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REALIZATION OF SUSTAINABLE DEVELOPMENT AIMS FOR INDUSTRY AND INNOVATIONS ON GLOCALIZATION PRINCIPLES

Topicality. *Creating of sustainable infrastructure and promoting of inclusive and sustainable industrialization and innovations is one of the aims of sustainable development of the state, approved by the United Nations, that implemented by the Government of Ukraine as a basis for future economic development policy. In the process of studying of the state's sustainable development, setting aims and finding ways of realization important place takes the research of industrial development and innovations, that takes into account the national specificity of the state's institutional development and the existing socio-economic situation on the principles of glocalization. This will take into account the interests of local communities, involve them in cross-border and international economic relations and will enable them to take part in globalized markets on the basis of local preferences and features.*

Aim and tasks. *The aim of the article is to formulate the conceptual foundations and work out scientifically grounded application tools that are used as a methodological approach to study the existing level of industry and innovation development and to find ways to improve it using bilateral joint of local resources and abilities with preferences and conditions of global markets.*

Research results. *The authors developed a complex of indicators for assessing the level of compliance of national industry, innovations and infrastructure with modern requirements for improving of the economic efficiency and "ecologization" of the economy through resource conservation and reuse of resources on the basis of glocalization. Data from the State Statistics Service of Ukraine, the Ministry of Economic Development and Trade of Ukraine, data from international rating agencies were the basis for the information provision of monitoring of the state of industry, innovations and infrastructure. According to the revealed tendencies, measures are proposed to regulate the development of industrial production, innovations and infrastructure on the principles of glocalization, the introduction of the postulates of the "green" and circular economics, in particular - economic and organizational stimulation of non-waste production through the application of tax holidays, priority in the competition for funding from the State Fund for Regional Development such projects that include non-waste treatment of garbage, complex industrial recycling of secondary or non-raw material without waste generation, as well as on the basis of the introduction of innovative domestic technologies.*

Conclusion. *The revealed patterns of ecologization of domestic industrial production in Ukraine on the basis of glocalization point to the low capacity of industrial non-waste recycling of garbage and the insignificant level of use of circular technologies in the production process, that confirms the fact of uncertainty of terms and prospects of the realization of the idea of decoupling and the introduction of industrial activities on the basis of environmental and the*

achievement of zero waste level. The implementation of innovations using low-waste, resource-saving technological processes remains at an average-low level and in a year does not exceed 30-35% from the total number of implemented innovative technological processes, while the share of innovation activity and expenses for scientific developments in the total GDP volume is constantly shrinking. The level of penetration of a comfortable and well-developed infrastructure in the areas of infocommunications, in addition to Internet services, and road networks remains rather low and determines the prospects for further growth.

Keywords: solid household waste management, sustainable development, glocalization, infrastructure, "green economics".

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РЕАЛІЗАЦІЯ ЦІЛЕЙ СТАЛОГО РОЗВИТКУ ПРОМИСЛОВОСТІ ТА ІННОВАЦІЙ НА ЗАСАДАХ ГЛОКАЛІЗАЦІЇ

Актуальність. Створення стійкої інфраструктури та сприяння всеохоплюючій і сталій індустріалізації та інноваціям є однією з цілей сталого розвитку країни, затверджених Організацією Об'єднаних Націй, яка є впровадженою Урядом України в якості базису. В процесі дослідження сталого розвитку країни, постановки цілей та пошуку шляхів його реалізації важливе місце займає дослідження розвитку промисловості та інновацій з урахуванням національної специфіки інституціонального розвитку країни та існуючої соціально-економічної ситуації на засадах глокалізації. Це дозволить врахувати інтереси місцевих територіальних громад, залучити їх у транскордонні та міжнародні економічні відносини та відкриє для них можливість взяти участь в глобалізованих ринках на засадах використання локальних переваг і особливостей.

Мета та завдання. Метою статті є формулювання концептуальних засад та напрацювання науково обґрунтованого прикладного інструментарію, що використаний у якості методичного підходу для дослідження існуючого рівня розвитку промисловості та інновацій, та пошуку шляхів його поліпшення, використовуючи місцеві переваги в умовах глобальних ринків.

Результати. Авторами розроблено комплекс індикаторів з оцінки ступеню відповідності національної промисловості, інновацій та інфраструктури сучасним вимогам щодо підвищення економічної ефективності та «екологізації» економіки за рахунок ресурсозбереження та вторинного використання ресурсів на засадах глокалізації. Основою для інформаційного забезпечення моніторингу стану промисловості, інновацій та інфраструктури стали дані Державної служби статистики України, Міністерства економічного розвитку і торгівлі України, дані міжнародних рейтингових агенцій. Відповідно до виявлених тенденцій запропоновані заходи регулювання розвитку промислового виробництва, інновацій та інфраструктури на засадах глокалізації, впровадження постулатів «зеленої» та циркулярної економіки, зокрема - економічне та організаційне стимулювання безвідходного виробництва шляхом застосування податкових канікул, пріоритетності в конкурсі на фінансування з Державного фонду регіонального розвитку таких проектів, які передбачають безвідходне

поводження зі сміттям, комплексну промислову переробку вторинної або первинної сировини без утворення відходів, а також на засадах впровадження інноваційних вітчизняних технологій.

