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Structural Transformations in Innovative Activities of Industrial Enterprises at Local and Regional Levels: the Experience of Ukraine and EU Countries

Abstract. *This articles analyses the innovative dimension of structural transformations of the Ukrainian economy as exemplified by industrial enterprises (based on data from surveys conducted by regional departments of statistics). The authors compare them with experiences of European Union countries (based on Eurostat data). It was found that financial constraints remain the main factor responsible for the slower pace of innovation activities in Ukrainian industrial enterprises. Organizational-institutional problems, as well as the near absence of cooperation between the state, science and business in sectors that are priority for the national economy have been identified as the main obstacles to the activation of innovation in the Ukrainian industry. It was found that the problems with the staffing of high-tech development, as well as the practical lack of mechanisms for indirect state financing of innovation activities in Ukraine, are a higher barrier to innovation activities than in the EU countries.*

Keywords: *innovative activity, transformation of economy, structure of economy, innovation costs, innovations, industrial enterprise, innovative development, innovations in industry*

1. Introduction

Vigorous innovation activity in modern conditions of globalization is the most important engine of structural changes in the modern world economy. It defines the main, strategically oriented and irreversible changes in the structure of economies through the entry of new production and business technologies into the market space that can substantially better meet existing needs and create opportunities for the emergence of fundamentally new society needs.

Economic development in the leading countries of the world is increasingly affected by science, education and innovative processes in, which set the direction for the development of the global economy as a whole.

Despite the numerous measures to stimulate scientifically technological and innovative development stipulated by national programs, legislative and departmental normative documents, the actual effectiveness of their implementation remains low in Ukraine, particularly when one considers the following [Shinkaruk, Bevz 2015: 153]:

– in spite of the fact that Ukraine's rating in the Global Innovation Index (GII) in 2017 (50th among 127 countries) improved compared to 2016 (56th among 128 countries) and 2015 (64th among 141 countries), it still lags behind the world's leaders;

– Ukraine's participation in international patenting of leading technologies of the future is extremely low: the country's share in global patents ranges from 0.01% (in the pharmaceutical sector) to 0.09% (in nanotechnology; in some environmental technologies). At the same time the corresponding indicators for the USA are 40.5%, 34.6% and 22.0%; for Germany – 5.7%, 5.0% and 11.9%; for India – 3.7%, 1.5% and 0.9%[1];

– the most innovative sectors in 2012 and 2017 were high-tech industries – the oil and gas production and pharmaceutical industry in Poland, and the food industry in Ukraine;

– the share of research and development costs in Ukraine's GDP in 2017 was only 0.45% (in 2012 – 0.75%), while, for example, in Germany – 2.94%, France – 2.25%, Hungary – 1.21%, Poland – 0.97% [Karmazin 2018];

– overall GDP growth due to the introduction of new technologies in Ukraine is 0.7%, while in developed countries it is 60-90%.[2]

2. Structure and spatial concentration of innovative industrial enterprises

Today in Ukraine, as well as in the world, innovation centers are located in big cities, where the main production, intellectual and scientific potential is concentrated. Thus, in 2017 between 21.4% (in the region of Ivano-Frankivsk) to 80.0% (in the region of Mykolayiv) of innovative industrial enterprises ("IIE") were concentrated in cities – regional centers of Ukraine (Fig. 1).[3]

[1] Patents by main technology and by International Patent Classification (IPC): OECD Patent Statistics (database), http://dx.doi.org/10.1787/data-00508-en [accessed: 5.07.2019].

[2] *Save the Future: the first rating of innovative companies in Ukraine*, http://forbes.net.ua/ua/magazine/forbes/1416757-vryatuvati-majbutne-pershij-rejting-innovacijnih-kompanij-ukrayini [accessed: 5.07.2019].

[3] Hereinafter, only those large cities are presented in the pictures and tables, for which all the information necessary for analysis was available.

