GENERAL PROBLEMS OF THE MODERN RESEARCH AND INNOVATION POLICY

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MODERN DEVELOPMENT TRENDS AND PROSPECTS FOR INNOVATION IN THE TECHNOLOGY-INTENSIVE SECTORS OF UKRAINE'S INDUSTRY

Introduction. *The development of an innovation-based competitive and highly structured model of the Ukrainian economy is impossible without modern advanced industry.*

Problem Statement. *To launch structural and technological transformations, Ukraine needs to implement a systematic, consistent innovative industrial policy aiming at neo-industrialization as a basis for developing the domestic market, increasing exports of goods with a high added value, improving the quality of life, reducing poverty, and forming the middle class of society.*

Purpose. *To determine the current trends in the innovative processes in Ukraine's industry by technology-intensive sectors from the standpoint of opportunities and threats for the neo-industrial development of Ukraine.*

Materials and Methods. *The research is based on the Neo-Schumpeterian school and institutional theory and on the theoretical achievements of Ukrainian and foreign researchers on innovation and the implementation of structural and technological shifts in the economy. The methods of analysis and synthesis, logical generalization, system approach, and statistical analysis have been used.*

Results. *The institutional foundations for the modernization and development of Ukrainian industry in accordance with the modern world trends has been found underdeveloped. The innovative activities of industries in terms of costs and benefits, which are systematized according to the levels of manufacturability based on the Eurostat methodology have been analyzed. Unstable dynamics and a significant difference between technology-intensive sectors, a decrease in the knowledge intensity of innovation products, a low efficiency of investment in innovation in most industries, and a tendency towards simplifying the innovative activities in the industry have been revealed.*

Conclusion. *The proposed directions and measures of innovation-based industrial policy are to facilitate neo-industrialization of Ukraine and to overcome its innovative and technological decline.*

Keywords: innovation, innovative activity, industry, technology-intensive sector, innovation-based industrial policy, and neo-industrialization.

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Industry, in particular its manufacturing sectors, is the engine of economic growth in any country. Focusing attention on the development of industry and the recognition of its leading role in meeting the global challenges has been the dominant trend of recent decades, as evidenced, in particular, by the reshoring processes in advanced economies. Thus, in the United States, reshoring is recognized as a key factor in economic recovery after the coronavirus pandemic crisis in 2021 [1]. The European Union (EU) aims at making European industry greener, more circular, and more digital and maintaining its competitiveness on the world stage, which has been enshrined in the new EU Industrial Strategy [2, 2]. In the light of the new conditions driven by the SARS-CoV-2 virus pandemic, the EU updated its Industrial Strategy in May 2021 focusing on the three key measures: 1) maintaining the interdependence of global supply chains and the sustainability of the EU single market; 2) ensuring openness to trade and investment to prevent a lack of critical products for European countries; 3) creating conditions to support the already launched processes of transition to "green" and "digital" industry [3]. Germany's National Industrial Strategy 2030 [4] and the Franco-German Manifesto for European Industrial Policy Fit for the 21st Century [5] recognize the importance of an active European industrial policy to promote Europe's international competitiveness in the context of Intensive Industry 4.0.

The special importance of industrial policy in advanced economies is explained by a significant impact of industry on socio-economic processes. Firstly, it is industry that forms the demand for research and development (R&D) and is the key driving force of innovation in the economy. In the EU, industry accounts for 64% of R&D expenditure and almost 50% of innovation expenditure [6, 5]; secondly, industry creates high-tech jobs with decent working conditions and a demand for highly skilled workers, thus contributing to the accumulation of human capital. Through raising productivity and wages, it creates economic conditions for increasing the welfare of the population. Thus, the EU had been trying for many years to overcome the negative trends of declining employment in industry, so the recorded growth of this indicator in 2014—2017 was officially recognized as a long-awaited event [7, 6]. The highest employment rates in industry (from 19 to 28% of all employed (aged 20—64)) were recorded in the Czech Republic, Slovenia, Slovakia, Hungary, Poland, Romania, and Germany, as of 2017 [7, 7]. In total, the European industry provides 35 million jobs, mostly highly skilled with above-average wage [2; 8, 8]; thirdly, industry fills the domestic market with domestic goods, develops the country's export potential (in particular, the EU industry accounts for 80% of exports [2]), strengthens the position of domestic producers in European and world markets. Therefore, industrial production and, above all, its high- and medium-high-tech sectors are a widely recognized driver of accelerated economic development in the world.

In Ukraine, although the need for radical structural changes has been emphasized, in fact there have been reported opposite tendencies. During the period of independence, Ukraine has practically lost its industrial assets, on which an innovation-based economy may develop. The share of the process industry in GDP decreased more than 4 times between 1992 and 2019 (Fig. 1).

Most branches of the domestic industry have been using outdated equipment and technologies, which correspond to the third and fourth technological systems that dominated in the late 19th—20th centuries [9, 7—9; 10, 117—118]. The innovation activity of the industrial enterprises remains low; the share of innovative industrial enterprises in their total number decreased more than twice in 2000—2019 [11, 71; 12, 195], which does not allow domestic producers to compete successfully in world markets. According to the United Nations Competitive Industrial Performance Index that measures the ability of countries to produce high value-added products and to develop high-tech industries, Ukraine is ranked 69th out of 152 countries, behind Poland (23),

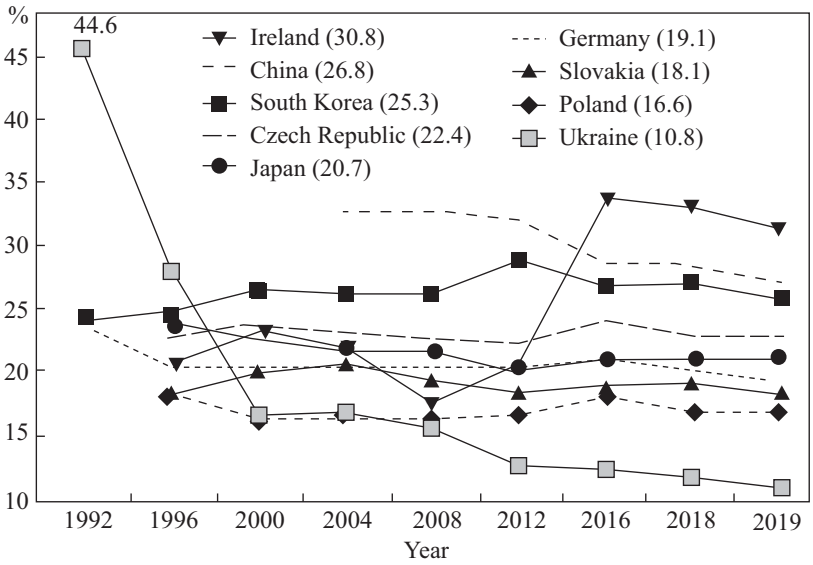

Fig. 1. Dynamics of the share of the process industry in GDP of some countries and Ukraine, %
Based on: the World Bank. World Development Indicators. Manufacturing. value added (% of GDP). 2020. URL: https://data.worldbank.org/indicator/NV.IND.MANF.ZS?locations=UA-CN-DE-CZ-JP-SK-PL-KR-IE (Last accessed: 07.05.2021).