Висновки. Виявлені закономірності екологізації вітчизняного промислового виробництва в Україні на засадах глокалізації свідчать про низьку спроможність промислової безвідходної переробки сміття та про незначний ступінь використання циркулярних технологій у виробничому процесі, що підтверджує факт невизначеності термінів і перспектив щодо реалізації ідеї декаплінгу та впровадження промислової діяльності на засадах екологічності та досягнення нульового рівня відходів. Впровадження інновацій із застосуванням маловідходних, ресурсозберігаючих технологічних процесів залишається на середньо-низькому рівні і в рік не перевищує 30-35% від загальної кількості в загальній кількості впроваджених інноваційних технологічних процесів, при тому, що частка інноваційної діяльності і витрат на наукові розробки в загальному обсязі ВВП постійно скорочується. Рівень проникнення комфортної та стало розвиненої інфраструктури в сферах інфокомунікацій, окрім послуг мережі Інтернет, та дорожніх мереж залишається достатньо низьким і визначає перспективи для подальшого зростання.

Ключові слова: поведження з твердими побутовими відходами, сталий розвиток, глокалізація, інфраструктура, "зелена економіка".

Problem statement and its connection with important scientific and practical tasks. The need of development of a methodological approach to assess the level of development of industry, innovation and infrastructure of the national economy is substantiated by the necessity to investigate the relevance of existing trends to the aims and priorities of sustainable development and to develop recommendations for ways to improve the existing situation.

Analysis of recent publications on the problem. Among the scientists problems of sustainable development of industry and innovations was researched by G. Deily [1], E. Libanova [2], K. Skonberh, A. Viikman and others. The problems of ecologization and low-waste economics problem was reasearched by N. Andreeva [3], B. Burkynskyi [4], A. Bularha, L. Musina [5], T. Kvasha and others. The postulates of the "green" and circular economics was developed in European Parliament Committees and European Commission documents, such as Implementation of the Circular Economy Action Plan and Circular Economy Package Four Legislative Proposals on Waste.

Allocation of previously unsolved parts of the general problem. Insufficient attention in the study of trends in the development of industry and innovations in Ukraine was devoted to the realization of the conception of the development of the "green economy" and the ecologization of the components of the economic system. Also possible benefits of glocalization principle implementation is not taken into account.

Formulation of research objectives (problem statement). The aim of the study is to find ways to optimally regulate the development of the industrial, innovative and infrastructural sectors of economics in order to ensure the ecologization of the national economic system along with increased economic efficiency and improvement of social standards, that is consistent with the postulates of sustainable development, based on the application of assessment tools and economic-organizational, institutional regulation of the economic system, based on the principles of glocalization, which are developed and adapted in accordance with the plan of the EU states on the implementation of the model of the circular economics.

An outline of the main results and their justification. One of the main directions of introducing the postulates of the "green" and circular economics is more environmentally friendly production, stimulating a thriving attitude towards raw materials, using secondary resources as raw materials, and efficient waste management.

Increasing environmental pressures associated with the intensive development of industrial production requires a change in the paradigm of resource use and the transition to effective waste management practices. According to the target values of non-waste production indicators proclaimed in EU countries, the desirable value of garbage recycling by industrial environmentally friendly methods is 70% -100%, however, this level will be reached, even in the most developed states, as predicted in 2050 [6]. The Action Plan on the introduction of the circular economy in the European Union [7, 8] provides for the achievement of maximum full reuse of waste in the production process.

For national realities, given the insufficiently developed statistical base provided in the open access, we propose to use as indicators of approximation to the state of maximum full use of waste in the production process "The share of useful industrial waste disposal in the total amount of waste management" and the "Ratio of positive industrial and negative methods of waste utilization".

An analysis of the state of domestic and similar waste management in Ukraine shows a significant increase the volume of household waste generation, despite a decrease in population. An increase in waste

generation by 52,07% is accompanied by an increase, but with a significant backlog, industrial utilization (including burning for energy, composting and other methods) – an increase of only 14,2%.

Despite the absolute and relative reduction in the use of such inefficient methods of industrial waste processing as burning without energy (a 98,8% reduction) and a harmful phenomenon such as disposal on unequipped waste landfills (a decrease of 24,3%), as well as the volume of waste removal to specially equipped waste landfills (increase by 2,2%) has increased insignificantly, yet the share of waste recycled and utilized (industrial processing, including burning for the purpose of energy recovery, composting) remained almost unchanged: growth from 2,2% to 23%. Moreover, in different years during the time series studied there was a drop and drop to 1,5-1,1% (in 2013) (Fig. 1)

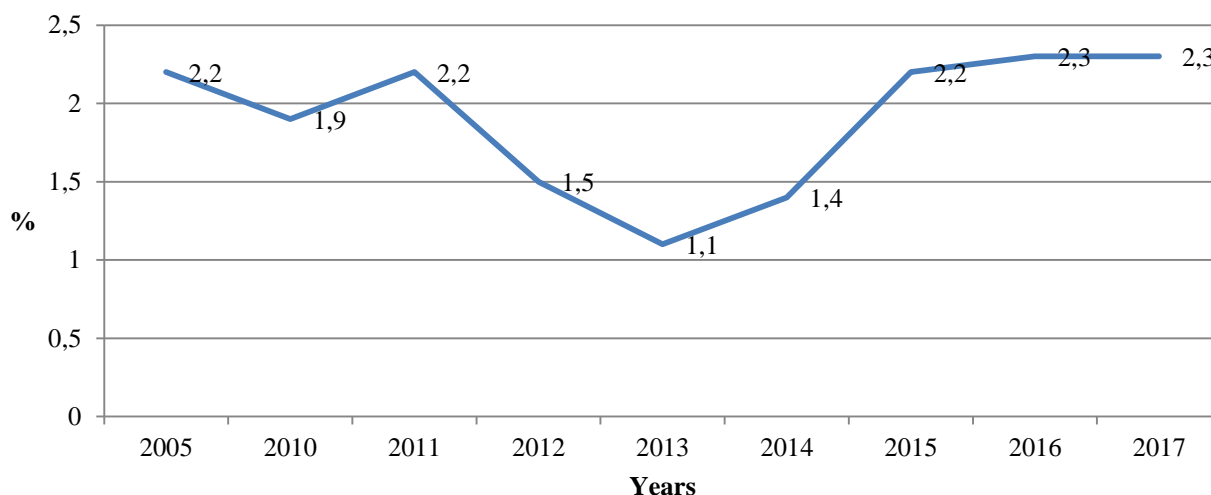


Fig. 1 The share of useful industrial waste disposal in the total amount of waste management*, %

