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ECOLOGICAL ENTREPRENEURSHIP AS A FACTOR OF SOCIAL AND ECONOMIC DEVELOPMENT OF REGIONS

The article defines the possibilities of ecological entrepreneurship for the socio-economic development of Ukrainian regions, which forms a conscious and responsible consumption of natural resources with minimization of harmful impact on the environment, implementing ecological policy aimed at organic production, circular economy, and using alternative energy sources in economic activity. The purpose of the article is to substantiate the possibilities of developing ecological entrepreneurship to ensure the resilience of Ukraine's regions. The study was conducted using theoretical and empirical methods: content analysis and synthesis of scientific literature — to study modern approaches to ecological entrepreneurship; system analysis — to estimate ecological entrepreneurship as a complex phenomenon that combines economic, social and environmental components; abstract and logical — to establish logical relationships between ecological entrepreneurship and sustainable development; statistical analysis — to evaluate the indicators

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of ecological entrepreneurship development in the regions; functional analysis — to analyze regulatory acts, analytical reports, and support programs for ecological entrepreneurship; benchmarking — to compare best practices of ecological entrepreneurship in different countries.

The novelty of the study is a comprehensive analysis of the role of ecological entrepreneurship as a key factor in the socio-economic development of Ukrainian regions by identifying the interrelationships between entrepreneurship, environmental protection, and increasing the resilience of regional economies, considering the best European practices. The main environmental indicators of entrepreneurial activity are estimated, and the impact of military operations on the environment in the regions of Ukraine is determined. The types of ecological entrepreneurship are distinguished, and the possibilities of developing organic production as one of the priority directions for the recovery of entrepreneurial activity in the regions are substantiated. The successful practices of ecological entrepreneurship in Ukraine are analyzed, and directions of their development in various types of economic activity in the regions are determined in the article. The article summarizes foreign experience in various types of environmental entrepreneurship, which allowed us to confirm the hypothesis that it is promising to spread it to ensure the resilience of regional development in Ukraine. The instruments for promoting the development of ecological entrepreneurship in Ukraine are substantiated, including: certification and ecological labelling; energy saving and use of renewable energy sources; green innovations and technologies; waste management; investment in green projects; education and awareness raising; cooperation with local governments, wide involvement of regional stakeholders; development of digital platforms; promotion of eco-friendly products, etc. Conclusions are made on promising areas for further researches in the field of environmental economics in the regions, namely, the recommendations for regional authorities, enterprises and investors to prioritize ecological entrepreneurship in renewed regional and local strategies of socio-economic development, considering their natural resource potential, economic specialization and environmental status, which will facilitate the regions' adaptation to global environmental and economic challenges.

Keywords: ecological entrepreneurship, resilience, regions, renewable energy sources, organic production, regional strategies, sustainable development tools.

Description of the research problem. In Ukraine, as in other countries of the world, the socio-economic development of regions is accompanied by numerous environmental challenges. They are particularly evident in the context of war-time. Hostilities, destruction of infrastructure, relocation of businesses, and mass migration of the population have caused the disintegration of regions, interrupted industrial chains and business relationships, which have led to increased spatial regional disparities. In addition, the war has a destructive impact on ecosystems, which leads to negative long-term consequences: environmental destruction; chemical contamination of soil, air, and water resources; and large-scale devastation of forests through fires and explosions. All these lead to socio-economic and natural losses: reduced productivity of agricultural areas, biodiversity losses, ecosystem degradation, deterioration of public health, limitations in the usage of natural resources, food security threats, and reduced quality and availability of drinking water, which is becoming catastrophic in many regions.

Relevance of the theme. Overcoming the threatening consequences of environmental challenges requires an immediate public reaction, as environmental problems are directly related to the socio-economic recovery of Ukraine. In this

context, ecological entrepreneurship can play an important role as an effective tool for the post-war economic recovery of Ukraine based on the sustainable development and in this context, ecological entrepreneurship can play an important role as an effective tool for the post-war reconstruction of Ukraine's economy based on the sustainable development and the European Green Deal, which helps to attract innovative solutions, create jobs and ensure balanced regional development.

Analysis of the recent studies and publications. The global challenges faced by humanity require the mandatory implementation of sustainable development principles that take into account the interconnectedness of economic, social, and ecological aspects to balance current needs without risking the ability of future generations to satisfy their own. In this context, ecological entrepreneurship — a sustainable approach to economic activity focused on achieving economic goals while being ecologically responsible, adapting the needs of the business to environmental conditions — is of particular relevance.