Slovakia (24), Hungary (26), Romania (32), Bulgaria (55), and Belarus (46) [13, 157—160]. The increase in the share of raw materials and low processed products in the commodity structure of Ukraine's exports indicates a clear agrarianization of the country's economy [14, 108]. Thus, for Ukraine, the task of ensuring the development of high-tech industries is currently one of the main priorities, which greatly contributes to the introduction of "smart specialization" approach in the system of strategic regional development planning [15—18].

The importance and problems of industrial development have been studied by many foreign and Ukrainian researchers. Thus, reflecting on the causes of wealth and poverty, Norwegian economist E. Reinert have noted that all advanced economies today used the same strategy, as they abandoned the resource-based and extractive industries in favor of the process industry and necessarily came through the period when emulation (the aspiration and desire to grade up or to surpass) was their main priority [19]. In this context, it is worth mentioning that at the end of the 18th century, the first U.S. Secretary of Economy A. Hamilton in his report to Congress said that such an economically immature country as the United States had to care of weak industries and to protect them from powerful foreign competitors until they became stronger. Germany managed to overcome the deep post-war crisis of the 1940s and 1950s thanks to its production strategy and the conscious development of the process industry. Japan made a rapid economic leap through patents, intellectual property, and technology. At present, these countries are among the top five in the above-mentioned Competitive Industrial Performance Index [13, 157]. Nevertheless, today, popular models for the development of poor economies, which aim at strengthening market mechanisms and reducing the role of government intervention, ignore the importance of industrial development. This is true the recommendations of the Washington Consensus, which govern the international credit institutions led by the International Monetary Fund.

Among the modern foreign researchers who deal with the theory of industrial development,

the problems of new industries based on Industry 4.0 technologies in the development of the fourth industrial revolution, in particular in emerging markets, there are K. Aiginger [20], S. Ezell [21], H. Flegel [22], K. Kelly [23], J. Lin [24], D. Rodrik [20; 25], A. Ross [26], and K. Schwab [27].

In particular, D. Rodrik has stated that the future of developing countries is associated with modern disruptive technologies and new global value chains [25]. Highlighting China's successful experience of industrial development, J. Lin has emphasized that unlike in many other countries, in China, the industrial policy from the very beginning has been focused on supporting the strengths of production rather than on correcting the weaknesses, which ultimately adversely affects their competitive advantage. K. Kelly has analyzed the technological trends that, in his opinion, are inevitable and today have a profound effect on all spheres of society, including industrial production and employment [23]. A. Ross has noted that the fourth industrial revolution will boost economies that are among the first, relying on their competitive advantages, unique experience, and innovation potential, to develop new industries shaping the highest-yielding markets in the coming decades, such as medicine and genomics, robotics and cyber defense. He believes, such opportunities are still open to all economies, including developing countries [26].

In Ukraine, the problems of industrial development and its individual industries, the formation and implementation of industrial policy at the national and regional levels have been studied by leading research institutions. The researchers of the Institute of Economics and Forecasting of the NAS of Ukraine [28] in their collective monograph have studied the structural reforms in the economy as the basis for inclusive development of Ukraine, the problems of deindustrial transformations in Ukraine and their consequences for inclusiveness, as well as substantiated the directions of inclusive industrialization for achieving the ninth goal of the sustainable development.

The researchers of the Institute of Industrial Economics of the NAS of Ukraine have published a monograph on the problems of smart industry in the digital economy [29]. In particular, they have analyzed the problems and substantiated the directions of the formation of smart production in individual domestic industries, and made proposals on fiscal, budget, financial and credit regulation of the formation of smart industry in Ukraine in the context of achieving steady economic growth.

The collective monograph of researchers of the Dolishnii Institute for Regional Studies of the NAS of Ukraine deals with the problems and prospects of the process industry development in the regions of Ukraine [30]. The authors have conducted a comprehensive study of the status, challenges, and prospects of the chemical, light, woodworking, and agro-processing industries of Ukraine by regions, in terms of the need to develop technologically advanced and export-oriented economy.

The monograph published at the Research Center for Industrial Development Problems of the NAS of Ukraine deals with the development of R&D and methodological principles and the mechanism for government support for the reconstruction of Ukrainian industry [31]. The researchers consider that the main elements of this mechanism are development institutions, industrial parks, and stimulating fiscal policy, which together allow intensifying innovation and investment activities in the industrial sector of the economy.

The researchers of the Institute of Market Problems and Economic and Environmental Research of the NAS of Ukraine in their research work [32] have assessed the compliance of industry, innovation, and infrastructure of Ukraine with the modern requirements of sustainable development, based on the developed set of indicators. According to the assessment results, the authors have identified a set of measures to regulate the development of environment friendly production and the implementation of green and

circular economy, with the use of domestic innovative technologies.

However, the ongoing processes of economy deindustrialization, the lack of real priorities for the development of Ukraine's process industry, and European integration efforts of Ukraine require further research on the development of national industry in the light of European practices.

Given the above, the purpose of this research is to identify the current trends in innovation processes in the industry, by technology sectors, in terms of opportunities and threats to neo-industrial development of Ukraine. The research is structured as follows: firstly, the institutional principles for ensuring the modernization and development of the national industry in accordance with modern world trends have been systematized; the dynamics and the innovation activity of industries in 2015—2019, by technological sectors, have been analyzed and assessed in accordance with the methodology of Eurostat in terms of costs and benefits; finally, there are given the conclusions and proposals on the directions of neo-industrialization of Ukraine's economy, which allows improving the innovative industrial policy at the national, regional, and sectoral levels.

Institutional Principles of National Industry Development in Accordance with Modern World Trends

During the years of Ukraine's independence, the industrial development did not receive due attention from the state, which has led to its current crisis. Back in 2003, the Concept for the State Industrial Policy was approved by the Decree of the President of Ukraine, but no relevant long-term program for its implementation has been developed. Industry has been gradually pushed out of the priorities of government economic policy. The most important component of the economy did not have a separate governing body capable of ensuring its progressive development. Established in 2012, the Ministry of Industrial Policy of Ukraine, which had previously been reorganized several times, was reformed again in 2014 into a department of the Ministry of Economic Development and Trade of Ukraine. As late as in July 2020, the government established the Ministry for Strategic Industries of Ukraine.