Notes:* calculated by the authors on the basis of data [9, 10, 11]

** excluding the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and part of the area of the anti-terrorist operation

The ratio of positive industrial and negative methods of waste utilization in 2017 compared with 2005 improved – from 5,3% to 12,7-14%. This growth was stimulated by the process of creating united territorial communities in Ukraine, which began to solve the problem of waste utilization at the regional level. The principle of regionality has been the basis for the National Waste Management Strategy in Ukraine until 2030 [12], which places local governments in place to set up waste collection facilities and objects for their processing. However, a steady trend in the fight against unorganized waste landfills with real results in Ukraine has not yet been formed (Fig. 2).

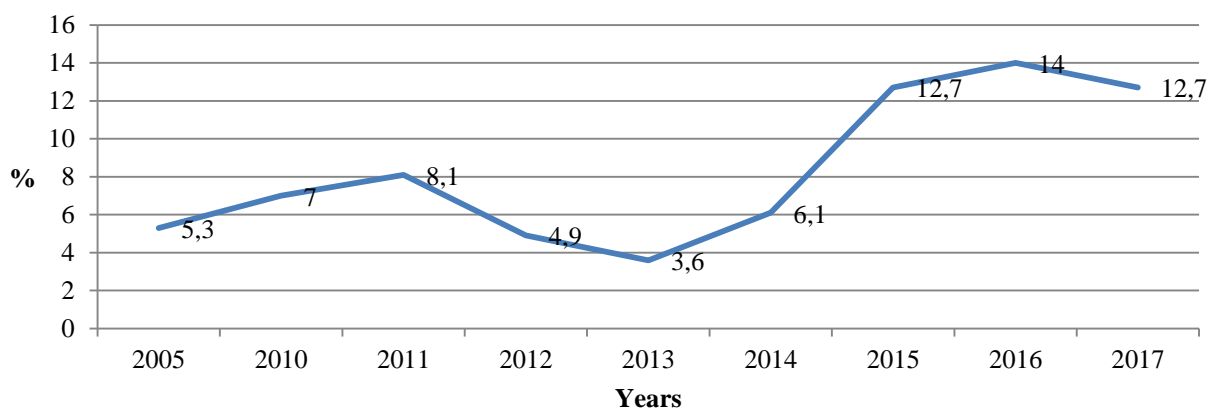


Fig. 2 The ratio of positive industrial and negative methods of waste utilization*, %

Notes:* calculated by the authors on the basis of data [9, 10, 11]

** excluding the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and part of the area of the anti-terrorist operation

Glocalization processes can play a catalytic role for development of non-waste manufacturing, because united territorial communities nowadays demonstrate the use of modern and tailored internal approaches, policies and technologies for garbage sorting and processing. Such approaches may be new even in global dimension and create basis for transboundary and international specialization of Ukrainian territorial economical systems.

If we focus on the EU's desire to achieve 65% of the non-waste utilization rate of municipal waste in industry in 2030, then in Ukraine, unfortunately, the preconditions for pursuing this trend were not formed, as can be seen from the dynamics of the selected indicators.

To preserve resources for future generations in Ukraine, a transition to the so-called decoupling – waste reduction, consumption of new resources and pressure on the environment, along with the growth of industrial production, should take place [13]. It can be assumed that the practical realization of the idea of decoupling is possible if the volume of waste generation in industrial production will grow at a lower pace than the increase in production volumes.

The ideal option is to approach the complete recycling of waste and garbage in the production process, that is, the transition to non-waste production technologies, when the waste is not actually formed, but is converted to other types of useful products and services. To estimate the dynamics of the transition to non-waste technologies in industrial production, in particular in the extractive and processing industries, we propose the application of the ratio of the Coefficient of correlation of growth of industrial production rates to formation of wastes (Table 1). To calculate this coefficient, we use official statistics, according to which the growth rates of industrial production were expressed by the indicator of the volumes of industrial products sold (general in industry, as well as by the breakdown by mining and processing industry). Since the volumes of sales of industrial products are given in current prices, for the purpose of leveling the influence of inflationary phenomena and for statistical correctness, when comparing the growth rates of this indicator with the growth rate of generation of waste in a natural measures, we have been transferred to the volumes of industrial products sales at comparable prices of 2005.

As can be seen from the data provided, the Correlation of growth of industrial production rates to formation of wastes in the processing industry of Ukraine in 2017 amounted to 1,7, and the overall growth of this coefficient in 2017 compared to 2005 was almost 1,5 times, which positively characterizes the trends of formation of non-waste production in Ukraine. However, the growth rates of non-waste in the industrial sector of the national economy are still not enough to talk about the prospects for implementing the idea of decoupling.