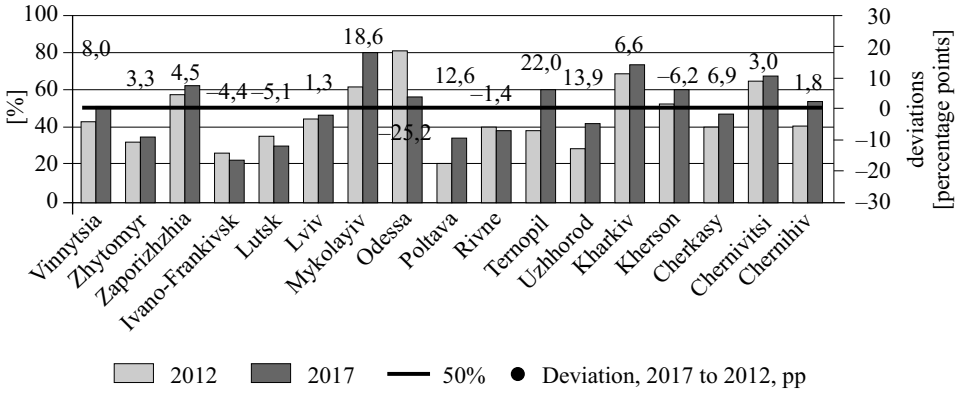

Figure 1. IAIE concentration in cities – regional centers of Ukraine in 2012 and 2017 (% to the respective region)

Source: based on survey data from the regional statistical offices.

In 2017, only 16.2% of industrial enterprises in the country were engaged in innovation activities (–1.2 pp compared to 2012), while in the region of Mykolayiv this share was 38.5%, in Ternopil – 33.3%, Kharkiv – 31.2%, Kiev – 20.7%, and in Lviv – 18.2%. For example, in Poland, 17.5% of industrial enterprises were innovatively active in 2012-2014, and in 2017 – 20.2%. Corresponding figures for two Polish provinces that border Ukraine in the west are: Podkarpackie – 18.4% and 21.2%; Lubelskie 21.2% and 23.2%. According to Eurostat data, in 2016, 87.2% of industrial enterprises were innovatively active in Belgium, 88.7% in Austria, 86% in France, 79.6% in Greece and in the countries bordering on Ukraine: Hungary – 68.5% and Romania – 25.2%. At the same time, it should be noted that the indicator in question in all of these countries exhibited a growing trend compared to the previous year.

In Ukraine, the spatial concentration of innovative industrial enterprises in large cities depends on a number of factors: 1) proximity to a large number of sellers and buyers, which makes it relatively easy to respond quickly and flexibly to the market situation; 2) availability of local workforce with specific skills; 3) greater opportunities to attract transnational stakeholders; 4) availability of institutional, transport infrastructure, etc.

In 2017, there was an overall decline by 1.2 pp in innovation activity of Ukrainian industrial enterprises. On average, the level of innovation in Ukrainian enterprises fell, whereas declines recorded in specific big cities were more pronounced (Fig. 2).

The share of industrial enterprises engaged in innovation activity in Chernivtsi in 2017 compared to 2012 increased by 27.5 pp, in Kharkiv – by 8.7 pp,

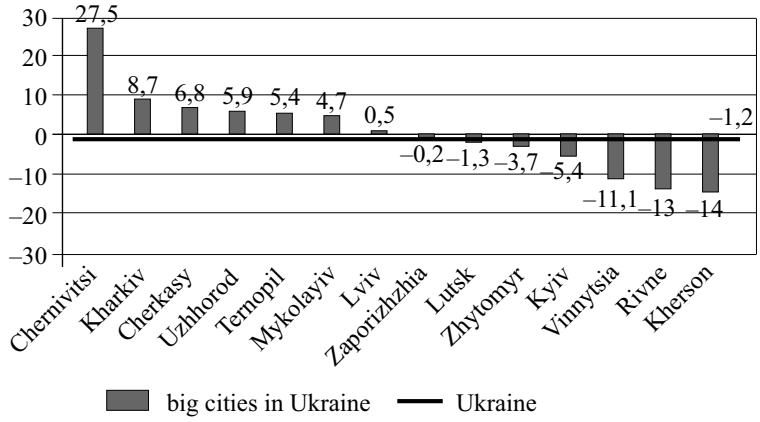

Figure 2. Change in the share of industrial enterprises engaged in innovation activity in large Ukrainian cities in 2017 compared to 2012, in percentage points