In 2016, the National Committee for Industrial Development was established as an advisory body to the Cabinet of Ministers of Ukraine in order to develop recommendations for transforming Ukraine's economy from a resource-based to a high-tech industrial one. The Committee experts developed important initiatives and decisions [33, 19], but most of them did not receive any financial support from government and, in 2020, the Committee was abolished and replaced by the Coordination Center for Industry with the same legal status and a new purpose "to ensure concerted action for developing the priorities of the government industrial policy and the mechanism of sustainable development of the industry" [34]. This indirectly testifies to the fact that Ukraine's government has no intentions to build a competitive industrialized country, which neither meets the interests and requirements of economic security of Ukraine under the conditions of globalization and increasing international competition and nor complies with the national Sustainable Development Goals [35, 61—75].

The current situation has been largely caused by the lack of conceptual and strategic support for the country's industrial growth, despite repeated efforts. In 2016, a draft Strategy for the development of high-tech industries until 2025 was developed, but it was not supported by the Cabinet of Ministers of Ukraine. In 2018, a draft Strategy for the Development of Ukraine's Industrial Complex up to 2025 was prepared and discussed, but remained officially unapproved, despite the fact that it was a part of the Action Plan for the implementation of the Association Agreement between Ukraine and the EU [36] and recommended for achieving the ninth goal of sustainable development of Ukraine to promote inclusive sustainable industrialization [35, 75]. In particular, the draft contained a list of measures for the development of Industry 4.0 in Ukraine,

including the audit of infrastructure, the promotion and advancement of 4.0 technologies, the application of information and communication technologies, and the implementation of international standards in industrial production. However, it did not provide any instruments for financial support of the implementation of these measures and any ways to establish cooperation between all stakeholders in this process.

In fact, the only valid strategic document that identifies the areas and initiatives to promote the development of Ukraine's Industry 4.0 capacity is the Concept for the Development of the Digital Economy and Society of Ukraine, but it expired at the end of 2020. The directions and initiatives enshrined in the Concept are important for increasing the readiness of Ukrainian industry, economy, and society for the fourth industrial revolution, but their implementation is limited to formal steps. The government has neither initiated any large-scale digitalization programs and projects, in particular, in the sphere of industrial production, nor introduced any incentives to increase the demand of enterprises for new equipment and digital technologies.

In 2018, a group of experts from the Association of Industrial Automation Enterprises of Ukraine developed a draft *Industry 4.0* national development strategy, submitted it to the government. Prepared by the experts in high-tech industry, it deserves special attention because, given the crisis in the industry, it states that Ukraine may be at least a regional leader in complex and knowledge-intensive engineering services.

In March 2021, the National Economic Strategy up to 2030 was approved. However, the need for industrial development is mentioned neither in the vision, nor in the goal and guidelines of the Strategy. The mission is innovation-based economic growth, but it is unknown how it should be

Table 1. **Classification of Ukraine's Industries by Level of Manufacturability, Based on Eurostat Methodology**

Industrial sector	KVED code 2010	Classification of industries by level; of manufacturability
Process industry	C	
Pharmaceuticals	21	high-tech
Computers, electronic and optical products	26	high-tech
Chemical substances and chemical products	20	medium-high-tech
Electrical equipment	27	medium-high-tech
Other machinery and equipment	28	medium-high-tech
Motor vehicles, trailers and semi-trailers and other vehicles	29 + 30	medium-high-tech*
Coke and refined petroleum products	19	medium-low-tech
Rubber and plastic products, other non-metallic mineral products	22 + 23	medium-low-tech
Metallurgical products, finished metal products other than machinery and equipment	24 + 25	medium-low-tech**
Food, beverages, and tobacco products	10 + 11 + 12	low-tech
Textile manufacture, clothing, leather, leather products and other materials	13 + 14 + 15	low-tech
Wood products, paper-making and printing	16 + 17 + 18	low-tech***
Furniture, other products, repair and installation of machinery and equipment	31 + 32 + 33	low-tech****

* except for shipbuilding (medium-low-tech sector) and manufacture of aircraft and spacecraft (high-tech sector); ** except for manufacture of weapons and ammunition (medium-high-tech sector); *** except for reproduction of recorded information (medium-low-tech sector); **** except for manufacture of medical and dental instruments and materials (medium-high-tech sector).

Based on Eurostat indicators on High-tech industry and Knowledge-intensive services. Annex 3 High-tech aggregation by NACE Rev.2. Aggregations of manufacturing based on NACE Rev. 2. Eurostat. 2008. URL: https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf (Last accessed: 20.05.2021)

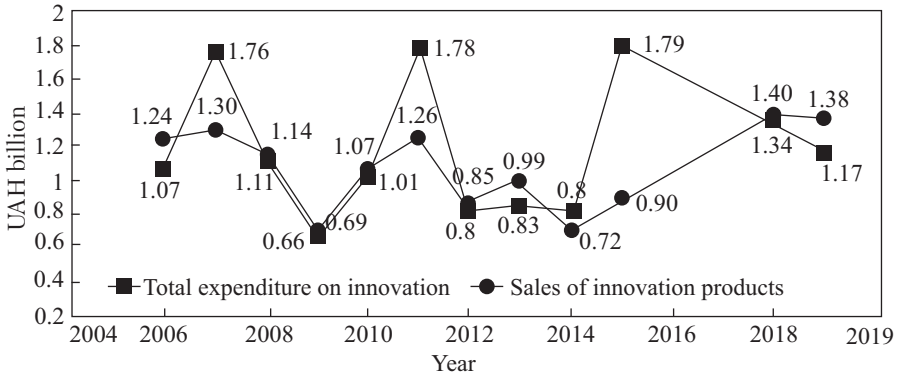

Fig. 2. Expenditure on innovations and sale of innovation products in Ukraine in 2006–2019 (as compared with the previous year)

achieved without the developing the industrial sector. In the list of the strategic directions of the economic policy up to 2030, industry is ranked tenth, behind the agro-industrial complex. The list of the strategic goals in the *industry* [37, 134] shows that the National Economic Strategy aims neither at significantly modernizing industry, nor at reforming the structural and technological components of the economy, nor at forming the smart industry in accordance with the European strategies of progressive industrial development. Without this, it is hardly possible to enhance national competitiveness and to ensure the transition to a new high-tech model of development.

Analyzing the Parameters of the Innovation Activities of the National Industries by Technological Sectors

To develop an effective innovation industrial policy and assess the direction of technological development of industry on the way to Industry 4.0, it is advisable to analyze the parameters of its innovation by technology sectors based on Eurostat methodology (Table 1), which is a modern standard for EU member states. members of the EU and other countries that have harmonized national classifiers and statistics with European standards.

Based on Eurostat indicators on High-tech industry and Knowledge-intensive services. Annex 3 High-tech aggregation by NACE Rev.2. Aggregations of manufacturing based on NACE Rev. 2. Eurostat. 2008. URL: https://ec.europa.eu/eurostat/cache/metadata/Annexes/htec_esms_an3.pdf (access date: 20.05.2021).

