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## ECO-INNOVATIONS UNDER CONDITIONS OF GLOCALIZATION OF ECONOMIC AND SUSTAINABLE DEVELOPMENT OF THE REGIONAL ECONOMY

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**ABSTRACT:** The aim of the study is to indicate the essence and increasing importance of the ecologization of innovative development in the glocalization of economic processes as well as the potential benefits of eco-innovation for long-term objectives of regions development. The study systematize the knowledge on this topic, and indicate the necessity of their continuous development. The applied methodology is based on an analysis of scientific literature European countries. The research methodology is systematization of approaches to the direction of innovation processes for the development, creation and implementation of innovations in the form of new products, technology, method, form of production organization, etc., which directly or indirectly contributes to reducing the environmentally destructive effects of production and consumption on the environment and solving environmental problems. The authors hypothesis is that the glocalization on the basis of the implementation of environmental innovations will contribute to the sustainable development of the economy of the regions. This is a new way of looking at the region development, i.e. that looks at how ecologization of innovative development should be used for strategic advantage of region and how processes of ecologization of innovative development of the region can be a catalyst for the processes of market glocalization and promote sustainable development of the regional economy.

**KEY WORDS:** ecologization of innovative development, ecological innovations (eco-innovations), glocalization

## Introduction

Strengthening of regions' economy, creation of their competitive priority based on innovations as well as capability to cooperate with the state and private structures working in the region, involvement of the population to an innovative process is a direction of a current development policy of the European Union determined in a new economic EU strategy "Europe 2030".

As the main priority objectives of ecologization of innovative development, there are considered most often the goals related to the changes in socio-economic development of the economic system, which, along with the positive socio-economic effect, improve the state of the environment or significantly minimize the negative impact on it. Therefore, under the ecologization of innovative development of the regions, reference is made to the innovative processes for the development, creation and implementation of innovations in the form of new products, technology, method, form of production organization, etc., which directly or indirectly assist to minimize the negative impact of production and consumption on the environment and dealing with the ecological problems. Ecologization of the innovative development of the region is a complex process, in which certain tasks need to be addressed: formation of the concept of environmentalization of socioeconomic development; development of the system of organization and financing of ecologization of innovative development of the region; legal regulation at the international, state, regional and local levels; – harmonization of socio-economic and biotechnological decisions.

The main principle of glocalization is the priority of national or local interests and the focus on local resources, subject to the consideration of global trends. The glocalization of economic processes requires a change in the paradigm of regional innovation policy, which consists in moving away from the distribution of financial resources and the widespread creation of innovation infrastructure to stimulating, the formation of a favorable business climate and institutional environment, the integration of regional innovation systems into global networks. Innovation policy should be varied in line with the specificity of the innovative development of each region.

In the conditions of the stagnation of global demand for commodities, the state faces the task of modernizing market policy in the internal and external dimensions in order to maximize the use of benefits of glocalization while simultaneously minimizing its negative effects. It is expedient to shift the emphasis of internal market policy in support of regional producers of quality and environmentally safe processed products, to assist them in certification for export to the EU and other countries of potentially competitive goods. It is expedient to direct the vector of the foreign market policy of the state on

implementation of export potential of high value-added goods markets by strengthening the position of exporters in the traditional and development of new external markets.

The aim of the article is to indicate the essence and growing importance of ecologization of innovative development of the regions as well as the achievable benefits resulting from the use of eco-innovations in globalization processes. The study presents a theoretical review of selected aspects of ecological innovations and their analysis and effect of implementation.

## General characteristics of ecologization of economy

Ecological and socio-economic concepts have evolved to a certain extent independently of each other. In our opinion, the main principle approaches to the study of socio-economic and environmental relations are (Hetman, 2019a; Socio-economic development..., 2016):

- systematic research,
- streamlining (balancing) of economic-ecological relations,
- problem-oriented (smart) management.

The priority task at the present stage is to activate the process of incorporating the ecological component into the system of indicators of "basic production" at both macro and micro levels.

Indeed, it is not possible to deny the objective fact that environmental costs are socially necessary.

In the theoretical and methodological terms there are no unambiguousness and identity, firstly, with regard to the conceptual definition of the ecological component, and secondly, by the methods of evaluation and accounting in the context of the system of indicators of the international system of accounts, which entails the incompatibility of the "true" development of economics of different countries.