Table 1

Correlation of growth of industrial production rates to formation of wastes*

Correlation of growth of industrial production rates to formation of wastes, points	2005	2010	2011	2012	2013	2014	2015	2016	2017	2017 to 2005
general in industry, including:	1,01	0,71	0,91	1,25	1,05	0,97	0,86	1,17	0,86	0,85
- mining	1,21	0,85	0,93	1,36	0,97	1,18	0,82	1,18	0,77	0,63
- processing	1,14	1,05	0,93	1,22	1,22	0,47	0,88	1,18	1,70	1,49

Notes: * calculated by the authors on the basis of data [14, 15, 16, 17]

** 2014-2017 without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and parts of the zone of anti-terrorist operation

Also, to realize the idea of decoupling, an important factor is reducing the cost of materials in the production of products by increasing the efficiency of their use in the national economy, through the introduction of innovative technologies. To study the current state and to identify trends, it is expedient to use such indicator as the material productivity of GDP, calculated as the ratio of GDP and the total volume of

material resources used in the territory of the country. For greater objectivity, we use both the data of the State Statistics Service of Ukraine [18] and the United Nations [19] in 2010 concurrent prices (Fig. 3).

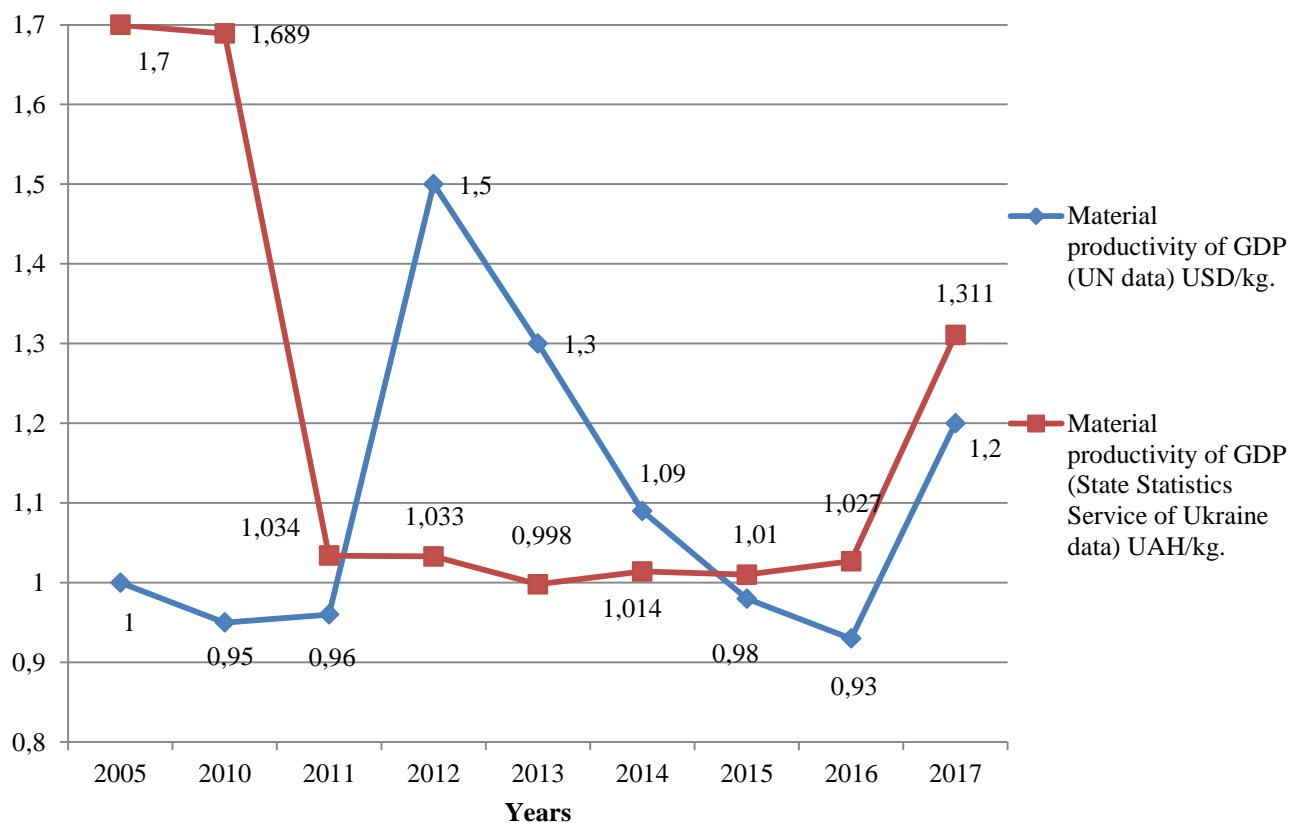


Fig. 3 Material productivity of GDP of Ukraine*

Notes: * calculated by the authors on the basis of data [20, 21]

**2014-2017 without taking into account the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and parts of the zone of anti-terrorist operation

The results of the calculations obtained through different methodological approaches to the collection of statistical information are significantly different when comparing the approaches of the United Nations statistical unit and the State Statistics Service of Ukraine, but the tendencies towards changes in the material productivity of GDP are approximately the same and indicate a lack of significant changes towards improving the use of material resources and nature conservation. This is due to the impact of macroeconomic cyclical fluctuations and the lack of targeted state policy to reduce resource-demanding in GDP in Ukraine.