All industries of Ukraine have different level of manufacturability. The analysis of the dynamics of innovative development of industrial activities by technological sectors has allowed identifying the dominant trends and assessing them from the standpoint of opportunities and threats to neo-industrial development of Ukraine. Neo-industrialization involves the transition to a new, smart industrialization [38, 7] or transition to a new, sixth, technological structure (Industry 4.0), manufacture of high value-added products that are individualized, nanosized, biotechnology-intensive, cognition-intensive, involving the development of additive and key technologies 4.0 through reindustrialization and reshoring, i.e. increasing the jobs in national economy based on these technologies [39, 27]. This concept has gained popularity quite recently, although the first studies started even earlier than the post-industrialization research. In 1967, John Kenneth Galbraith put forward the idea of a new industrial society, the main feature of which was change in the structure of the working class by increasing the share of those employed in high-skilled labor [40]. Unlike the concept of post-industrialization, which is also based on shifting the structure of employment in the economy towards the service sector,

Table 2. **Dynamics and Structure of the Innovation Expenditure by Technology–Intensive Industries in 2015–2019**

Industrial sector	Total expenditure, UAH million				
	2015	2018	2019	2018	2019
				% with respect to 2015	
Ukraine's industry	**13813.7**	**12180.0**	**14220.9**	**88.2**	**102.9**
Process industry	13171.5	11051.3	11002.5	83.9	83.5
High-tech sector					
pharmaceuticals	1589.4	595.0	1449.2	37.4	91.2
computers, electronic and optical products	183.8	470.9	221.6	256.2	120.6
Total	1773.2	1065.9	1670.8	60.1	94.2
Medium high-tech sector					
chemical substances and chemical products	130.9	110.9	906.0	84.7	692.1
electrical equipment	185.7	538.0	483.0	290.0	260.1
other machinery and equipment	747.7	1049.7	1019.5	140.4	136.4
motor vehicles, trailers and semi-trailers, etc.	471.6	922.9	362.8	195.7	76.9
Total	1535.9	2620.8	2771.3	168.7	180.4
Medium low-tech sector					
coke and refined petroleum products	26.9	1.0	c[1]	3.6	—
rubber and plastic products, other non-metallic products	127.7	862.9	560.8	675.7	439.2
metallurgy, finished metal products other than machinery and equipment	7901.3	4437.4	2025.2	56.2	25.6
Total	8055.9	5301.3	2586.0	65.8	32.1
Low-tech sector					
food, beverages, and tobacco products	1540.3	1336.9	3227.7	86.8	209.6
textile manufacture, clothing, leather, leather products and other materials	40.5	79.5	81.4	196.4	200.9
wood products, paper-making and printing	143.6	461.8	415.9	321.6	289.6
furniture, other products, repair and installation of machinery and equipment	82.0	184.6	177.1	225.0	215.9
Total	1806.4	2062.8	3902.1	114.2	216.0

[1] confidential information

Estimated and prepared based on [11, 79; 41, 70; 42, 150].

the main task of neo-industrialization is to maintain high rates of production in the high-tech and medium-high tech sectors.

The analysis has been carried out from the standpoint of costs and benefits, as evidenced by innovation products sold (sales of innovation products). The data in Fig. 2 indicate a close relationship between these parameters at least until 2018. After this, the relationship manifests itself with a lag of at least one year. The comparison of costs and benefits allows assessing the effectiveness of innovation in industries.

In the structure of innovation costs, the expenditure on internal (in-house) and external R&D works that ensures the development of new products and technologies is very important. In Ukraine, in recent years, the total expenditure on innovation and the expenditure on in-house R&D [1] have been varying significantly from year to year and generally shown a downward trend (Table 2), but in some sectors their dynamics differ. In 2019,

[1] The expenditure on external R&D is not taken into consideration, since in the recent years, not all corporations have been reporting on it.

Including, in-house R&D, UAH million					Structure of expenditure by industries, %					
2015	2018	2019	2018	2019	Total expenditure			In-house R&D expenditure		
			% with respect to 2015		2015	2018	2019	2015	2018	2019
1834.1	**2706.1**	**2449.9**	**147.5**	**133.6**	**100**	**100**	**100**	**100**	**100**	**100**
1819.3	2303.0	1981.2	126.6	108.9	95.3	90.7	77.4	99.2	85.1	80.9
861.6	362.8	569.1	42.1	66.1	11.5	4.9	10.2	47.0	13.4	23.2
96.6	273.7	115.7	283.5	119.8	1.3	3.9	1.6	5.3	10.1	4.7
928.2	636.5	684.8	68.6	73.8	12.8	8.8	11.8	52.3	23.5	27.9
55.1	34.8	329.3	63.2	597.6	0.9	0.9	6.4	3.0	1.3	13.4
124.4	261.9	297.9	210.5	239.5	1.3	4.4	3.4	6.8	9.7	12.2
411.9	526.3	426.3	127.8	103.5	5.4	8.6	7.2	22.5	19.5	17.4
151.3	559.5	179.7	370.0	118.8	3.4	7.5	2.6	8.2	20.7	7.3
742.7	1382.5	1233.2	186.1	166.0	11.0	21.4	19.6	40.5	51.2	50.3
—	—	—	—	—	0.2	0.0	—	—	—	—
0.7	41.0	c	58.6 times	—	0.9	7.1	3.9	0.0	1.5	—
15.0	112.9	c	7.5 times	—	57.2	36.4	14.2	0.8	4.2	—
15.7	152.9	—	9.7 times	—	58.3	43.5	18.1	0.8	5.7	—
82.8	44.2	c	53.4	—	11.2	11.0	22.7	4.5	1.6	—
9.6	9.4	c	97.9	—	0.3	0.7	0.6	0.5	0.3	—
3.1	20.3	c	6.5 times	—	1.1	3.8	2.9	0.2	0.7	—
7.3	56.1	c	7.7 times	—	0.6	1.5	1.2	0.4	2.1	—
102.8	130.0	—	126.5	—	13.2	17.0	27.4	5.6	4.7	—

the total cost of innovation in *the high-tech sector* decreased by 5.8% because of the pharmaceutical industry. As a result, the share of the sector in the total investment in innovation decreased by 1%.

The same trend is observed in the dynamics of expenditure on in-house R&D, as in 2016—2019, their amount decreased by 1.5 times. In 2015, the high-tech sector provided more than half (52.3%) of the expenditure on in-house R&D; while in 2019, its share made up only 27.9%. At the same time, the manufacturers of pharmaceuticals and drugs in 2019 significantly increased their expenditure as compared with 2018 (2.4 times). On the contrary, the manufacturers of computers, electronic and optical products significantly (more than twice) reduced it, which indicates the unstable innovation processes in this sector.

