Introduction. The main condition for the intensification of innovation in Ukraine is the regulatory framework that should ensure the regulation of all mechanisms for the implementation of the innovation process. The manufacture and sale of products created with the use of advanced technologies increase the efficiency of enterprises and their competitiveness in domestic and foreign markets.

Problem Statement. The adoption of regulations has not significantly affected the innovation-driven development of Ukraine’s economy, as indicated by the economic performance of industrial enterprises. Therefore, the issue of enhancing the innovation activities in changing economic conditions requires constant thorough research.

Purpose. The purpose of this research is to study the status of innovation activities of industrial enterprises in Ukraine and to determine the prospects for their further development.

Materials and Methods. Regulatory and legal documents on the innovation activities, statistical data on the number of actively innovating industrial enterprises, the number of new types of innovation products introduced and the scope of their implementation, costs of innovation and sources of innovation financing in Ukraine for the period 2010–2019 have been used to analyze the activities of enterprises.

Results. The status of innovation activities of industrial enterprises has been assessed and the main prospects for their further development have been determined. Most of the goods manufactured and services provided do not meet the modern requirements of consumers, which slows down the dynamics of production and sales. The implementation of program measures in the form of legislative acts regarding tax levers and the creation of an attractive investment climate, innovation infrastructure, and financial support will raise the competitiveness of Ukrainian industrial enterprises.

Citation: Udovychenko, S. M., and Maksyma, M. B. Monitoring the Activities of Industrial Enterprises in the context of Innovation-Driven Development of Ukraine. Sci. innov., 18(5), 16–25. https://doi.org/10.15407/scine18.05.016
Conclusions. The use of outdated technologies inhibits the innovation upgrade of the production base of industrial enterprises, the enhancement of the production of modern products and sales revenues. The directions of innovation-driven development, as declared in the regulatory acts, shall be based on tax levers, innovation infrastructure, and financial support.

Keywords: state regulation, industrial enterprises, innovation products, innovation costs, employment, innovation activities, and financing.

In the conditions of the world economy transition to the post-industrial development, it is extremely necessary for Ukraine to solve the problems that inhibit its transition to innovation-driven growth. The legal framework is the fundamental basis for the activation and intensification of innovation. It should be noted that since the 2000s, the country has adopted a number of normative legal acts, in which, to their credit, progressive norms of innovative development of the state have been laid down. At the same time, their adoption did not significantly affect the innovative development of the economy, as indicated by statistical data of the economic indexes of the activities of domestic industrial enterprises, in particular, enterprises of the mining, processing industry, electricity, gas, and water supply.

A necessary condition for innovatively upgrading and ensuring the competitiveness of enterprises in the domestic and foreign markets is the production and sale of products created with the use of advanced technologies. Therefore, the improvement of the production process through the use of innovations is the key to the effective operation of any enterprise.

It should be noted that the problems of innovation-driven development, both at the level of organizations and at the level of the state as a whole, are in the focus of many foreign and Ukrainian researchers. Such foreign researchers as Y. Chen, T. Puttitanun, J. Aubert, M. Srholec, G. Zanello, A. Morrison, C. Pietrobelli, R. Rabellotti have made a significant contribution to the development of the mentioned issues in developing countries [1—5].

The research works by Y. Chen and T. Puttitanun deal with the identification of the relationship between intellectual property rights and innovations in developing countries. Based on an empirical analysis of data from 64 countries, the researchers have confirmed the positive impact of intellectual property rights on innovation and the existence of a U-shaped relationship between the number of patented intellectual property rights and economic development [1].

J. Aubert in his research works has discussed the conceptual foundations of innovation promotion in developing countries. The researcher has emphasized the importance of meeting the needs that arise at the local level and demonstrated the importance of supporting entrepreneurs and local communities by providing grants to facilitate the mobilization of local resources and property [2].

Using a large sample of firms from many developing countries, M. Srholec has substantiated a multi-level model of innovation, which combines micro- and macro-levels of analysis in an integrated framework. He has emphasized that the national economic, technological, and institutional framework conditions directly predict the ability of firms to implement innovations [3].