Source: based on survey data from the regional statistical offices.

in Cherkasy – by 6.8 pp and in Uzhgorod – by 5.9 percentage points. However, the same indicator for Kherson decreased by 14.0 pp, for Rivne – by 13.0 pp and for Vinnitsa – by 11.1 pp. This situation was caused both by the global financial-economic fluctuations and by the unstable socio-economic situation of Ukraine, which was due, in particular, to military activities in the east of the country, the imperfection of the existing institutional and organizational support of innovative activity, etc. Besides, in recent years, along with innovations in the field of industrial production, a number of large cities of the country, have focused on innovations in the services sector. In addition, it should be emphasized that official statistics available in Ukraine, unlike European countries, do not contain information on innovative activities in the field of services.

During the reference period most innovative enterprises in the big cities of Ukraine represented the manufacturing industry (for example, in 2017 in Kyiv – 87.4%, in Lviv – 90.9%, in Ivano-Frankivsk – 100%), in particular mechanical engineering (manufacture of machinery and equipment; manufacture of electrical, electronic and optical equipment; manufacture of vehicles and equipment), as well as the manufacture of food, beverages and tobacco (for example, in 2017 in Kyiv – 25.3% and 16.9% respectively (Fig. 3), in Lviv – 17.5% and 35% respectively).

Mechanical engineering is an important branch in terms of providing scientific and technological development of the industry. However, our study indicates a slight decrease in the share of innovative machine-building enterprises in the total number of industrial enterprises in large cities of Ukraine in 2017 compared to 2012 (for example, Kyiv –4.9 pp, Lviv –7.5 pp, Ivano-Frankivsk –13.8 pp).

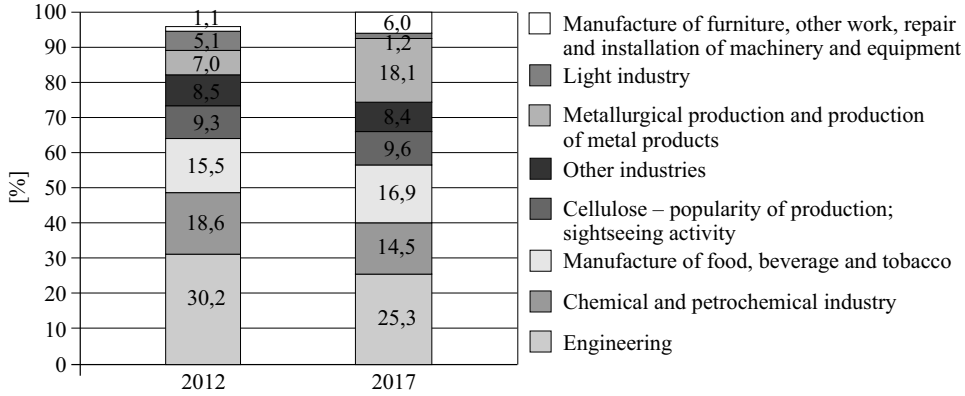

Figure 3. The structure of innovatively active industrial enterprises in Kyiv by type of economic activity in 2012 and 2017, %

Source: based on data published by the regional statistical office in Kiev: http://kiev.ukrstat.gov.ua/ [accessed: 5.07.2019].

In addition, once can observe a reorientation of the enterprises, from mechanical engineering (production of machines, equipment, vehicles) to the production of spare parts and equipment. This is one of the obstacles in the production of competitive innovative products.

3. Transformation of the cost structure for innovation

From the perspective of the transition towards a knowledge-based economy and taking into account the improvement of production technologies and stimulate growth, it is important to study the transformation of the cost structure for innovation activities.

