^2 = 0{,}51$). Based on these models, we made the following conclusions. In the first period, with the growth of innovative products sold by 1 million UAH the gross value added of Ukrainian enterprises grew by an average of UAH 6.4825 million, while in the second period by UAH 23.756 million, that is, more than four times.

Analyzing the dependence of gross profit on the realized innovatve products sold, we constructedmodels of dependence in two periods (*Fig. 2*).

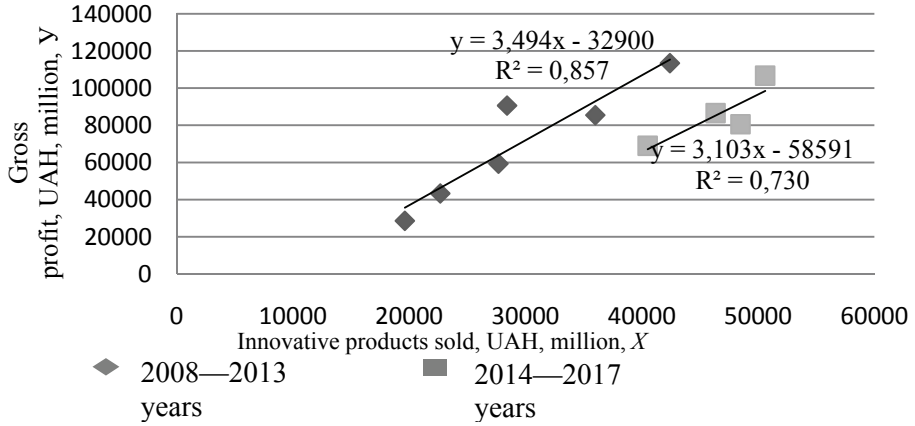

Fig. 2. **Correlation field and models of dependence gross profit on innovative products sold by Ukrainian enterprises (2008—2017)**

Note: authors research.

In the first period, the dependence of Ukrainian enterprises gross profit on the innovative products sales is described by the regression model $y_1 = 3{,}4949x - 3\ 290$ ($R^2 = 0{,}86$). In the second period, a similar dependence is described by the regression model $y_2 = 3{,}103x - 58\ 591$

(R^2 = 0,73). In the first period, with the growth of innovative products sold by 1 million UAH the gross profit of Ukrainian enterprises grew by an average of 3,4949 million UAH, while in the second period by UAH 3,103 million. This is proved the fact that the production of innovative products contributes to the growth of financial results of the enterprise.

Also an important factor in the enterprise financial growth is the effectiveness of the enterprise innovation activity.

In order to analyze the overall performance indicators of Ukrainian enterprises innovation activity, the dependence of the volume innovative products sold from the total innovations financing was analyzed (*Fig. 3*).

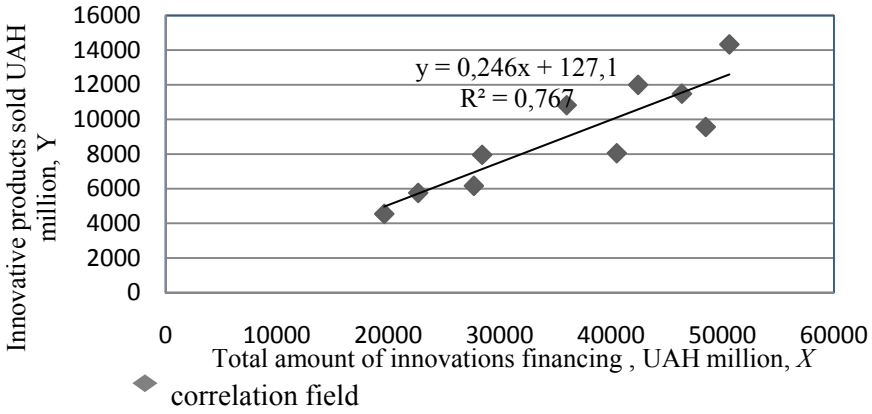

Fig. 3. **Correlation field and dependence models of the innovative products sold from the total amount of innovations financing by Ukrainian enterprises (2008—2017)**

Note: authors research.

Formalization of this dependence is represented by the following regression model $y = 0{,}2463x + 12\ 712$ ($R^2 = 0{,}77$). On the basis of this model, we conclude that, on average, over the period considered, with an increase in the total amount of innovations financing by 1 million UAH the volume of innovative products sales increased by 0,2463 million UAH. That is, the efficiency of Ukrainian enterprises investments amounted to an average 24,63%, which is a very low indicator.

In the regression models considered, the indicator of realized innovation products was used, all types of innovation activity were actually limited to food innovation. However, this does not have a significant impact on the results reliability, since, food innovations are the predominant type of industrial enterprises innovation activity in Ukraine. The results showed that, innovation activity is a significant factor in the financial growth of enterprises. At the same time, a low level of Ukrainian enterprises innovation activity efficiency was identified, which is a negative factor constraining the financial growth of enterprises. The analysis of industrial enterprises that carried out innovative activity, allows us to conclude that significant changes have taken place in the structure of innovative directions activity. Therefore, the important task of the industrial enterprises innovative development today is the introduction of new production and storage technologies that enable the creation of high-quality and safe products. Other promising innovation directions are introduction of international standards of food quality and safety, organic production development and diversification of energy supply sources.

Conclusions. The dynamics of innovative development in industry of Ukraine is positive, despite the insufficiently high rates of innovative transformations implementation. In order to activate the innovation activity of industrial enterprises, it is necessary to carry out a wide range of measures related to the actions of the authorities and with the actions of the enterprises themselves. The proactive introduction of innovations is what industrial enterprises need at the present stage of their development. The results of our investigation showed the significant role of innovative activity financing. The management of companies should take into account the reserve to accelerate the financial growth of enterprises is to increase the efficiency of innovations investments. The basis for improving the dynamics of innovation activity should be the identification and application of internal reserves of enterprises and search for external sources of financing. The basis for the accumulation

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and optimal allocation of resources, potential possibility and reserves of enterprises should be clearly developed, integrated and simultaneously detailed development strategy for the long-term and medium-term perspective, as well as a short-term development program. To attract foreign investments it is important to develop innovations which solve global economic, industrial, social problems. Important directiond is to increase the financing of startups, which propose introduction of information technologies, climate innovations, alternative energy in the activities of enterprises.

The limitation of the study is that not all factors influencing innovation activity efficiency considered. Future research directions should be aimed at empirically proving the existence of the relationship between the growth of the enterprises value and the dynamics of their innovation activities, considering not only the actual volumes of innovative products sales, but also the investments distribution within the organization. Future research should be undertaken to identify barriers that limits for innovations adoption on enterprise.

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