In Ukraine, the legal framework for transition to a new system of management for economic and environmental relations has been established. The administrative and economic management methods are allocated. The administrative ones include environmental expertise, environmental audit, environmental licensing, etc. To administrative methods belong the following: taxes on the use of resources and pollution of the environment, methods of monetary valuation of damage, natural resource potential, methods of economic and environmental justification of investment projects, promotion of innovative ecological-oriented activity, etc. However, such a division is an arbitrary one, since administrative acts provided for by legal acts are based on the use of economic methods. In our view, the systematization of manage-

ment methods in two groups deserves attention: the methods of accounting and control over the behavior of a managed economic and ecological system (information provision of the management process: cadastre-registering of natural resources and emissions of pollutants into the environment, environmental monitoring) and methods of impact on the managed system (administrative ones: environmental expertise, environmental audit, licensing, standardization and valuation, regulations and rules, certification; economic ones: payments by nature usage, compensation of losses, methods of price valuation of ecological component accounting at macro and micro levels, methods of stimulation of ecologically oriented development, methods of economic and ecological substantiation of innovation and investment projects (including environmental protection).

Despite this radical reorientation of methods of managing economic and environmental relations in general, a qualitatively new existing mechanism does not contribute to a real improvement of the resource and ecological situation in the country. In our opinion, one of the main principles of constructing methods for managing economic-ecological relations is the principle of functional definition of the goal, which proceeds from the methodology of the system approach. This principle involves consolidating the implementation of state strategic objectives in the field of resource use and environmental protection by a specific management method. This will promote interconnectivity, interdependence and complementarity of management tools and will eliminate current duplication and paradoxicalness in the current Ukrainian regulatory economic base of managing economic and environmental systems.

Strategic public tasks are the following: reducing the nature and waste generation of the economy. The economic mechanism should be aimed at their solution, thus ensuring the preservation of the natural resource potential of the country for present and future generations.

One of the most important indicators of the sustainability of the economic systems development at the macro level is the correlation between environmental costs and economic losses in relation to the gross domestic (national) product and the pace of its growth. Under the ecological cost we mean the productive costs of protection and the rational use of natural resource potential. These are the investments required in the economy, aimed at preserving the "quality of the environment" (the cost of reproduction of natural resource potential). The economic damage means economic losses as a result of deterioration of the "quality of the environment".

In the developed countries of Europe, the ecological component in the gross national product is 1-2%, the economic damage in relation to the same indicator – 6% with the growth rate of GNP – 1-2%. The most favorable pic-

ture is in Japan: the environmental component and the economic loss are one and the same percent in relation to GNP – 2%. In Ukraine, with the same share of environmental costs, the magnitude of the damage is more than 20% (and according to individual estimates – even more), while the growth rate of GDP is 3%. This is a very unfavorable trend, which shows that in our country it is necessary to spend more financial means for the ecologization of production, mainly for implementation of the progressive, less resource-intensive and retarded technical equipment, of technologies that meet international standards. Otherwise, further degradation of the “quality of the natural environment” will continue, presenting an ecological threat to the life of the regions and the state as a whole (Hetman, 2019b; Gusev, 2011; EIO Europe in transition, 2013).

An important issue is the provision of stable financial sources for the implementation of state environmental programs. In this case, the current system of payment for nature use in Ukraine is of particular importance: taxes on the use of natural resources (land, water, forest, fish, minerals, including continental shelf) and pollution of the environment (on the emission of harmful substances into the atmosphere by stationary and mobile sources of pollution, pollution of water facilities, waste disposal). The system of payment is considered in Ukraine in the context of tax policy. Environmental taxes are the mandatory taxes for economic entities, regardless of their ownership form.

The methodology of tax formation for the usage (use) of natural resources was based on the ideology of the two components of these payments: medium-forming and rent. The medium-forming component should be considered analogically to amortization deductions as a payment for the consumed cost of natural resource potential, or as a fee for quantitative and qualitative deterioration of natural resource potential. Its main functional purpose is the accumulation of financial resources for the reproduction of natural resource potential. In this regard, these charges acquire a strictly targeted nature of their use. The rental component should reflect the excess profits of economic entities from the use of natural resources, which are the best in quality and location of. Its withdrawal corresponds to the implementation of the goal of equalizing the economic conditions of economic entities. In this case, the excess profits must belong to the owner of natural resources. Property relations should be at the heart of the processes of collecting, distributing and using these charges. At the same time, the modern development of the normative basis for collecting charges for the use of natural resources does not correspond to the original ideology and indicates the lack of systematic formation of these charges for the use of natural resources (Iermakova et al., 2019, p. 35; Bönte, Dienes, 2013).