In 2017 in Ukraine, the share of innovative costs of industrial enterprises in cities (regional centers) in the regional indicator was 97.3% (+10.3 pp compared to 2012) for Zaporizhzhya, 87.4% (+60.3 pp compared to 2012) for Mykolaiv, 81.6% (–14.6 pp compared to 2012) for Vinnitsa, and 62.1% (–22.6 pp compared to 2012) for Lviv.

In addition, in the reporting year, the share of expenditures made by industrial enterprises located in large cities to finance innovation activities in the regional indicator increased at a much higher rate than the expenditures made by innovative industrial companies in the regional centers (the share in the corresponding regional indicator, in particular, in Zaporizhzhia, Ternopil and Vinnytsia).

The volume of innovative expenses incurred by innovative industrial companies in 2017 was, for example, UAH 19.6 million in Kyiv, UAH 52.1 mil-

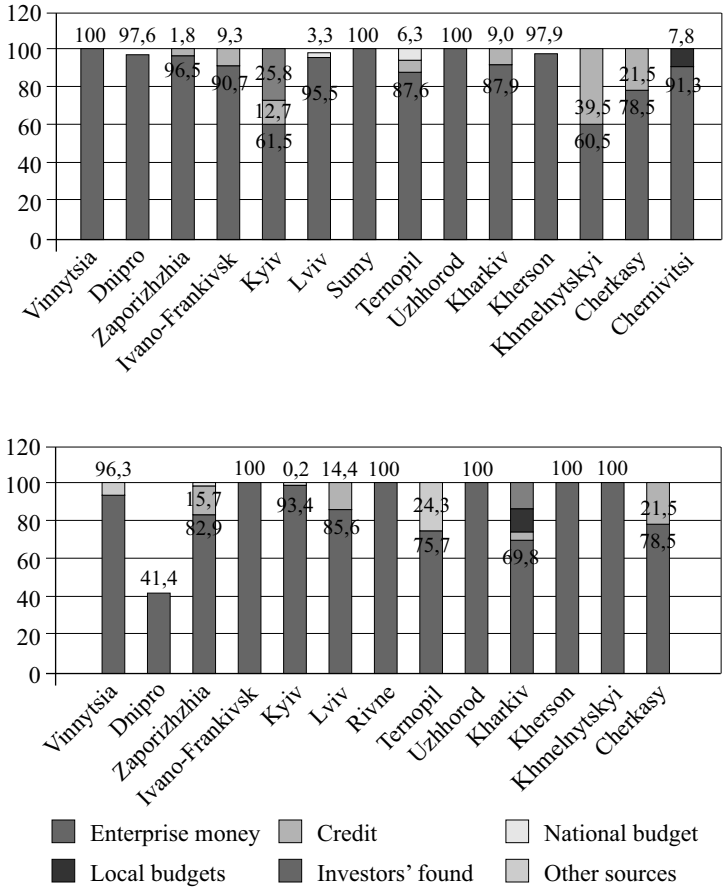

Figure 4. Structure of innovation expenditures of industrial enterprises in large cities of Ukraine by source of financing in 2012 (a) and 2017 (b), %

Source: based on survey data from the regional statistical offices.

lion in Zaporizhzhia, and about UAH 87.5 million in Kharkiv and Lviv. At the same time, the average figure for Ukraine was UAH 12.01 million, in Poland – UAH 40.5 million (PLN 5.7 million), and in high-tech industries – UAH 53.4 million[4] (7.6 million PLN). Own funds of industrial enterprises in large cities were the main source of financing innovative activities during the reference period (Fig. 4).

On average, the share of enterprises' own funds in the total cost of innovative activities in the cities of interest was 74.2% in 2012 and increased to 78.7% in

[4] Conversion based on the official exchange rate of hryvnia against foreign currencies published by the National Bank of Ukraine (average exchange rate for 2017: 100 PLN = 704.90 UAH).