The medium-high-tech sector shows the opposite, generally positive, dynamics. During the period from 2015 to 2019, in all industries (except for the manufacture of motor vehicles), there was reported a tendency to increase the overall investment in innovation, as well as the expenditure on

Table 3. **Dynamics and Structure of Innovation Products Sold by Technology-Intensive Industries**

Industrial sector	Sales of innovation products, UAH million				
	2015	2018	2019	2018	2019
				% with respect to 2015	
Ukraine's industry	**23050.1**	**24861.1**	**34264.9**	**107.9**	**148.7**
Process industry	22897.9	24429.1	33495.7	106.7	146.3
High-tech sector					
pharmaceuticals	624.5	879.8	667.7	140.9	106.9
computers, electronic and optical products	466.1	1044.9	881.4	224.2	189.1
Total	1090.6	1924.7	1549.1	176.5	142.0
Medium high-tech sector					
chemical substances and chemical products	1918.9	963.7	441.1	50.2	23.0
electrical equipment	1389.0	1382.7	1481.2	99.5	106.6
other machinery and equipment	3246.9	1854.7	4976.5	57.1	153.3
motor vehicles, trailers and semi-trailers, etc.	2187.2	3746.7	2390.8	171.3	109.3
Total	8742.0	7947.8	9289.6	90.9	106.3
Medium low-tech sector					
coke and refined petroleum products	270.6	c	c[1]	—	—
rubber and plastic products, other non—metallic products	565.5	2092.2	1446.0	370.0	255.7
metallurgy, finished metal products other than machinery and equipment	6174.6	3718.7	13387.5	60.2	216.8
Total	7010.7	5810.9	14833.5	82.9	211.6
Low-tech sector					
food, beverages, and tobacco products	4874.5	6292.4	5779.9	129.1	118.6
textile manufacture, clothing, leather, leather products and other materials	112.8	437.6	52.3	387.9	46.4
wood products, paper-making and printing	675.2	1295.9	661.1	191.9	97.9
furniture, other products, repair and installation of machinery and equipment	391.8	713.7	334.4	182.2	85.3
Total	6054.3	8740.2	6827.7	144.4	112.8

[1] confidential information

Estimated and prepared based on [11, 94; 41, 82; 42, 172].

in-house R&D. Therefore, the share of this sector in the total expenditure has almost doubled, and it has become dominant (50.3%) in terms of the expenditure on in-house R&D. However, the total expenditure on innovation in 2019 decreased as compared with the previous year in all industries (except for chemical production). This indicates a decrease in the ability or interest of corporations to invest in innovation.

The medium-low-tech sector is the most problematic, as it includes the coke and refining industry that has lost a significant share of its resources because of external factors and has almost stopped innovating. There was reported a significant reduction in the total expenditure on innovation in the metallurgical industry, the share of which in 2015 accounted for 57%. Only in the manufacture of rubber and plastic goods there was a significant positive trend, especially, in the expenditure on in-house R&D (in 2018, it increased 58.6 times [2]). In the low-tech sector, as of 2019, the total expenditure on innovation grew in all

Sales of innovation products that are new for the market, UAH million					Structure of innovation products sold, by industries,%					
2015	2018	2019	2018	2019	Total sales of innovation products			Total sales of innovation products that are new for the market		
			% with respect to 2015		2015	2018	2019	2015	2018	2019
7284.2	**7863.8**	**6826.2**	**108.0**	**93.7**	**100**	**100**	**100**	**100**	**100**	**100**
7282.1	7840.7	6817.2	107.7	93.6	99.3	98.3	97.8	99.9	99.7	99.9
62.3	97.5	39.3	156.5	63.1	2.7	3.5	1.9	0.8	1.2	0.6
332.9	220.6	581.9	66.3	174.8	2.0	4.2	2.6	4.6	2.8	8.5
395.2	318.1	621.2	80.5	157.2	4.7	7.7	4.5	5.4	4.0	9.1
944.4	369.8	35.4	39.2	3.7	8.3	3.9	1.3	13.0	4.7	0.5
1120.2	495.5	413.9	44.2	36.9	6.0	5.6	4.3	15.3	6.3	6.1
2606.1	961.1	2451.2	37.0	94.1	14.1	7.5	14.5	35.7	12.2	35.9
733.4	1493.7	1475.0	203.7	201.1	9.5	15.1	7.0	10.1	19.0	21.6
5404.1	3320.1	4375.5	61.4	81.0	37.9	32.1	27.1	74.1	42.2	64.1
21.1	—	c	—	—	1.2	c	c	0.3	—	—
262.4	1070.8	c	408.1	—	2.5	8.4	4.2	3.6	13.7	—
150.2	237.1	c	158.0	—	26.8	14.9	39.1	2.1	3.0	—
433.7	1307.9	—	301.6	—	30.5	23.3	43.3	6.0	16.7	—
877.6	2253.1	847.9	256.7	96.6	21.1	25.3	16.9	12.0	28.7	12.4
56.5	25.0	c	44.2	—	0.5	1.8	0.2	0.8	0.3	—
1.4	447.8	c	320 times	—	2.9	5.2	1.9	0.02	5.7	—
113.5	168.1	c	148.1	—	1.7	2.9	1.0	1.6	2.1	—
1049.0	2894.0	—	275.9	—	26.2	35.2	20.0	14.4	36.8	—

industries. The largest amount belonged to food industry as the most powerful industry of this group. As a result, the share of this sector in the total expenditure increased from 13.2%, in 2015, to 27.4%, in 2019, i.e. in terms of the total expenditure on innovation, this sector became dominant. However, in general, the industries of this group have a very small share of the expenditure on in-house R&D, which confirms the classification as low-tech sector.

The analysis of the amount and dynamics of investment in innovation has shown that the medium-high-tech (except for motor vehicles) and the low-tech sectors had the most positive dynamics and the greatest investment potential in the reporting period.

The main result of innovation is the release of innovation products, especially, new products for

[2] It is impossible to analyze the changes in the amount and structure of expenditure on in-house R&D in the medium high-tech and low-tech sectors in 2019 because this information is not disclosed by the corporations.

the market, which indicates a truly innovative shift in production (Table 3). In the high-tech sector, the amount of innovation products sold increased by 42%, but its share in the total innovation products sold in the industry decreased. On the positive side, in 2019, the share of the sector in the structure of innovation products (new to the market) sold grew significantly, because of the increase in this category in the manufacture of computers, electronic and optical products. The industries of the medium-high-tech sector show contradictory dynamics: only in the manufacture of motor vehicles there was reported an increase in both the total innovation products sold and innovation products sold, which were new to the market. Chemical production was characterized by a significant decline in the sales of innovation products, especially those that were new products for the market, as a result of a reduction in the expenditure on innovation in this industry, in 2018. Other industries of this sector showed an increase in the total innovation products sold in 2019, but the share of products that were new to the market decreased. In general, this sector gave up positions in the production and sale of innovation products.