Giacomo Zanello has dealt with identifying barriers to the creation and diffusion of innovations in the private sector of low-income countries that is the developing countries. In particular, two groups of countries have been highlighted. The first one comprises countries with a gross domestic product (GDP) of USD 1,025 per capita (Afghanistan, Bangladesh, Cambodia, etc.) The second group includes countries with a GDP ranging within USD 1,026—USD 4,035 USD per capita. Among these countries, there are Albania, Armenia, Vietnam, Georgia, Sudan, Ukraine, etc. G. Zanello focuses on the fact that the innovation-driven development of the country depends on such characteristics as geographical location, socio-economic development, and peculiarities of the political and legal subsystems. The researcher
has identified five distinctive characteristics of the low-income countries, which distinguish them from the advanced countries and hinder their innovation-driven development. They are low diversification of the economy; low level of specialization of firms and underdeveloped relationships between them; a large share of the informal sector; a small share of direct foreign investment; and the lack of innovation. These features should be taken into account for developing the innovation policy of these countries [4].

A. Morrison, C. Pietrobelli, and R. Rabellotti, while studying the patterns of the global value chain (GVC), have concluded that it is beneficial for developing countries to participate in it, as these countries get the opportunity to use state-of-the-art technologies, which contributes to the acceleration of the innovation-driven development of their economies. At the same time, the researchers have rightly emphasized that entry into global value chains by itself does not lead to upgrading and improving industrial performance in developing countries. For this, specific and effective mechanisms for the integration of firms into the GLV are needed. By the example of Mexican and Brazilian firms, it has been proven that in order to obtain benefits from integration, local firms shall invest in personnel training, capacity building in the sphere of technology, upgrade of production facilities, etc. [5].

The innovation-driven development of advanced economies and their progressive experience have been highlighted by R. Schillo, R. Robinson, C. Marxt, C. Brunner, B. Akcali, E. Sismanoglu and many others [6—8]. In particular, R. Schillo and R. Robinson have focused the attention of scientists on the negative impact of innovations in the economic, social, and environment spheres. It has been emphasized that innovation-driven development is often accompanied by an increase in social inequality, a decrease in employment, and the marginalization of certain segments of population, as the experience of advanced economies has shown. In this regard, the researchers have rightly suggested forming a four-dimensional structure of inclusive innovations, which is comprehensive in terms of people engaged in the innovation process, types of activities, results (including economic, social, and environment), and management of innovation systems [6].

Swiss researchers C. Marxt and S. Brunner have dealt with the analysis of Switzerland’s innovation system as basis of its high competitiveness in the global environment. According to the European Innovation Scoreboard, Switzerland is the leader in innovation in Europe. According to many indicators of innovation-driven development, the country surpasses Finland, Sweden, Germany, and others. In addition, Switzerland is also one of the most competitive countries in the world. The country has been maintaining its leading position by expanding and strengthening the national innovation system on a sustainable basis [7].

B. Akcali and E. Sismanoglu have discovered the relationship between R&D expenditure and economic growth. Therefore, the innovation-driven development of the country largely depends on the amount of funding of science and education. This fact shall be constantly kept in mind [8].

In Ukraine, the problematic aspects of innovation-driven development of industrial enterprises have been studied by O. Amosha, Y. Bazhal, L. Voloshchuk, A. Galchynskyi, T. Ivanova, O. Zakharova, S. Ilyashenko, L. Fedulova, O. Yurkevich, and others [9—13]. T. Ivanova has raised the problem of the downward trend in the number of innovation enterprises on the territory of Ukraine [9]. She has noted that the costs for innovation activities are increasing, which is interpreted as a positive phenomenon. At the same time, the researcher has drawn attention towards such problematic aspects of innovation-led development as limited sources of financing, mainly from the company’s own funds, and underdeveloped international relations of domestic enterprises, as a result of which more than half of innovation products are sold in the domestic market, which limits the prospects for further innovation-led development of the enterprises.

L. Voloshchuk [10] has discussed the problems of statistical and economic analysis of innovation-
driven development of industrial enterprises of Ukraine. The researcher has shown the shortcomings and limitations of the tools of statistical analysis and stated that the available statistical base of indexes allows analyzing only one aspect of innovation-driven development, namely, the innovation activities of enterprises, while its influence on the enterprise economic development remains neglected, which narrows the possibilities for making adequate managerial decisions regarding the intensification of innovation activities of the enterprises.