2017 (corresponding figures for Ukraine – 52.9% and 84.5%). This structure of innovation expenditures is slightly higher than in the leading EU countries (for example, in 2015-2017 the average for Germany was 67.1%, for France – 63.1%, for the UK – 61.4%), but is similar to that of Poland (75.5%), China (73.4%) and Japan (76.5%). However, while the public sector in the developed countries finances 10-14% of innovations in industry, and in Poland – 1.6% (almost half of which is the state financial support for industrial research),[5] the corresponding indicator for the big cities of Ukraine was, on average, only 0.09% in 2012 and 0.41% in 2017.

In addition, the most developed countries of the world that are part of the OECD also use indirect methods of stimulating innovations, such as tax breaks, authorization to use accelerated depreciation, tax credits, etc. [Shestakov, Poliarus 2017]. In other words, developed countries, along with the allocation of public funds for certain projects, stimulate the development of innovative companies by mitigating their financial obligations to the state. Also, a large proportion of European industrial enterprises are supported in their innovation activities through funding programs of the European Union (for example, in 2016 15.4% of innovative industrial enterprises in neighboring Slovakia, in Poland – 16.3% of enterprises, and in Romania – 24 9%).[6]

This means that in recent years, Ukraine has virtually ceased to stimulate innovative processes in industry. Among other things, this may be a consequence of the excessive social orientation of budget expenditures (in particular, the financing of consumer needs of the population), which makes practically it impossible to invest in the innovative development of the regions.

The country's level of innovation also depends on the level of investment, which not only serves as "financial fuel" for the development of high-tech industries, but also reflects the state of the business environment in the country, the availability of human resources and skilled labor, the state of the internal market. However, investor funds are almost absent as financing sources for innovative activities of industrial enterprises in large cities of Ukraine. In 2012, in particular, only Kyiv received financial support from investors (25.8% of total expenditures on innovative activities, 97.6% of which are funds from foreign investors), Kharkiv (1.3%) and Sumy (0.02%), and in 2017 – only Kharkiv – 16.3%,[7] moreover all the funds were invested by domestic investors.

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[5] Central Statistical Office in Poland, https://stat.gov.pl; Research and Development: National Trends and International Comparisons, https://www.nsf.gov/statistics/seind14/index.cfm/chapter-4/c4s2.htm#s2 [accessed: 5.07.2019].

[6] Results of the Community Innovation Survey: 2016: database, https://ec.europa.eu/eurostat/data/database [accessed: 5.07.2019].

[7] According to the above indicator, 21 city – regional center were analyzed.

In 2012, on average, 1.3% of innovative activities undertaken by industrial enterprises were financed by domestic investors, and 8.7% by foreign investors. In 2017, the corresponding figures were 3.0% and 1.2%, and for Poland,[8] in 2015-2017, 3.7% were funded by foreign investments.

Thus, the domestic investment process in Ukraine does not fulfill the function of promoting the industrial renewal through innovation, which could start a structural adjustment of the national economy by focusing on industries with long-term innovative competitive advantages.

The average share of innovative activities of industrial enterprises in large cities financed through bank loans in 2012 was 6.5% of total innovation expenses, which decreased to 5.7% (–0.8 pp) in 2017; the corresponding figures for Ukraine were 3.8% and 6.5%, and for Poland – just over 7%.

The main direction of innovation activities undertaken by industrial enterprises in large cities of Ukraine in 2017 (this trend existed in previous years) was the purchase of machinery, equipment, installations, software and new technologies (for example, in 2017, in Dnipro – 95.3% of innovation costs, 55% in Kyiv, 58.1% in Lviv, 56.1% in Kharkiv).

It should be noted that the structure of innovative costs in industry in the EU countries is similar. Thus, 77.7% of enterprises in Poland purchased machinery, equipment and software in 2016, 69.1% in Croatia, 68.3% in Slovakia.[9] However, in monetary terms, the innovation costs of industrial enterprises in EU countries are much higher than those of similar enterprises in Ukraine.