According to the National Report "Report on the Green Transformation in Ukraine" [5], material productivity of GDP in Ukraine amounted to 3,1 UAH /kg in 2013, against 3,17 UAH / kg in 1990 (GDP in 2010 prices) and decreased only by 2% in 13 years. The data obtained in our study are somewhat different from the values of the indicators obtained in the National Report "Report on the Green Transformation in Ukraine", due to different approaches to the grouping of data obtained from the State Statistics Service of Ukraine. Thus, in our calculation, we used data on consumed material resources for a greater number of categories of products produced by the mining industry in the spheres of agriculture, forestry, fish, hunting and fishing, which, we believe, more characterizes the existing significant impact on the environment. Accordingly, the data we obtained on the material productivity of GDP are significantly lower than in the National Report on Green Transformation in Ukraine, and the values of this indicator fluctuate throughout the period under investigation from USD 0,93 to USD 1,5. per kg of consumed resources (according to the UN method) or from 1,03 to 1,7 UAH / kg. (according to the methodology of the State Statistics Service of Ukraine).

If we use the methodological approach to calculating the GDP growth rate with the growth rates of material use, then the material productivity of GDP, calculated as the coefficient of correlation of growth rates, it will be 1,311 UAH / kg in 2017.

In 2011, material productivity, calculated on the basis of GDP in US dollars for PPPs and at constant prices in 2010, amounted to 0,97 USD / kg This is at least 3 times lower than the OECD average and is worse than any of the EU countries. There is necessary to make deep analysis of the reasons for such a large lagging behind other countries, based on the assessment of the efficiency of the use of resources by enterprises of various types of economic activity. Resource-saving should be included in the priority directions of the government's work. To accomplish this task, it is necessary to set the aim - to reduce the GDP's material resources in the country and increase the material productivity of GDP. The target value of such indicators may be the average level of material productivity and capacity of GDP in OECD countries (average for member countries).

An important factor in realizing the aims of sustainable development of industry and innovations on the basis of glocalization is also the developed infrastructure of the state. Let's consider the problem that stands especially sharply in rural areas – the availability of roads with hard cover, which greatly affects the country's ability to develop due to the complication of movement of population and goods at destination. Although the situation has improved somewhat in recent years, much of the permanent rural population still lives at distances of over 3 km. from roads with hard cover (Table 2).

Table 2

The share of a permanent population in a rural areas that lives at more than 3 km. from roads with hard cover*

Indicator	Years								
	2005	2010	2011	2012	2013	2014	2015	2016	2017
The share of a permanent population in a rural areas that lives at more than 3 km. from roads with hard cover, %	11,2	10,74	10,74	10,28	10,74	7,58	6,9	6,9	6,9
Rate of growth, points	<i>X</i>	<i>X</i>	<i>1,00</i>	<i>0,96</i>	<i>1,04</i>	<i>0,71</i>	<i>0,91</i>	<i>1,00</i>	<i>1,00</i>

Notes:* calculated by the authors according to the data of the State Statistics Service of Ukraine [7, p. 12; 8, p. 9, 22], as well as according to [22, p.6-7]

** target indicators by source [23].

The ability of transportation achievement for glocalization idea realization is very important because the process of including of local economical systems in international capital-changing activities requires the presence of roads and other elements of transport-technological systems.

The reduction of the share of the rural population, that lives at more than 3 km from roads with hard cover, in 2017 compared to 2005 was 5,3 percentage points. This is insufficient and proves the need to take stimulating measures to intensify the construction of roads in rural areas. The implementation of these measures should take place with the coordinated participation of the Ministry of Regional Development, Construction and Housing and Communal Services, which is currently active in supporting the reform of decentralization and improvement of the territories of newly formed united territorial communities and with the participation of the Ministry of Infrastructure of Ukraine, which in the National Transport Strategy of Ukraine on period until 2030 [24] set the task to achieve such a state coverage of the country with high-quality roads, in which the share of rural population living at a distance of more than 3 km from roads with hard cover in 2030 should not exceed 0,5% [24, p.40].

The success of promoting the accelerated development of high-tech and medium-tech sectors of the processing industry, which is formed on the basis of the use of the "education – science – production" chains and the cluster approach, can be assessed by indicators "Share of value added at cost of production of enterprises belonging to the high-tech sector of the processing industry (in particular, for the production of pharmaceutical products and preparations, computers, electronic and optical products, and other transport according to CTEA) in total value added for the cost of production of industrial enterprises" and "Share of value added at cost of production of enterprises belonging to the medium-high-tech sector of the processing industry (in particular, the production of chemical products, electrical equipment, machinery and equipment, motor

vehicles, trailers and semi-trailers, according to CTEA), in total value added for the cost of production of industrial enterprises" The results of the calculation of these indicators are shown in Table 3.

Table 3

Assessment of the value added at cost of production of enterprises belonging to the high-tech and medium-high-tech sectors of the processing industry*

Indicators	Years								
	2005	2010	2011	2012	2013	2014	2015	2016	2017
Share of value added at cost of production of enterprises belonging to the high-tech sector of the processing industry (in particular, for the production of pharmaceutical products and preparations, computers, electronic and optical products, and other transport according to CTEA) in total value added for the cost of production of industrial enterprises, %	8,5	7,8	8,5	9,1	8,1	6,0	6,0	5,6	5,2
Rate of growth, points	X	X	1,08	1,07	0,89	0,74	1,00	0,93	0,93
Share of value added at cost of production of enterprises belonging to the medium-high-tech sector of the processing industry (in particular, the production of chemical products, electrical equipment, machinery and equipment, motor vehicles, trailers and semi-trailers, according to CTEA), in total value added for the cost of production of industrial enterprises, %	9,5	10,1	8,1	9,0	11,4	10,3	11,7	7,9	9,9
Rate of growth, points	X	X	0,8	1,1	1,3	0,9	1,1	0,7	1,3

*Notes:**calculated according to the data of the State Statistics Service of Ukraine [25, 26, 27] and according to sources [2, 5]

The results of the analysis of the state of value added at the cost of production of enterprises belonging to the medium-high-tech sector of the processing industry show relatively high values of the share of medium-high technology enterprises in creating the total industrial value added in Ukraine. In 2017, the value of this indicator was 9,9%. However, in the dynamics, the share of medium-high-tech industries in the Ukrainian industry is observed to fluctuate from 7,9% to 11,4% that indicates a lack of targeted regulatory policy to increase the share of medium-high technology enterprises in industrial production in Ukraine.