The *medium-low-tech sector* includes the problematic industry of coke production, where innovation has virtually stopped. In 2019, the metallurgical industry and the manufacture of rubber and plastic products showed an unstable increase in the sales of innovation products, which ensured an increase in the share of this sector in the structure of the total innovation products sold by

Table 4. **Sales of Innovation Products per Unit of Investment, UAH million**

Industrial sector	2015	2018	2019	2018	2019
				% with respect to 2015	
Ukraine's industry	**1.668641**	**2.041141**	**2.409473**	**122.3**	**118.0**
Process industry	1.738443	2.210518	3.044362	127.2	137.7
High-tech sector					
basic pharmaceutical products and pharmaceuticals	0.392916	1.478655	0.460747	376.3	117.3
manufacture of computers, electronic and optical products	2.535909	2.218942	3.977778	87.5	156.9
Medium high-tech sector					
chemical substances and chemical products	14.65928	8.689811	0.486892	59.3	3.3
electrical equipment	7.479806	2.570074	3.066543	34.4	41.0
other machinery and equipment	4.342517	1.766886	4.881116	40.7	112.4
motor vehicles, trailers and semi-trailers, etc.	4.637829	4.059703	6.590309	87.5	142.1
Medium-low-tech sector					
coke and refined petroleum products	10.05948	c[1]	c	—	—
rubber and plastic products, other non-metallic mines. products	4.428348	2.424615	2.578240	54.8	58.2
metallurgy, finished metal products other than machinery and equipment	0.781466	0.838036	6.610593	107.2	845.9
Low-tech sector					
food, beverages, and tobacco products	3.164643	4.706710	1.790694	148.7	56.6
textile manufacture, clothing, leather, leather products and other materials	2.785185	5.504403	0.642993	197.6	23.1
wood products, paper-making and printing	4.701950	2.806193	1.589554	59.7	33.8
furniture, other products, repair and installation of machinery and equipment	4.778049	3.866197	1.887582	80.9	39.5

[1] confidential information.

Estimated and prepared based on [11, 94; 41, 70, 82; 42, 150, 172].

almost 13%. However, it is impossible to analyze the changes in the amount and structure of the innovation products sold, which were new to the market, in 2019, because the corporations of this sector keep this information confidential. The same is true for *the low tech sector* all industries of which have been showing a decrease in the innovation products sold, except for food industry, thanks to which this indicator for the sector has increased. In general, the share of this sector in the total innovation products sold downed from 26.2 to 20.0%.

Based on the analysis, it may be concluded that the level of manufacturability of the innovation products sold in 2019 decreased as compared with 2015, but there were reported some positive trends as compared with 2018. Despite the fact that the amount of innovation products sold in the high-tech sector increased 1.4 times, it has a small share in the total sales of innovation products (4.5%). A significant reduction in this indicator for the medium-high-tech sector has led to the fact that these two sectors provide only about 30% of the sales of innovation products against 42.6%, in 2015. However, it is positive that the total share of innovation products of these sectors, which are new to the market, remains high (73.2%), in 2019 (in 2015, 79.5%). The leader in the dynamics of innovation products sold for the reporting period is the medium-low-tech sector (in 2018, it was the low-tech sector).

However, in 2018—2019, the high- and medium-high-tech sectors worsened their positions in the total sales of innovation products. Thus, the share of less knowledge-intensive industries started dominating in the manufacture of industrial innovation products, which adversely affects the further technological development of Ukraine's economy and its competitiveness.

The innovative capacity of products (the amount of innovative products of the industry as the share of the total output of this industry) varies widely by type of industrial activity. In 2019, it showed positive dynamics mainly in the medium-low-tech and low-tech sectors, but in the knowledge-intensive industries, the indicator demonstrated negative dynamics [11, 94; 41, 82; 42, 172]. This is because of decreasing return on investment in innovation. The analysis has shown that the sales of innovation products per unit of expenditure on innovation dropped in most industries (Table 4).

The return on investment (ROI) in innovation varies greatly through the industries. On the negative side, there is the fact that pharmaceuticals (one of the industries of the high-tech sector) as well as chemical and textile industries have the lowest ROI, although in 2018, these industries showed high returns. In 2015—2019, a significant increase in ROI was observed in metallurgy, however, it was rather low in 2015. All industries of the low-tech sector, as well as the manufacture of electrical equipment, rubber and plastic products demonstrated dropping ROI.

Conclusions

Ukraine needs to pursue a systematic, consistent innovation-based industrial policy aiming at overcoming technical and technological backwardness and at ensuring progressive structural transformations in the economy for the purpose of building a modern competitive industry as a basis for developing the domestic market, increasing exports of high value-added goods and services, combatting poverty, and forming the middle class.

Institutional support for the modernization and development of the national industry in accordance with modern world trends remains a relevant issue. This applies to both the legal framework and the activities of the respective ministry. The solution of this problem requires analyzing the status and problems of Ukraine's industrial development, studying and using positive experience in the innovation-oriented industrial policy and the best practice in the sphere of developing a progressive strategy for Ukraine's industrial complex on the basis of Industry 4.0, as well as improving the industrial policy, which

have been elaborated by researchers of the NAS of Ukraine, representatives of the business sector and NGOs, who contribute to the development of high-tech industry in Ukraine.

The analysis of innovative activity of the process industry of Ukraine has shown unstable dynamics and a significant discrepancy between the tech sectors. The share of the high-tech sector in the total innovations is insignificant and tends to decrease both in terms of investment in innovation and in terms of the share of innovation products sold. In the medium-high-tech and low-tech sectors, the investment in innovation is growing, but the sales of innovation products have been declining, which adversely affects the return on investment. The innovation activity in the medium-low-tech sector has been growing against the background of dropping investment in innovation, which indicates raising efficiency in this sector, mainly due to metallurgy. The medium-low-tech and low-tech sectors whose share in the total sales of innovation products has been increasing and as of 2019 amounted to 63.3% against 56.7%, in 2015, have a small share in the expenditure on in-house R&D, which leads to a decrease in the knowledge-intensity of the innovation products and the simplification of industrial innovations. The innovation capacity of domestic products varies widely throughout the type of industry and has a pronounced negative trend, in particular, as a result of a low return on investment in innovation in most industries.

It should be noted that industrial corporations alone are unable to bring the country out of the innovation and technological decline. Active government support is required. This support shall comprise both the horizontal measures (the introduction of favorable tax, credit, and customs regulation, non-fiscal incentives) and the organization of conditions for dialogue between the stakeholders and the groups (corporations, researchers, NGOs, and local authorities) in terms of developing joint decisions on the areas of modernization and smart specialization of regions and the country as a whole. It is necessary to generalize and systematize the best practice in elaborating a progressive strategy for the development of the industrial complex of Ukraine on the basis of Industry 4.0 and to adopt this strategy for the implementation with appropriate funding. These tasks should be a priority for the Cabinet of Ministers of Ukraine and the newly established Ministry of Strategic Industries of Ukraine. It is advisable to constantly monitor the indicators of innovation in all industries.