The main functional purpose of ecological taxes is the following: formation of environmental protection funds at the local and state levels for solving the problems of preventing the pollution of natural objects (atmosphere, water, land resources). In fact, the collection of these fees is intended for the implementation of defensive expenditures; encouraging business entities to implement environmentally-friendly, low-cost technical equipment and technologies.

However, in practice, none of these functions is performed. The basic tax rate is lower than the minimum costs for preventing emissions of pollutants. For example, the tax for atmospheric pollution with 1 tonne of CO<sub>2</sub> is 10 UAH. At the same time, the minimum costs for measures to prevent 1 tonne of CO<sub>2</sub> – more than 40 UAH. As a result, it is easier for the polluter to pay for pollution than to implement measures to reduce these emissions. The size of these fees does not provide the financial basis for the implementation of state programs in the field of reducing the flow of pollutants into the natural environment. It should be noted that this situation is due, in our opinion, to a scientifically biased “lossmaking” approach chosen to determine the basic standards for pollution tax. The basis of this system should be a program targeted approach, which allows to make pollution prevention as the tax rate basis. The loss-making approach in this case is related to the unacceptable duplication of the pollution tax with the compensation mechanism for the damage compensation.

As for the compensation mechanism itself, it should be noted as well the imperfection of the theoretical and methodological foundations of the estimation of economic losses, which leads to ambiguity of the cost estimation of the same ecological damage under various operating methods. First of all, the lack of complexity in the assessment of economic damage should be noted. The damage is economic losses to third parties. In the methodological sense, the compiling a list of these “third parties” has not been resolved; unequivocal approaches to assessing their economic losses are not defined officially. Current methods of calculating losses, as a rule, allow only to assess partially (incompletely) the state or industry’s economic losses, but not the detriment to specific legal entities, individuals, citizens of the country.

It is tax changes that can promote the ecologization of the economy to realize and implement measures for reforming industry, agriculture, financial and non-financial services. One of such levers can be an environmental tax credit, which was actively implemented in many European countries.

## Ecologization of innovative development under conditions of glocalization of economic

The ecologization of innovative development is directly linked to the creation of more favorable conditions and additional opportunities for investments in the economy that need to be addressed:

- in the sphere of production,
- in the environmental complex (in the system of treatment facilities, waste recycling complexes, ecological monitoring, etc.),
- in manufacture of environmental products using advanced scientific and technological developments (technologies),
- in research and technical research, designed to provide the resource-ecological safety of society,
- in the social and infrastructural component (education system, legislation, information provision of society).

In present-day conditions there is a certain imbalance between the level of complexity of environmental problems and the instrumentarium used for their analysis and resolution. This situation is due, at least, to three reasons: the lag in development of environmental knowledge; the lack of awareness of the importance of using environmental innovations; the fundamental distinction between the implementation of the achievements of science and technology, on the one hand, and environmental technologies – on the other.

The complex process of planning environmental innovations consists of three main stages:

1. Creation or development of innovative ecologically oriented ideas.
2. Bringing of innovative ecologically oriented ideas from the source of their origin to the participants of the social system.
3. Changes occurring within the social system as a result of the implementation or abandonment of environmental innovations.

At the same time, the environmental innovations may be incompatible with the existing social structure of society for the following reasons. Innovations can be in conflict with existing public perceptions. When environmental innovation comes into conflict with the generally accepted social principles, the several consequences are possible:

- a) ecological innovation is simply rejected by society or social group,
- b) ecological innovation is accepted along with its conflicting features, but these features from time to time cause a protest that makes its adoption unsustainable.

The ecologization of innovative development should include such an aspect as the dissemination of environmental innovations.

It is a process by which the innovations are distributed from the source of their origin among the participants in the social system.