The regional specificity of innovation-driven development of industrial enterprises of Ukraine has been studied in research works of O. Amosha, O. Zakharova, I. Barbanova, and K. Koledina [11, 12, 13]. By the example of industrial enterprises of Kharkiv Oblast where there is the largest number of innovation enterprises, it has been shown that the share of enterprises that introduce innovations and sell innovation products is insignificant. Undoubtedly, in order to intensify the innovation activities of industrial enterprises, it is necessary to attract budget funds and foreign investments [13].

Despite a significant number of research works, the problem of enhancing the innovation activities of industrial enterprises under varying conditions of the economic environment, which requires constant thorough research, remains understudied.

The purpose of this research is to study the current state of innovation activities of industrial enterprises of Ukraine and to determine the prospects for their further development.

In 2002, the Law of Ukraine on Innovation Activities was adopted. It defines the legal, economic, and organizational principles of state regulation of innovation and aims at supporting the development of Ukraine’s economy through innovation [14].

In 2010, the Verkhovna Rada approved the Recommendations of the parliamentary hearings under the title Strategy for Innovation-Driven Development of Ukraine for 2010–2020 in the Context of Globalization Challenges [15]. This document, along with the analysis of the status of R&D and innovation development, contained the formulation of the tasks regarding the priority measures for the formation and implementation of the strategy for innovation-driven development of Ukraine.

The modern vision of the formation of an effective national innovation economy has been reflected in the Strategy for the Development of the Sphere of Innovation for the Period Until 2030 [16]. Its goal is to create, by 2030, the national innovation ecosystem that is able to become a driver of accelerated economic growth and contributes to the introduction of new technological solutions. In order to achieve the goal, the key problems at different stages of the innovation process have been outlined in the document:

- the creation of innovations;
- the innovation transfer;
- the introduction of innovation through the creation of a specialized small innovation enterprise, i.e. a startup;
- the introduction of innovations at already existing enterprises, the launch of serial production. It should be noted that the industry is not able to be the driving force of the acceleration of economic development and qualitative changes in the structure of the economy unless the fixed assets are modernized, innovations are introduced, and there is the transition to the production of competitive products with a high share of added value.

Let us consider the influence of the adopted legislative acts on the results of innovation activities of industrial enterprises.

Enterprises engaged in the development and/or implementation of innovations are recognized as active in terms of innovation. Their share in the total number of enterprises is one of the most important indexes characterizing the innovation sphere of any country. According to the statistical data [17, 71], in 2019, there were 782 actively innovating enterprises, which was almost half as much as in 2010, although their share in the total...
number of industrial enterprises rose slightly from 13.8 to 15.8% (Table 1). The largest number of the actively innovating industrial enterprises is located in Kharkiv (116), Dnipropetrovsk (64), and Zaporizhzhia (47) Oblasts [17, 73].

The indexes of innovation activities of industrial enterprises describe the functioning of national innovation system. Over the years, there have been no significant fluctuations in the share of the innovation enterprises that introduced innovations in the total number of the industrial enterprises: 11.5%, in 2010 versus 13.8%, in 2019, but their number decreased from 1217 to 687, respectively (Fig. 1, Table 1).

The share of the innovation products sold in the total products of industrial enterprises sold has decreased 4 times since 2010 (Fig. 1), however, in natural terms, this index slightly increased in 2019 as compared with 2010 and amounted to UAH 34,264.9 million. (Table 1) [17, 72].

Having analyzed the data, we come to the conclusion that the total number of industrial enterprises gradually decreased, while the sales of industrial products increased slightly, which indicates an insignificant increase in the level of production at the enterprises.

Despite the fact that the use of innovations radically changes labor technology, increases the quality of manufactured products and provides an opportunity for enterprises to develop and grow economically, the analysis of the number of introduced innovations has not shown a stable positive trend. The year 2016 was distinguished by the largest number of innovations of all kinds, however, there was no significant increase in income at industrial enterprises, and the following year 2017 turned out to be the worst for the studied period in terms of the sales of innovation products, as they amounted to UAH 17,714.2 mi-

| Table 1. Dynamics of the Results of Innovating Industrial Enterprises of Ukraine, in 2010–2019 |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Number of actively innovating industrial enterprises | 1462 | 1679 | 1758 | 1715 | 1609 | 824 | 834 | 759 | 777 | 782 | 53.5 |
| Number of industrial enterprises that introduced innovations | 1217 | 1327 | 1371 | 1312 | 1208 | 723 | 735 | 672 | 739 | 687 | 56.5 |
| Innovation industrial products sold, million UAH | 33697.6 | 42386.7 | 36157.7 | 35891.6 | 25669.0 | 23050.1 | ... | 17714.2 | 24861.1 | 34264.9 | 101.7 |

* The index is not estimated.