To assess the state of involvement of workers at domestic enterprises in the medium-high technology sectors of the processing industry in Ukraine, we calculated the indicator "The share of workers employed in enterprises belonging to the high and medium-high technology sectors of the processing industry" (Table 4).

The results of the analysis of the state of involvement of workers in high and medium-high technology sectors of the processing industry in Ukraine show relatively high values of the share in the total number of employed workers in the Ukrainian industry. The indicator has slight fluctuations, although recent years tend to decrease. So in 2014, this indicator amounted to 20,2%, and in 2017 18,7%. In the case of an increase of the number of high-tech innovative enterprises in the Ukrainian industry, natural growth of the share of those employed at such enterprises is expected. This should be promoted by the relevant regulatory policy of the state authorities.

In order to ensure the implementation and development of low-waste resource-saving technologies, the introduction of innovations, in particular low-waste, resource-saving technological processes, is important.

Investments in scientific research and innovation, which are important for the "green" growth, in particular, low-waste, resource-saving technological processes are carried out mainly by the economic entities. The share of expenses for the implementation of scientific and scientific- technical works in GDP is steadily declining and in 2017 reached a value of 0,45%, which is very negative and shows a backwardness from the

trends of developed countries of the world, in which the similar indicator is 2,5-3%, concerning stimulation of the development of fundamental and applied scientific research as the basis for further economic growth.

Table 4

Involvement of workers in high and medium-high technology sectors of the processing industry in Ukraine*

Indicator	Years								
	2005	2010	2011	2012	2013	2014	2015	2016	2017
The share of workers employed in enterprises belonging to the high and medium-high technology sectors of the processing industry (in particular, for the production of pharmaceutical products and preparations; chemical products, machine building, other transport, according to CTEA), in the total number of employed workers in industry, %	20,0	19,3	20,2	21,4	20,1	20,2	19,5	19,2	18,7
Rate of growth, points	X	X	1,05	1,06	0,94	1,00	0,97	0,98	0,97

*Notes:**calculated according to the data of the State Statistics Service of Ukraine [26, p.73-74, 27, 28, 29] and according to sources [2, 5]

Assessment of the dynamics of the introduction of low-waste, resource-saving technological processes in the total number of implemented innovative technological processes is presented in Table 5.

Table 5

The state of implementation of resource-saving technologies in the innovation process of Ukrainian enterprises*

Indicators	Years								
	2005	2010	2011	2012	2013	2014	2015	2016	2017
The share of expenses for the implementation of scientific and scientific-technical works in GDP, %	1,09	0,75	0,65	0,67	0,7	0,6	0,55	0,48	0,45
The share of realized innovative products in the volume of industrial, %	6,5	3,8	3,8	3,3	3,3	2,5	1,4	0,9	0,7
Share of enterprises that introduced innovations, %	8,2	11,5	12,8	13,6	13,6	12,1	15,2	16,6	14,3
Introduced new technological processes, which are low-waste, resource-saving, units	690	479	517	554	502	447	458	748	611
Share of the introduction of low-waste, resource-saving technological processes in the total number of implemented innovative technological processes, %	38,2	23,4	20,6	25,3	31,9	25,6	37,6	21,4	33,4

*Notes:**calculated by the authors according to the data of the State Statistics Service of Ukraine [30]

In accordance with the reduction of financing for the development of its own scientific base there is a reduction of the share of realized innovative products in the total volume of industrial production.

The number of implemented technological processes that are low-waste, resource-saving and the share of the introduction of low-waste, resource-saving technological processes in the total number of implemented innovative technological processes have changed during the investigated period somewhat chaotically, which indicates the absence of a targeted state regulatory policy in this area.

The volume of public expenses for the implementation of innovation activities, for the implementation of SRWs in the field of green innovation development, are also characterized by the absence of stable positive tendencies (Fig. 4)