Research and development activities are the major driver of innovation. However, the number of enterprises engaged in this activity in 2017 was insignificant and decreased sharply compared to 2012. Most research involved internal works. There was also no demand for new technologies from outside (except Vinnitsa, where 90.4% (+7.8 pp compared to 2012) of funds spent by innovative industrial enterprises in 2017 were used to finance R&D), which was caused, in first turn, by the expensive cost of external knowledge. In these business conditions, it is economically feasible for companies to produce (generate) innovations on their own. In addition, in this context, one of the problems faced by Ukraine is the low level of cooperation between industry and universities in the field of scientific research. According to the ranking "Research cooperation of universities with industry" in 2016, Ukraine ranked 57th in the world. The top three places were occupied by Switzerland, Finland, Israel and the USA.

For comparison, there is a high level of cooperation between industrial enterprises with universities in Germany. In particular, nine of the country's top technology universities have formed the TU9 association to facilitate joint

[8] Central Statistical Office in Poland, https://stat.gov.pl [accessed: 5.07.2019].

[9] Results of the Community Innovation Survey: 2016: database, https://ec.europa.eu/eurostat/data/database [accessed: 5.07.2019].

lobbying for favorable conditions of cooperation with politics and business, and it is currently the leading organisation in Germany when it comes to gaining funds from foreign organizations. Thanks to this collaboration between academic institutions and industry, German universities are consistently at the top of technology and innovation rankings. In addition, according to UNESCO, Germany is among the top ten countries where the business sector spends the most funds on research and development in industry [Bilyayeva 2019].

The trends observed in large Ukrainian cities outlined above generally resemble the trends for the whole of Ukraine, where 64.7% of expenditure on innovations in 2017 were used to cover the costs of purchasing machinery, equipment and software; internal research works – 21.3%; acquisition of other external knowledge – 0.2% (in 2012 – 70.1%, 8.4%, 0.4%, respectively). For comparison, in Poland, the structure of expenditures on innovation activities in industrial enterprises was dominated by the so-called capital expenditures on fixed assets (costs of purchasing machinery, technology, tools) – on average 74% in 2012 and decreased to 70% in 2017 (almost 80% of these costs were spent by large innovative industrial enterprises), as well as research expenditures – just over 17% in 2012 and almost 23% in 2017. The costs of purchasing software and the marketing of new or significantly improved products each accounted for 2% of total expenditure, and the costs of acquiring external knowledge – 3.1% in the base year and only 0.6% in the reporting year.[10]

4. Structure of innovations implemented and implemented by industrial enterprises

During the reference period the development of production of innovative types of products prevailed in the structure of innovations implemented by industrial enterprises in large cities of Ukraine. The largest number of innovative products were created industrial enterprises in Kharkiv – 306 units in 2017 (+70 units compared to 2012). However, considering the number of new products per one innovative industrial enterprise, it was the industrial enterprises the region of Kherson that took the lead with almost 6 types of innovative products recorded in 2012, and 8 types in 2017.

Considering the total volume of innovative products implemented in industrial enterprises located in large cities of Ukraine, new products prevailed (for example, in 2017, 94.8% in Chernivtsi, 100% in Ivano-Frankivsk, 81.3% in Kharkov). A similar trend was observed in other regions of Ukraine, where in 2012 and 2017, almost 80% of innovative products introduced into production

[10] Central Statistical Office in Poland, https://stat.gov.pl [accessed: 5.07.2019].

were new to the enterprise. For example, the corresponding figure for Poland[11] in 2012-2017 was about 90%.

At the same time, despite the fact that industrial enterprises in large cities introduced a considerable number of new technological processes, their number was still critically low. Thus, in 2012, the number of technological processes per one enterprise in Kharkiv was almost 7, in Kherson just over 2, in Dnipro and Ternopil – just over 1, and in other cities – less than 1. The situation did not improve much in 2017 either. In particular, the highest rate of implementation of new technological processes per one enterprise was recorded in Ternopil – 4.1 units.