Source: calculated by the authors based on [17, 72].
ion that was 0.7% of the total industrial products sold [17].

Figure 2 features the results of analysis of the number of introduced innovations. The enterprises developed innovation products more actively than new technological processes (Fig. 2) [18].

Innovation is a continuous process of radical upgrade of production, in which the amount of costs for innovation and the revenues from their implementation are inextricably linked. In the Law of Ukraine on Investment [14], innovation is defined as a set of measures aiming at the creation, implementation, distribution, and sale of innovations for obtaining a commercial and/or social effect, which are realized at the expense of investments in innovation.

Therefore, the level of innovation costs plays an important place among the main indexes that characterize the innovation sphere.

Over the years, there has been no increase in the costs for the creation and implementation of innovations, which accordingly affects the production output and the sales of innovation industrial products [17, 71—72] (Fig. 3).
Having analyzed the enterprise activities in terms of expenditure on innovation and innovation industrial products sold in the regions with the largest number of actively innovating industrial enterprises, we found that Dnipropetrovsk Oblast spent the most on innovation, but the sales of innovation products were the smallest among the leading regions (Fig. 4). In Zaporizhzhia Oblast, the innovation costs were slightly higher as compared with those in Kharkiv Oblast (UAH 681,707.2 and UAH 672,151.6 thousand, respectively), but the sales of innovation products were less by UAH 781,512.4 thousand. Donetsk Oblast was ranked first in terms of sales, with 90.2% of production exported to other countries. In terms of expenditure, Donetsk Oblast was the second one falling behind Dnipropetrovsk Oblast [17, 78 and 93].

Half of the Ukrainian regions have a low level of innovation, which is characterized by a reduction in the commercialized innovation products. In 2015–2019, 12 regions (Volhynian, Dnipropetrovsk, Zhytomyr, Zakarpattia, Zaporizhzhia, Ivano-Frankivsk, Lviv, Poltava, Rivne, Sumy, Ternopil, and Chernivtsi Oblasts) lost their positions. This situation is a consequence of an underdeveloped innovation market, a weak consumer interest in innovation products, and a lack of financial resources for production modernization. Economic instability caused by military aggression in the east of the country had a significant adverse impact, as well.

The analysis of the sources of financing of innovation has shown that the enterprise’s own funds are the main source of funding their innovation activities. Since 2003, the minimum funding (52.9% of the total) was reported in 2011, while the maximum (97.2%) was reached in 2015. The government interest in the innovation-driven development of the economy is determined by the amount of financial support, which was very low and varied from 0.3% of the total financing, in 2013, to 5.2%, in 2018. Since 2000, significant nonresident investments were attracted in 2009 (19%), in 2010 (30%), and 2013 (13.1%), but during the specified period, in 2019, they accounted for as few as 0.3%.

Therefore, the monitoring of the innovation in the industry has shown the presence of several problems that prevent the innovation-driven development of the country, including the underdevelopment of the innovation infrastructure, the imperfection of mechanisms for the R&D transfer, weak interest of industrial enterprises in introducing innovations into economic activities, uneven distribution of the innovation activities
of enterprises across regions, insufficient funding of research institutions and many others. The systemic nature and multifacetedness of the mentioned problems require a systematic approach to their solution, which involves the development and justification of a set of measures of legal, financial, economic, organizational, engineering, technological, educational, and cultural nature. There are numerous limitations and obstacles at all stages of the innovation process, without exception, from the search for an idea to the implementation and distribution of an innovation product.

In these conditions, building an innovation-driven economy with developed entrepreneurship and high productivity requires taking measures in the following directions:

- the creation of a favorable regulatory and legal field for economic entities doing innovation activities;
- the development of innovation infrastructure, methodological and consulting support, expansion of ties between domestic researchers, inventors, and foreign enterprises;
- the enhancement of capacity by means of cultural and educational activities, improvement of innovative culture and education [16].