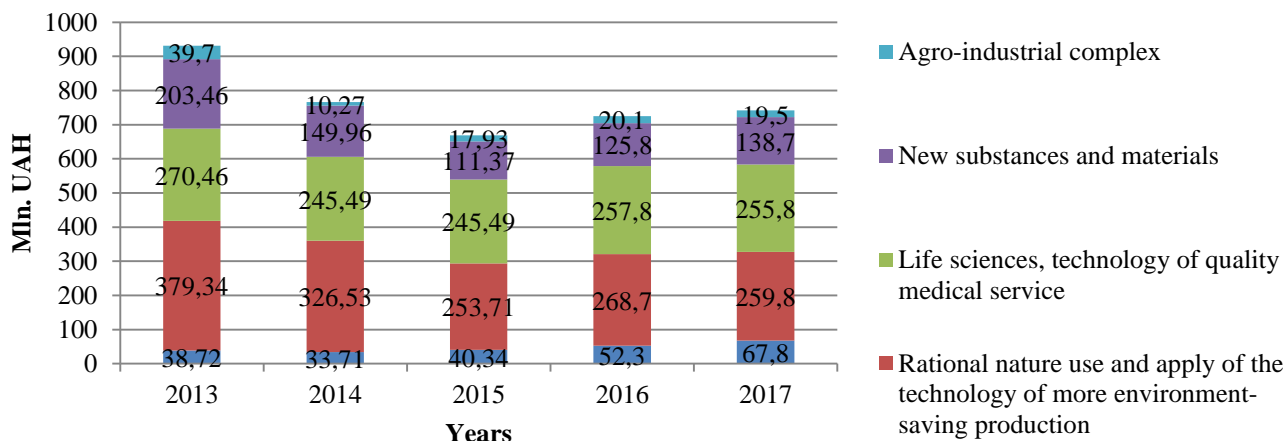


Fig. 4 Volume of public expenses for research and innovations in green areas in Ukraine in 2013-2017*

Notes: *calculated according to the State Statistics Service of Ukraine [31]

The dynamics of the share of financing "green" directions of innovation activity in Ukraine due public expenses is given in Fig. 5

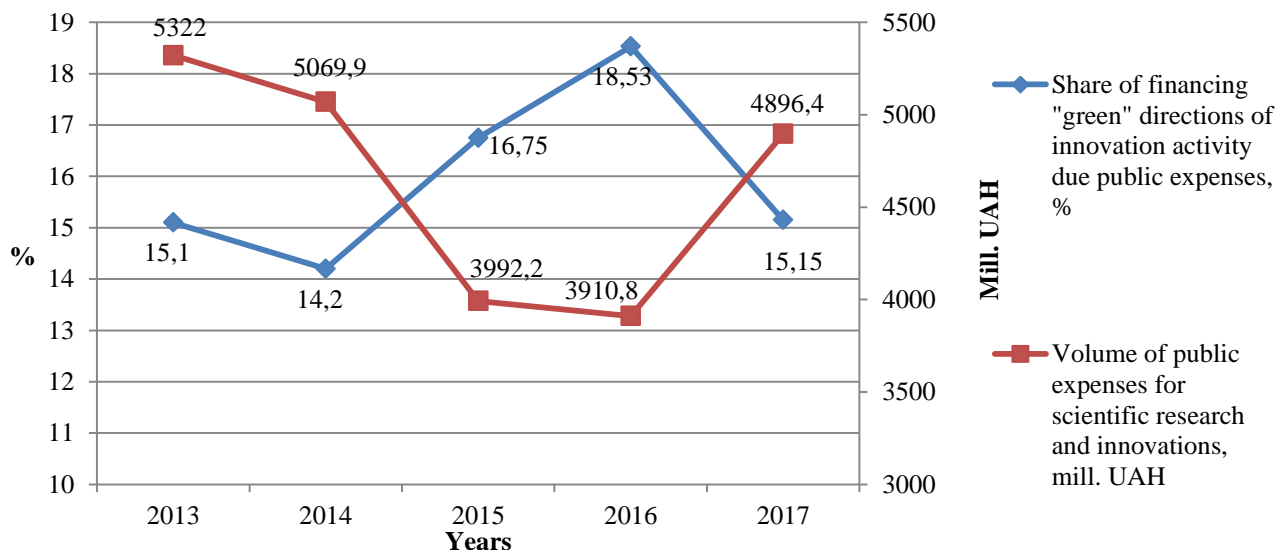


Fig. 5 Dynamics of public expenses for scientific research and innovations with the allocation of innovations share for "green" areas in Ukraine in 2013-2017

Source: [31]

Data on public expenses for innovations and implementation of SRWs also characterize the absence of stable positive tendencies. The total public expenses for carrying out researches in 2017, although rising compared to 2015 and 2016, however, are significantly behind the public expenses for scientific developments in 2013 and 2014. The share of public expenses on the "green" areas of research is unstable and in 2017 it was 15,15%. Taking into account the fact that in recent years inflationary phenomena have taken place, in

comparable prices, the volume of public expenses for scientific researches and innovations in the "green" areas in Ukraine tended to decrease.

For globalization idea realization in Ukrainian regions it is necessary to take into account the development of such important sectors as technological components development, Internet's distribution and involvement of scientists, especially young researchers, into real sector of economy.

Indicators of sustainable innovation development of the national economic system can serve components of the integral index of ease of doing business, which is calculated by the World Bank, namely those that characterize the innovative development and technological readiness of the country's economic system. The analysis of these two components is presented in Table 6.

Table 6

Innovative and technological components of ease of doing business in Ukraine*

	2005	2010	2011	2012	2013	2014	2015	2016	2017
Innovations	3,29	3,18	3,2	3,16	3,03	3,18	3,41	3,44	3,37
Rating changes, points	X	-0,11	0,02	-0,04	-0,13	0,15	0,23	0,03	-0,07
Technological readiness	3,9	3,7	3,8	3,6	3,28	3,5	3,45	3,58	3,83
Rating changes, points	X	-0,2	0,1	-0,2	-0,32	0,22	-0,05	0,13	0,25

Notes: *calculated according to the rating of ease of doing business in Ukraine [32]

As we can see, the data show that there are no significant changes in the dynamics of innovation-technological components of ease of doing business in Ukraine according to the World Bank rating. The dynamics are unstable and indicate the need for regulatory targeted state policy to be implemented.

Sustainable development of infrastructure and innovations based on green growth should be accompanied by the availability of info-communication services for different segments of the population, especially the provision of Internet services in different types of settlements, including in rural areas (Table 7).