It should be noted that in Ukraine in general the share of industrial enterprises introducing innovations in 2012 and 2017 was the largest in the sector of food, beverage and tobacco production – 26.7% and 90.8% respectively, as well as mechanical engineering – 25.4% and 34.5% respectively. In 2017 the most innovative sectors in Poland were oil and gas production and the pharmaceutical industry (respectively 66.7% and 45% of the industrial enterprises that introduced innovations). Many innovative companies introduced innovations in the production of chemicals and chemical products.[12]

The share of industrial enterprises that sold innovative products in the reporting year ranged from 33.4% in Rivne and Ternopil up to 100% – in Lutsk. However, while in 2012 industrial enterprises in most large cities sold their innovative products outside Ukraine Ukraine, in 2017 this was true only for seven cities (Poltava – 66.7% of corresponding enterprises, Cherkasy – 54.5%, Kherson – 50.0%).

The presence of a small, but growing share of innovative industrial enterprises in large cities of Ukraine in 2017 (for example, in Chernivtsi – by 27.5 pp, in Poltava – by 11 pp, in Kharkiv – by 8.7 pp) was not accompanied by a similar growth in the share of innovative products in the total volume of sold industrial production (in particular, in Kyiv the corresponding indicator decreased by 4.1 pp, in Lutsk – by 2.8 pp, and in Ternopil – by 2.4 pp.

It should be noted that the share of sold innovative products in the total volume of sold industrial production in the reporting year averaged 0.7% in Ukraine and decreased by 2.6 pp compared to 2012. This situation is not surprising, given the fact that the lion's share of the those innovative products were new for the enterprise (and not for the market), and, therefore, were not in demand in the market. Accordingly, the share of sales of innovative products is negligible. This means that industrial enterprises are guided by their own needs in the manufacture of innovative products.

[11] Central Statistical Office in Poland: https://stat.gov.pl [accessed: 5.07.2019].

[12] Industrial Warehouse. Innovation of the Polish industry – report, https://www.magazynprzemyslowy.pl/zarzadzanie-i-rynek/Innowacyjnosc-polskiego-przemyslu-raport [accessed: 5.07.2019].

The structure of sold innovative products by type of economic activities in large cities of Ukraine was different. For example, in 2017, Kyiv saw the highest sales of innovative products in the food industry (44.4%; –6.3 pp compared to 2012), and in Ivano-Frankivsk – in mechanical engineering, in particular – manufacture of machinery and equipment (48.4% of the total sales of innovative products).

During the reference period, the lion's share in the total volume of sold innovative products in the majority of large cities were products which can classified as internal novelties. Thus, for example, in Kiev, the figure was 63% in 2017 (+18.2 pp compared to 2012), and in Chernivtsi – 87.6%. However, in Kharkiv more than a half of sold innovative products were new to the market – 55.7% (per enterprise – only 44.3%).

Along with the general decline in sales of innovative products by industrial enterprises located in large cities of Ukraine in 2017 compared to 2012 (with the exception of Vinnitsa, Lviv and Kherson), a slight decrease in the volume of export of innovative products was observed.

Thus, in 2017 innovative enterprises in Poltava exported 56.4% of innovative products, enterprises in Zhytomyr and Nikolaev – almost 30%, those in Vinnitsa, Kiev, Lviv, Kherson and Cherkasy – less than 10% of innovative products. At the same time industrial enterprises of Ivano-Frankivsk, Lutsk, Rivne and Khmelnitsky did not export innovative products in the reporting year.[13] It should be emphasized that in 2012 the share of innovative products sold abroad by industrial enterprises in large cities of Ukraine was 83.5% – in Sumy, 77.9% – in Mykolayiv, 69% – in Kharkiv, 66.8% – in Chernivtsi, and 48.1% – in Chernihiv. However, in this case, it should be noted that a number of cities recording exports of innovative products do not disclose relevant information, which is classified as confidential.

5. Conclusion. The main factors inhibiting innovative activity of Ukrainian industrial enterprises

The study revealed that financial constraints caused by an acute shortage of financial resources on the part of industrial enterprises, which are the main source of financing of innovative activities, remain the main factor responsible for the slower pace of innovative activities of Ukrainian industrial enterprises.