It is necessary to implement the directions and measures aiming at neo-industrialization of Ukraine, including the following ones:

- to create favorable economic and institutional conditions for supporting cluster development primarily in the high-tech and medium-high-tech sectors in order to form new modern industries on their basis as well as to establish the legislative framework for the creation of clusters in accordance with the EU practices;
- to encourage the integration of engineering industries with science to generate demand from engineering companies for academic and industry science, in particular by means of innovation voucher tool;
- to reduce economic pressure on producers from the high- and medium-high-tech sectors by optimizing the tax framework, timely refunding VAT, and regulating tariffs for services of energy suppliers and transport monopolies;
- to introduce tools for financial support of implementing smart specializations in the regions of Ukraine for attracting producers to cooperation with science and local authorities through meetings, discussions, and coordination of joint actions;
- to support the startup sector as an innovation leader in the economy by increasing funding of innovation-based businesses at early stages through the Ukrainian Startup Fund;
- to launch government targeted programs (GTP) for reindustrialization of the economy; to this end, it is necessary to lift the ban on the preparation of new GTP, which was introduced by the Resolution of the Cabinet of Ministers of

Ukraine on the Efficient Use of Public Funds (paragraph 12) dated October 11, 2016 [43];

- to develop the educational system in accordance with the needs of neo-industrialization, to increase the number of specialists in engineering and natural sciences by expanding the admission of students to universities in these specialties, in particular by government order;
- to ensure a gradual (during 2022—2027) increase in funding of science as a foundation for the emergence and development of new industries [3] at the expense of public and private sources to 3% of GDP, as established by the law of Ukraine. This is an important signal to European partners about the seriousness of Ukraine's intentions and readiness to promote science and innovation in the long run.

These measures shall be taken immediately, as the centers of development of new industries in the world have not yet been formed and still there is an opportunity to ride a new crest of technological innovation, which is always open to countries in the course of technological revolution. In this context, an important area for further research is to substantiate tools for supporting the development of high-tech industries for domestic producers to be included into the global supply chains on more favorable conditions and to ensure the country's industrial progress based on neo-industrialization.

REFERENCES

1. Reshoring Initiative Data Report: Reshoring up Despite COVID. 2020. November. URL: https://www.automation.com/en-us/articles/november-2020/reshoring-initiative-data-report-reshoring-up (Last accessed: 12.05.2021).
2. European Commission. (2020). A new Industrial Strategy for a globally competitive. green and digital Europe. A European industrial strategy. URL: https://ec.europa.eu/commission/presscorner/detail/en/fs_20_425 (Last accessed: 12.05.2021).
3. European Commission. (2021). European industrial strategy. Internal Market. Industry. Entrepreneurship and SMEs. URL: https://ec.europa.eu/growth/industry/policy_en (Last accessed: 12.05.2021).
4. Federal Ministry for Economic Affairs and Energy. (2019). National Industrial Strategy 2030. Berlin. URL: https://www.bmwi.de/Redaktion/EN/Artikel/Industry/nationale-industriestrategie-2030.html (Last accessed: 18.05.2021).
5. Bundesministerium für Wirtschaft und Energie. (2019). A Franco-German Manifesto for a European industrial policy fit for the 21st Century. Paris. URL: https://www.bmwi.de/Redaktion/DE/Downloads/F/franco-german-manifesto-for-a-european-industrial-policy.pdf%3Fblob%3DpublicationFile%26v%3D2 (Last accessed: 18.05.2021).
6. European Union. (2018). Re-finding Industry. Report from the High Level Strategy Group on Industrial Technologies. Luxembourg: Publications Office of the European Union. URL: https://op.europa.eu/en/publication-detail/-/publication/28e1c485-476a-11e8-be1d-01aa75ed71a1 (Last accessed: 21.05.2021).
7. Eurofound. (2019). The future of manufacturing in Europe. Research Report. Luxembourg: Publications Office of the European Union. https://doi.org/10.2806/44491.
8. BusinessEurope. (2017). Building a strong and modern European industry. Views on a renewed EU industrial strategy. URL: https://www.businesseurope.eu/sites/buseur/files/media/reports_and_studies/building_a_strong_and_modern_european_industry_-_compressed_for_web_and_sending.pdf (Last accessed: 22.05.2021).
9. Amosha, O., Pidorycheva, I., Zemliankin, A. (2021). Key trends in the world economy development: new challenges and prospects. *Sci. innov.,* 17(1), 3—17. https://doi.org/10.15407/scine17.01.003.
10. Kwilinski, A. (2018). Mechanism of Modernization of Industrial Sphere of Industrial Enterprise in Accordance with Requirements of the Information Economy. *Marketing and Management of Innovations,* 4, 116—128.
11. State Statistic Service of Ukraine. (2020). *Scientific and innovative activity in Ukraine in 2019*. Statistical Yearbook [in Ukrainian].
12. State Statistic Service of Ukraine. (2008). *Scientific and innovative activity in Ukraine in 2007*. Statistical Yearbook [in Ukrainian].
13. United Nations Industrial Development Organization. (2019). Industrial Development Report 2020. Industrializing in the digital age. Vienna.

[3] For instance, the government of PRC has announced that genome studies are economic foundation of China's industrial ambitions in the 21st century