Table 7

State of Internet services accessibility*

	2005	2010	2011	2012	2013	2014	2015	2016	2017
The share of household subscribers of the Internet in the number of present population, %	4,5	6	6,9	9,7	11,6	12,7	12,9	34,2	48,6
Rate of growth, points	X	1,5	0,9	2,8	1,9	1,1	0,2	21,3	14,4
Internet penetration among the urban population, %	38	50	52	54	57	65	68	69	71
Rate of growth, points	X	12	2	2	3	8	3	1	2
Internet penetration among the rural population, %	9	12	14	22	28	32	36	45	51
Rate of growth, points	X	3	2	8	6	4	4	9	6
The share of Internet users among the adult population, %	15	29	40	43	49	54	57	62	63
Rate of growth, points	X	14	11	3	6	5	3	5	1

Notes: *calculated by the authors according to the State Statistics Service of Ukraine [30] and according to the Kyiv International Institute of Sociology [33]

The data indicate a positive dynamics in the coverage of the population of Ukraine by the available Internet service. The degree of Internet penetration in the cities remains bigger in comparison with the countryside, but Ukraine's involvement in world technological changes and innovations makes it possible to obtain sufficiently high-quality access to the global network, mainly using smartphones and mobile intranet services in the countryside. This explains the significant increase of indicator in 2016 and 2017.

Analysts of the Kiev International Institute of Sociology argued that in recent years, disparities in the penetration of the Internet in populated areas of different sizes significantly smoothed out. At present, rural areas are far behind in the Internet's distribution, residents of which more often refer to the restrictions in technical ability to connect sparsely populated places. The most commonly used devices to connect Internet are mobile phones (39%), home laptops (31%) and personal computers (30%). Today, 41,6% of the adult

population in Ukraine at least once a month uses the Internet on mobile devices - mobile phones or tablets, while online access via home-based personal computer or laptop is 54,4% and still retains its advantage [33].

Another important element in the development of innovations is the involvement of young people in scientific research (Table 8).

Table 8

Assessment of youth involvement in scientific research in Ukraine*

	2005	2010	2011	2012	2013	2014	2015	2016	2017
The share of persons under 40 years of age who are part of researchers with degree, %	20,8	21,1	21,5	22,2	23,4	23,9	25,2	27,0	25,9
Rate of growth, points	X	0,3	0,4	0,7	1,2	0,5	1,3	1,8	-1,1

*Notes:**calculated by the authors according to the data of the State Statistics Service of Ukraine [18, 30, 31]

The obtained data testify to the presence of positive dynamics in attracting young people to scientific research throughout the investigated period, except for the last 2017. Given the fact that more detailed information about level of involvement of youth scientists in research work is not available in open access, and also given the significant trends in the growth of labor migration among young people, further in-depth studies of this issue will be appropriate, subject to necessary statistical information will be available.

Conclusions and perspectives of further research. The results of the analysis show that there is a lack of technological readiness of the domestic industrial and innovation sectors for the transition to the principles of green growth, for the formation of a circular economy model and the implementation of decoupling ideas on the basis of glocalization. The correlation of growth of industrial production rates to formation of wastes in the industry of Ukraine is not sustainable and indicates the absence of an effective industrial policy aimed to the non-waste production process. The material productivity of GDP, although it grows in the industrial sector of Ukraine, however, does not have clear trends and amount on average about 1 USD per 1 kg. of used resources. It is at least 3 times lower than the OECD average and is worse than any of the EU countries. A thorough analysis of the reasons for such a large lagging behind other countries is needed to be based on the assessment of the efficiency of the use of resources by enterprises of various types of economic activities. Resource-saving should be included in the priority directions of the governmental policy and of work of state authorities. To accomplish such a task, it is necessary to set the aim - to reduce the GDP's material capacity in the country and increase the material productivity of GDP.

Industrial waste recycling in Ukraine is also not characterized by clear positive trends, and this issue needs to be addressed through the introduction of a centralized regulatory policy aimed to the recycling of all possible waste in the industrial sector of the country through their use as secondary resources.

To support and stimulate industrial waste recycling in Ukraine on the basis of the introduction of innovative technologies the implementation of the National waste management strategy in Ukraine up to 2030 is necessary [12]. In particular, it is advisable to introduce preferential tax rates for the reinvestment of the profits of domestic industrial enterprises that are directed towards financing projects to create a network of centers for the introduction of cleaner production (technologies) to minimize waste generation, the amount of which, as planned in the Strategy, should reach 20 units in Ukraine by 2030. It is stated that glocalization processes can play a catalytic role for development of non-waste manufacturing. United territorial communities in Ukraine are highly involved in projects of waste processing and they may be used as basical institutions for non-waste manufacturing policy realization. Local territorial communities deal with internal garbage resources and try to use modern globally approved technologies for their sorting and processing in tailored manner according to their internal features. Thus Ukrainian territorial economic systems apply glocalization principles and create basis for transboundary, international specialization and cooperation.

Positive changes characterize development in the infrastructure sector, which are related to the coverage of roads and the Internet in rural areas. If the level of provision of Internet services has positive trends due to the relative ease of implementation of the latest technological solutions and the wide distribution of smartphones among the population, then the issue of coverage of rural areas by the system of roads with hard cover requires appropriate state program measures. Also controversial is the situation in the field of youth involvement in science, research and development area, despite relatively positive trends during the period under study. To increase the involvement of youth scientists to research work, it is necessary to intensify the state youth

scientists policy, which would be aimed to organizational and financial encouragement of young researchers for scientific work in Ukraine.

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