[13] Relevant data for other large cities of Ukraine are not disclosed to ensure compliance with the requirements of the Law of Ukraine "On State Statistics" on the confidentiality of statistical information.

The shortage of own funds is caused, first of all, by the stagnation of industrial production and the unavailability of external sources of financing. In addition, bank loans are expensive, which makes it difficult to obtain resources to finance innovative projects, especially for low-profit enterprises in need of modernization (and therefore unable to attract long-term loans for innovative activities).

In view of the above, it should be noted, that according to Eurostat data, in 2016 the share of enterprises for which the lack of own financial resources was a significant barrier to innovative activities was, for example, 10.1% – in Poland (–18.3 pp compared to 2014), 17.6% – in Slovakia (–14.8 pp compared to 2014), 19.4% in Greece (–2.3 pp compared to 2014).

We believe that the problems faced by industrial enterprises trying to obtain financial support for their innovative activities, among other things, can be overcome by providing financial incentives for private investment in research and development, in particular in the form of indirect state support (state grants for research and development; investment tax credits for R&D; tax incentives and tax holidays for innovatively active enterprises, which direct part of the profit on investments in the development of production).

No less acute in Ukraine are the problems associated with the staffing of high-tech development, as well as with the outflow of qualified personnel abroad, which can be solved by improving the quality of technical education and ensuring its compliance with modern world trends and requirements; forecasting and monitoring the demand for specialists in technological specialties and the like.

At the same time, today the development of industry in big cities, and in Ukraine in general, is becoming a challenge to their ecology. Therefore, in the context of innovative activities, the strategic task for both the government and business now is to use effectively the existing investment potential to improve the environment.

In order to determine the attractiveness and value of domestic innovative products (in particular, by investors), it is necessary to monitor and assess innovative development and conduct its systematic analysis. However, unlike statistical offices in other European countries, Ukrainian statistics has a very limited amount of statistical information on industrial innovative activities, which has been collected and published every two years since 2015. Taking into account foreign experience, in order to provide relevant information about innovative development, it also seems appropriate, that the State Statistics Service of Ukraine should collect, process and publish information on innovative activities in the service sector and the information-communication sector.

The search for ways to create favorable institutional and organizational conditions for industrial enterprises to increase the scope of their innovative activities will be the subject of future research in this area.

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Przekształcenia strukturalne działalności innowacyjnej przedsiębiorstw przemysłowych na poziomie lokalnym i regionalnym – doświadczenie Ukrainy i krajów UE

Streszczenie. *Innowacyjny wymiar przemian strukturalnych ukraińskiej gospodarki został zbadany na przykładzie przedsiębiorstw przemysłowych (w oparciu o odpowiedzi danych na zapytania publiczne regionalnych departamentów statystyki Ukrainy); porównuje się je z odpowiednimi doświadczeniami krajów Unii Europejskiej (na podstawie danych Eurostatu). Ustalono, że ograniczenia finansowe są głównym czynnikiem spowalniającym działalność innowacyjną ukraińskich przedsiębiorstw przemysłowych. Główne przeszkody w aktywowaniu działalności innowacyjnej w przemyśle ukraińskim stanowią zidentyfikowane problemy o charakterze organizacyjnym i instytucjonalnym, a także w przeciwieństwie do rozwiniętych krajów europejskich współpraca między państwem, nauką i biznesem w głównych sektorach gospodarki narodowej. Ustalono, że problemy z obsadzaniem stanowisk związanych z rozwojem zaawansowanych technologii, a także brak mechanizmów pośredniego finansowania przez państwo działalności innowacyjnej na Ukrainie stanowią większą barierę dla innowacji niż w krajach UE.*

Słowa kluczowe: *innowacje, transformacja gospodarki, struktura gospodarki, koszty innowacji, innowacje, przedsiębiorstwo przemysłowe, innowacyjny rozwój, innowacje w przemyśle*