Without integration of the mechanism of environmental innovations into the system of economic relations, it will be impossible to transform new knowledge into a dominant factor of economic development. Thus, the main task of the ecologo-economic mechanism of innovation type is minimization of the expenses for implementation of environmental innovations. Figure 1 presents the results of ecologically oriented innovative development and the economic component of the effect of implementation.

Ecologization of innovative development of the region is a systemic dynamic process of creation, implementation and dissemination in the region as environmentally oriented innovations so as raising the level of environmental friendliness of innovations, penetration of the environmental world view into all areas of economic activity of the region, inclusion of the environmental component in the system of financial and economic relations, formation of environmental infrastructure and education (Circular Economy Strategy, 2019).

The final result of ecologization of innovative activity in the region is a positive socio-ecological and economic effect, which ensures balanced sustainable development of the region and the state as a whole.

Integration of regional socio-ecological and economic systems into national and global networks is possible by facilitating access to them and creating opportunities for their use by appropriate institutional support and financial incentives.

The development of modern economic systems is characterized by two opposing trends: globalization and localization of markets. The result of their interaction and synthesis is the process of market-based glocalization, which is one of the characteristics of the post-industrial economy.

The initial stage of market glocalization is the expansion of product market boundaries by the emergence of production of innovative products with specific properties that are in demand not only on local but also global markets. The next step is the export of these products, which, on the one hand, helps to establish and strengthen the integrative links between the local and global markets, the interpenetration of the local market in the world market space, on the other hand, leads to the expansion of the geographical boundaries of the market, that is, its glocalization (Iermakova, 2017; Institutional principles..., 2017).