14. Kindzerski, Yu.V. (2020). Policy of inclusive and sustainable industrialization: the challenges and priorities of implementation. *Economic Analysis,* 30(1), 105—117. *https://doi.org/*10.35774/econa2020.01.01.105 [in Ukrainian].
15. Yegorov, I., Ryzhkova, Yu. (2018). Innovation policy and implementation of smart specialisation in Ukraine. *Economy and Forecasting*, 3, 48—64. *https://doi.org/10.15407/eip2018.03.048*.
16. Snihova, O.Yu. (2018). Smart specialization potential revealing for the overcoming of regional structural inertness in Ukraine. *Economy of Ukraine*, 8(681), 75—88 [in Ukrainian].
17. Amosha, O., Lyakh, O., Soldak, M., Cherevatskyi, D. (2018). Institutional determinants of implementation of the smart specialisation concept: case for old industrial coal-mining regions in Ukraine. *Journal of European economy*, 17, 3(66), 310—344. *https://doi.org/*10.35774/jee2018.03.305.
18. Shevtsova, H., Shvets, N., Kramchaninova, M., Pchelynska, H. (2020). In Search of Smart Specialization to Ensure the Sustainable Development of the Post-Conflict Territory: the Case of the Luhansk Region in Ukraine. *European Journal of Sustainable Development*, 9(2), 512—524. *https://doi.org/*10.14207/ejsd.2020.v9n2p512.
19. Reinert, E. S. (2016). *How Rich Countries Got Rich ... and Why Poor Countries Stay Poor*. Moscow: HSE Publishing House [in Russian].
20. Aiginger, K., Rodrik, D. (2020). Rebirth of Industrial Policy and an Agenda for the Twenty-First Century. *Journal of Industry, Competition and Trade*, 20, 189—207. *https://doi.org/*10.1007/s10842-019-00322-3.
21. Ezell, S. (2018). Why Manufacturing Digitalization Matters and How Countries Are Supporting It / *Information Technology & Innovation Foundation*. URL: http://www2.itif.org/2018-manufacturing-digitalization.pdf (Last accessed: 17.05.2021).
22. Flegel, H. (2018). Manufuture Vision 2030: Competitive, Sustainable and Resilient European Manufacturing. Report from Manufuture. High-Level Group of European Union. URL: http://www.manufuture.org/wp-content/uploads/Manufuture-Vision-2030_DIGITAL.pdf (Last accessed: 17.05.2021).
23. Kelly, K. (2017). *The Inevitable. Understanding the 12 technological forces that will shape our future*. Moscow: Mann, Ivanov and Ferber [in Russian].
24. Lin, J. Y. (2011). *Demystifying the Chinese Economy*. New York: Cambridge University Press.
25. Rodrik, D. (2018). *New Technologies, Global Value Chains, and the Developing Economies*. Pathways for Prosperity Commission Background Paper Series; no. 1. Oxford. United Kingdom.
26. Ross, A. (2017). *The industries of the future*. Kyiv: Nash format [in Ukrainian].
27. Schwab, K. (2016). *The Fourth Industrial Revolution*. Switzerland: World Economic Forum.
28. Bobukh, I. M. (Ed.). (2020). *Structural changes as a basis of inclusive development of the Ukrainian economy*: monograph. Electronic edition. Kyiv. URL: http://ief.org.ua/docs/mg/332.pdf [in Ukrainian].
29. Vishnevsky, V. P. (Ed.). (2018). *Smart industry in the digital economy: prospects, directions and mechanisms of development*: monograph. Kyiv. URL: https://iie.org.ua/wp-content/uploads/2018/05/2018-Smart-promislovist-v-epohu-tsifrovoyi-ekonomiki.pdf [in Ukrainian].
30. Ishchuk, S. O. (Ed.). (2020). *Manufacturing of the regions of Ukraine: problems and development prospects*: monograph. Lviv [in Ukrainian].
31. Kizym, M. O. (Ed.). (2020). *Mechanism of state support for the reconstruction of industry in Ukraine*: monograph. Kharkiv [in Ukrainian].
32. Burkinskyi, B., Laiko, O., Losyev, M. (2018). Realization of sustainable development aims for industry and innovations on glocalization principles. *Economic Innovations*, 20, 4(69), 7—22. *https://doi.org/*10.31520/ ei.2018.20.4(69).7—22.
33. Salikhova, O., Shelud`ko, N. (2020). Institutional and financial mechanisms to stimulate technology innovation in industry: the experience of France, lessons for Ukraine. *Econ. promisl,* 2 (90), 5—26 [in Ukrainian]. *https://doi.org/*10.15407/econindustry2020.02.005
34. On the establishment of the Coordination Center for Industry: Cabinet of Ministers of Ukraine. from 19.02.2020 № 122. (2020). [in Ukrainian]. URL: https://zakon.rada.gov.ua/laws/show/122-2020-%D0%BF#Text (Last accessed: 20.05.2021).
35. Sustainable Development Goals: Ukraine. National report: Ministry of Economic Development and Trade of Ukraine. (2017) [in Ukrainian].
36. Cabinet of Ministers of Ukraine. (2017). On the implementation of the Association Agreement between Ukraine, of the one part, and the European Union, the European Atomic Energy Community and their Member States, of the other part, from 25.10.2017 № 1106. URL: https://zakon.rada.gov.ua/laws/show/1106-2017-%D0%BF#Text (Last accessed: 20.05.2021) [in Ukrainian].
37. Cabinet of Ministers of Ukraine. (2021). On approval of the National Economic Strategy for the period up to 2030 from 03.03.2021 № 179. URL: https://www.kmu.gov.ua/npas/pro-zatverdzhennya-nacionalnoyi-eko-a179 (Last accessed: 20.05.2021) [in Ukrainian].

38. Vishnevsky, V. P. (Ed.). (2016). National model of neo-industrial development of Ukraine: monograph. Kyiv. URL: https://iie.org.ua/wp-content/uploads/monografiyi/2016/2016_mono_Vishnevskiy_Zbarazska_Zanizdra_Chekina.pdf [in Ukrainian].
39. Liashenko, V. I., Kotov, Ye. V. (2015). *Ukraine XXI: a neo-industrial state or a project collapse*? Kyiv [in Ukrainian].
40. Galbraith, J. K. (2004). *The new industrial state*. Moscow: AST [in Russian].
41. State Statistic Service of Ukraine. (2019). *Scientific and innovative activity in Ukraine in 2018*. Statistical Yearbook [in Ukrainian].
42. State Statistic Service of Ukraine. (2016). *Scientific and innovative activity in Ukraine in 2015*. Statistical Yearbook [in Ukrainian].
43. Cabinet of Ministers of Ukraine. (2016). On the effective use of public funds from 11.10.2016 p. № 710 URL: https://zakon.rada.gov.ua/laws/show/710-2016-%D0%BF#Text (Last accessed: 21.05.2021) [in Ukrainian].

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СУЧАСНІ ТЕНДЕНЦІЇ ТА ПЕРСПЕКТИВИ РОЗВИТКУ ІННОВАЦІЙНОЇ ДІЯЛЬНОСТІ ЗА ТЕХНОЛОГІЧНИМИ СЕКТОРАМИ ПРОМИСЛОВОСТІ УКРАЇНИ

Вступ. Розбудова інноваційно-конкурентоспроможної та високоукладної моделі економіки країни неможлива без сучасної розвинутої промисловості.

Проблематика. Для запуску структурно-технологічних перетворень Україні потрібно здійснювати системну, послідовну інноваційну промислову політику, спрямовану на неоіндустріалізацію як основу розвитку внутрішнього ринку, нарощення експорту товарів з високою доданою вартістю, підвищення якості життя населення, зниження рівня бідності, формування середнього прошарку суспільства.

Мета. Визначення сучасних тенденцій перебігу інноваційних процесів у промисловості у розрізі технологічних секторів з позиції можливостей і загроз для неоіндустріального розвитку України.

Матеріали й методи. Дослідження базується на положеннях неошумпетерівської школи та інституціональної теорії, спирається на теоретичні напрацювання українських і зарубіжних учених з проблем інновацій та реалізації структурно-технологічних змін в економіці. Використано методи аналізу й синтезу, логічного узагальнення, системного підходу, статистичного аналізу.

Результати. Визначено несформованість інституційних засад модернізації та розвитку промисловості України відповідно до сучасних світових трендів. Здійснено аналіз інноваційної діяльності галузей національної промисловості у розрізі витрат і результатів, які систематизовано за рівнями технологічності на основі методики Євростату. Виявлено нестабільну динаміку та суттєву розбіжність між технологічними секторами, зниження наукомісткості інноваційної продукції, низьку ефективність інвестицій в інновації у більшості галузей, тенденцію до примітивізації інноваційної діяльності у промисловості.

Висновки. Запропоновано напрями й заходи інноваційної промислової політики, спрямовані на неоіндустріалізацію України та виведення її з інноваційно-технологічного занепаду.

Ключові слова: інновації, інноваційна діяльність, промисловість, технологічний сектор, інноваційна промислова політика, неоіндустріалізація.