At the stage of creating innovations, the most important measures are as follows:

- the enhancement of funding of research institutions, acceleration of the transfer of the research results to the business environment;
- the creation and development of innovation infrastructure with appropriate financial, information, analytical, and methodological support (territories, centers of intellectual and creative activities, rationalization movement, etc.);
- the study and adaptation of the best foreign experience regarding the development of innovation, encouragement of involvement of stakeholders into the European programs on innovation;
- the improvement of the quality of education by revising it in the context of the needs of the global market, etc.

The complexity and multifacetedness of the problem does not allow to analyze all its aspects in detail within the framework of one research paper. The directions for improving the innovation activities of industrial enterprises at the next stages of the creation and implementation of an innovation product will be discussed in the further publications.

Having analyzed the main results of innovation activities of Ukrainian industrial enterprises, we come to the conclusion that legal levers do not ensure the expected innovation of the economy. Because of the necessity to make significant investments and the risks during the transfer of innovations and the long duration of their implementation, domestic enterprises prefer time-tested technologies and engineering solutions, which are often outdated and negatively affect the quality of manufactured products. In this case, the majority of goods and services do not meet the modern requirements of consumers, which slows down the dynamics of output and sales. This inhibits the innovation upgrade of the production base, the enhancement of the production of state-of-the-art products and the financial flows of enterprises.

Given the disappointing indexes of innovation activities of industrial enterprises, it is necessary to ensure the implementation of program measures defined in the Strategy for the Development of the Innovation Sphere for the period until 2030. It is important that the declared directions have a real basis in the form of legislative act and regulations regarding tax levers, an attractive investment climate, innovation infrastructure, and financial support. The stabilization and further enhancement of the state vector towards high-tech development should strengthen the political, economic, and financial independence of Ukraine.
REFERENCES


МОНІТОРИНГ ДІЯЛЬНОСТІ ПРОМИСЛОВИХ ПІДПРИЄМСТВ В КОНТЕКСТІ ІННОВАЦІЙНОГО РОЗВИТКУ УКРАЇНИ

Вступ. Головною умовою активізації інноваційної діяльності в Україні є нормативно-правова база, яка має забезпечувати регулювання усіх механізмів здійснення інноваційного процесу. Виробництво та реалізація продукції, яка створюється за сучасними технологіями, підвищує ефективність роботи підприємств та їхню конкурентоспроможність на внутрішньому й зовнішньому ринках.

Проблематика. Економічні показники діяльності промислових підприємств показують, що прийняття нормативних документів суттєво не вплинуло на інноваційну розбудову економіки України, а тому питання підвищення інноваційної активності у мінливих економічних умовах потребує постійних грунтовних досліджень.

Мета. Дослідити стан інноваційної діяльності промислових підприємств в Україні та визначити перспективи їхнього подальшого розвитку.

Матеріали й методи. Використано нормативно-правові документи з врегулювання інноваційної діяльності, статистичні дані кількості інноваційно активних промислових підприємств, кількості упроваджених нових видів інноваційної продукції та обсягів її реалізації, витрат на інновації та джерел їх фінансування в Україні за період 2010—2019 рр. для аналізу діяльності підприємств.

Результати. Оцінено стан інноваційної діяльності промислових підприємств та визначено основні перспективи їхнього подальшого розвитку. Більшість виготовлених товарів і наданих послуг не відповідають сучасним вимогам споживачів, що сповільнює динаміку виробництва продукції та обсяги її реалізації. Здійснення програмних заходів у вигляді законодавчих норм щодо податкових важелів, привабливого інвестиційного клімату, інноваційної інфраструктури та фінансової підтримки підвищить конкурентоспроможність підприємств України.

Висновки. Використання застарілих технологій гальмує інноваційне оновлення виробничої бази промислових підприємств, збільшення випуску сучасної продукції та надходження фінансових ресурсів. Важливо, щоб задекларовані у нормативних актах напрями інноваційної розбудови спиралися на податкові важелі, інноваційну інфраструктуру, фінансову підтримку.

Ключові слова: державне регулювання, промислові підприємства, інноваційна продукція, витрати на інновації, зайнятість, інноваційна активність, фінансування.

ISSN 2409-9066. Sci. innov. 2022. 18 (5)