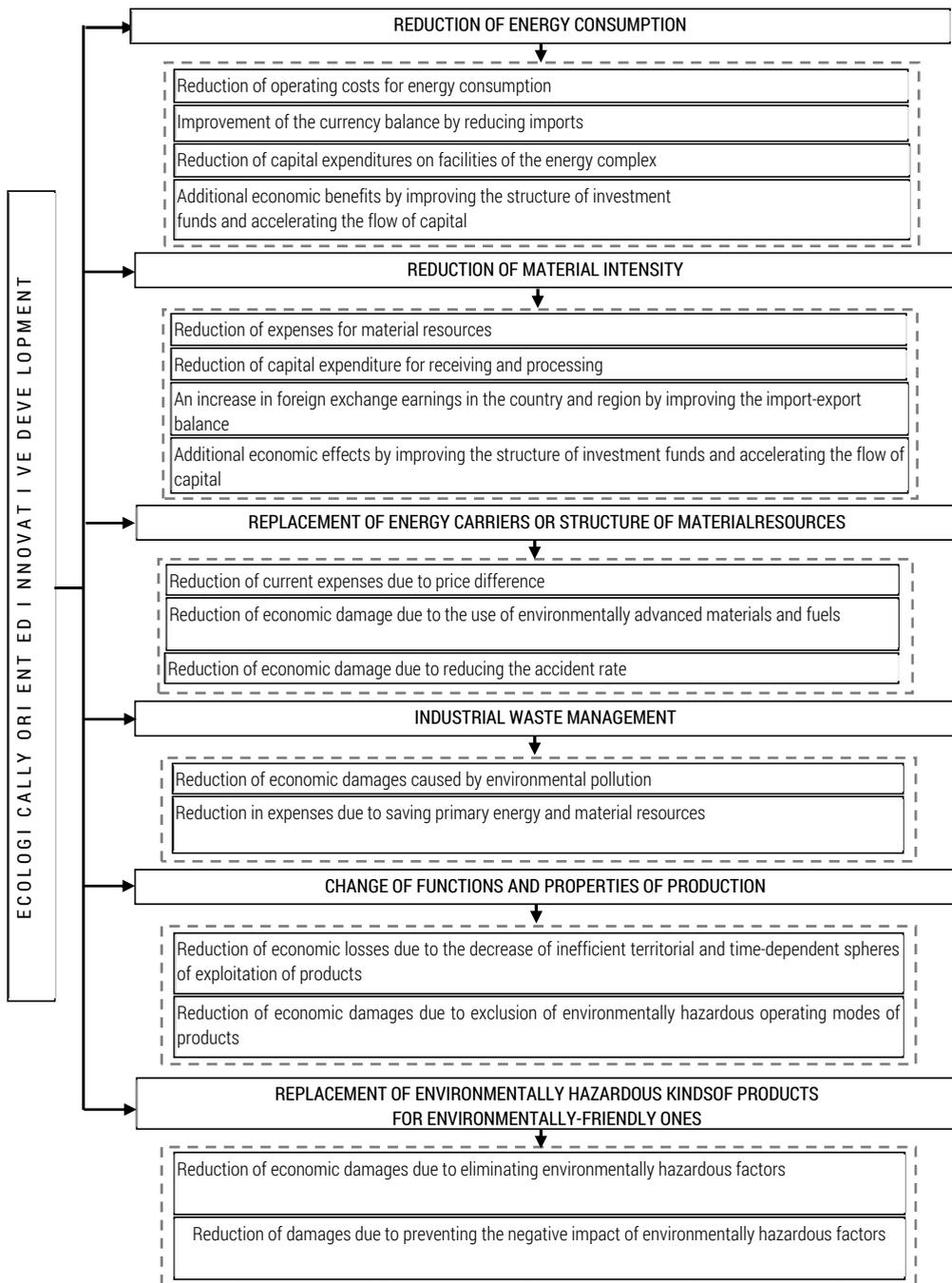


Figure 1. Ecologically oriented innovative development and economic component of the effect of implementation

Source: author's own work based on Prokopenko, 2008, p. 140.

The author hypothesis is that the glocalization of commodity markets on the basis of the implementation of environmental innovations will contribute to the sustainable development of the economy of the regions. We propose to consider environmental innovations as a catalyst for the processes of market glocalization in the internal and external dimensions. In the conditions of implementation of the principles of sustainable and balanced development of national economies, the environmental component of market glocalization becomes of paramount importance, determining the direction, peculiarities and nature of glocalizational processes. Further expansion of commodity and territorial boundaries of local markets will be possible due to the active implementation of environmental innovations by market actors focused on the formation of closed reproductive cycles, the development and production of new environmentally friendly goods, the use of resource-saving and low-waste technologies, new organizational forms, etc.

Environmental innovations are able to intensify and transform the processes of market-based glocalization, harmonize its socio-economic and environmental guidelines, change the type of market (for example, from local to regional or state), price and quality parameters of the product, characteristics of supply and demand, and significantly expand the markets (Nikishina, Zarudna, 2018; Nikishina, Bibikova, 2018).

Also, environmental innovations are able to increase the competitiveness of commodity producers through the reduction of their costs by saving resources, giving them the advantage of expanding the territorial boundaries of the market, entering into global value added chains, etc.

The environmental factor in ensuring the competitiveness of both economic entities and domestic commodity markets is becoming increasingly important and receives financial support.

In the sectoral dimension in Ukraine in 2017, 44% of the capital environmental investment in the state accounted for electricity, gas, steam and air-conditioning sector, 23.1% for the processing industry and 13.3% for the extractive industry (table 1). During the period 2014-2017 gg. there have been structural changes in the direction of reducing the share of electricity supply sector and processing industry in parallel with the growth of the extractive industry, water, public administration and defense sectors. Despite the growing trend, the share of agriculture in capital environmental investments is still insignificant (0.5%), which reduces the agrarian sector's ability to implement environmental innovations.

Thus, the analysis of environmental investment trends in Ukraine has demonstrated a growing trend in the cost of environmental protection, domination in their current cost structure, direction of about 40% of capital investment in integrated technology.

**Table 1.** The structure of capital investment in environmental protection by types of economic activity in Ukraine [%]

Types of economic activity	2014		2015	2016	2017		2017 in % till 2014
	UAH mln.	%			UAH mln.	%	
Total	<b>7959.9</b>	<b>100.0</b>	<b>7675.6</b>	<b>13390.5</b>	<b>11025.6</b>	<b>100.0</b>	<b>138.5</b>
1. Agriculture, forestry and fishery	26.2	<i>0.3</i>	22.4	43.7	50.4	<i>0.5</i>	192.4
2. Extractive industry	663.3	<i>8.3</i>	544	503.6	1467.7	<i>13.3</i>	221.3
3. Processing industry	2421.7	<i>30.4</i>	1730.9	2832.5	2551.6	<i>23.1</i>	105.4
4. Electricity, gas, steam and air-conditioning supply	4434.8	<i>55.7</i>	4433.7	8542.9	4847.4	<i>44.0</i>	109.3
5. Water supply, sanitation, waste management	180.1	<i>2.3</i>	502.9	750	930.8	<i>8.4</i>	5.2 times
6. Wholesale and retail trade; repair of vehicles	0	<i>0</i>	4.7	30.9	58.6	<i>0.5</i>	-
7. Transport, warehousing	78	<i>1.0</i>	59.5	96.7	65.3	<i>0.6</i>	83.7
8. Public administration and defense; compulsory social insurance	88	<i>1.1</i>	320.9	443.4	748.7	<i>6.8</i>	8.5 times
9. Other activities	67.8	<i>0.9</i>	56.6	146.8	305.1	<i>2.8</i>	4.5 times

Source: author's own work based on the State Statistics Service of Ukraine, 2018; Prokopenko, 2018.

## Conclusions

The essence and growing importance of ecologization of innovative development of the regions as well as the achievable benefits resulting from the use of eco-innovations in glocalization processes is the modern accelerator of the glocalization of economic processes, in the nature of which there are incentives for self-development, reproduction, generation of innovative ideas, production of new technologies, goods and services, ensuring the balancing of the socio-ecological and economic potential of the region and the country as a whole, which determines the direction, peculiarities and nature of the processes of glocalization. Scientific novelty of the research is to develop the theoretical principles of the glocalization of economic processes by substantiating the role of environmental innovations as a catalyst for modern processes of market glocalization (internal and external), capable of transforming the nature, parameters and direction of the glocalization of commodity markets, harmonizing its socio-economic and environmental tar-

gets, and intensifying the processes of the environmentally oriented type of glocalization in order to ensure sustainable balanced development of the economy of the state and its regions.

The concept of our investigation is that ecological compatibility of innovations intensifies local and global positions of the region in an innovative domain and is one of modern tools to advance glocalization processes. It is one of the best tools corresponding to overcoming obstacles for expanding product limits of strategic markets as well as their integration into global chains of the added value. Ecologization of innovative development of regions on the principles of glocalization requires a number of own new and active measures, involvement of all levels of the public administration, science, business, public representatives for taking into account social needs and interests.

The final result of ecologization of innovation activity is a positive socio-ecological and economic effect, which ensures balanced sustainable development of the region and the state as a whole. Thus, the modern accelerator of the glocalization of economic processes is the ecologization of innovation development, in the nature of which there are incentives for self-development, reproduction, generation of innovative ideas, production of new technologies, goods and services, ensuring the balancing of the socio-ecological and economic potential of the region and the country as a whole, which determines the direction, peculiarities and nature of the processes of glocalization.

Ecologization of innovative development of regions on the principles of glocalization demands a strategic approach to its practical realization.

Traditionally selected stages of strategizing, adapted to the peculiarities of regional innovation policy in terms of glocalization, are the following: preparation for the strategizing, analysis, design, implementation, popularization. The peculiarity of the proposed process of the strategizing of innovative development on the basis of glocalization is that it takes into account the distinct methodological principles, in particular the cross-sectoral partnership, which manifests itself in attracting all interested actors (power, business, science, community) to all stages of this process. This approach increases the perceptions of policy in society, the attraction of promising ideas on the principles of crowd sourcing and the accumulation of social capital, manifested in the growth of trust and cooperation among all actors of regional innovation policy. Also there is inducted the project stage of the strategizing that will ensure the effectiveness of the strategy, the practical implementation of strategic goals and objectives.

The presence in the regions of innovative development strategies, with account of the principles of smart specialisation, opens for them the pros-

pects of joining the Smart Specialisation Platform and opening access for the regions of Ukraine to the Platform's tools, which will allow to determine the economic and innovative specialisation of the regions, improve cooperation with the EU regions in the thematic areas (industrial modernisation, agri-food, energy), to expand access to EU structural funds, to increase synergy between different policies of Ukraine and the EU, as well as to effectively involve public and private investments.

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Olena Hetman – 25% (concept and objectives, literature review, research etc.).

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Oleksandr Laiko – 25% (concept and objectives, literature review, research etc.).

Oksana Nikishyna – 25% (concept and objectives, literature review, research etc.).

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