The modern concept of ecological entrepreneurship has been developing for a long time, acquiring new features of more conscious and responsible consumption of natural resources while minimizing the harmful impact on the environment, and at the same time shaping a modern ecological policy aimed at greening industrial and consumer processes.

Many scientists have developed the concepts that associate entrepreneurial activity with environmentalism. Thus, H. Deili and J. Farley are among the founders of the concept of ecological economics, which substantiates the impact of ecological constraints on economic growth [1]. P. Hawken developed the concept of ecology of entrepreneurship [2], which proposes to form business models that operate in accordance with nature, promoting the idea of a circular economy, whereby production waste can be recycled. M. Porter has developed the concept of the “ecological dimension of competitive advantage”, in which ecological responsibility is defined as an opportunity for entrepreneurs to improve their efficiency and competitiveness [3]. He proved that ecological standards and regulations can stimulate innovation, which, in turn, increases business efficiency, and justifies the opportunities for entrepreneurs to benefit from ecological policy.

These approaches have been widely supported by many foreign researchers. In particular, A. Lovins supported the idea that enterprises can be more eco-friendly and be more profitable at the same time [4]. S. Hart, known for his concept of “green strategies” and “ecological entrepreneurship” as a driver for sustainable development, in his book “Capitalism at the Crossroads” describes how entrepreneurship can help to solve ecological problems while also generating economic benefits, especially in emerging markets [5].

Common ecosystem management as a basis for ecological entrepreneurship and sustainable consumption of resources based on the paradigm of ecological economics was substantiated by E. Ostrom — Laureate of the Nobel Prize in

Economics for the study of common resources and their management, by proving that natural resources can be effectively operated by local communities without the necessity of public or private management [6].

J. Gast et al. introduce the concept of “ecological entrepreneurs” into the scientific discourse, whose activities are aimed not only at making a profit, but also at caring for the environment. They combine their entrepreneurial identity with environmental values, integrating them into their economic behavior [7, p. 44—56].

The actual issues of substantive theoretical and methodological contents, in which ecological entrepreneurship is considered from the positions of an economic approach as a way of generating revenue without harming the environment, and establishing the basis for the development of new types of economic activity related to the achievement of the SDGs, have been studied by Ukrainian scientists. Among them are the following scientific works by V. Vernadsky [8], E. Libanova [9], V. Heyets [10], B. Danylyshyn [11], S. Pyrozhev, Ye. Bozhok, N. Khamitov [12, p. 74—82], M. Kyzym, V. Khaustova [13], M. Khvesyk, H. Obykhod [14], O. Reshetniuk [15], H. Kupalova [16], Ye. Khlobystov [17], M. Melnyk, I. Leshchukh [18], and many others have devoted their works to substantiating the factors influencing the environmental sustainability of the region. At the same time, the issues of opportunities for the development of ecological entrepreneurship for the socio-economic development of the regions of Ukraine have not been widely investigated.

Innovative character. The novelty of the article is the comprehensive analysis of the ecological entrepreneurship as a key factor in the socio-economic development of Ukrainian regions by identifying the interrelationships between entrepreneurship, environmental protection, and increasing the resilience of regional economies, taking into account the best European practices.

Setting of the article's goal and tasks. The article is aimed at substantiating the possibilities of developing ecological entrepreneurship to ensure the resilience of Ukraine's regions.

Research methods. The study was conducted using theoretical and empirical methods: content analysis and synthesis of scientific literature — to study modern approaches to ecological entrepreneurship; system analysis — to estimate ecological entrepreneurship as a complex phenomenon that combines economic, social and environmental components; abstract and logical — to establish logical relationships between ecological entrepreneurship and sustainable development; statistical analysis — to evaluate the indicators of ecological entrepreneurship development in the regions; functional analysis — to analyze regulatory acts, analytical reports, and support programs for ecological entrepreneurship; benchmarking — to compare best practices of ecological entrepreneurship in different countries.

The main findings of the study. Ecological entrepreneurship is important for the socio-economic development of regions, contributing to the maintenance

of natural resources, the creation of new jobs, and the improvement of the quality of life of the population. Ecological entrepreneurship generates revenues for regional and local budgets, improves food supply, extends value chains, reduces negative environmental impact, and lays the foundation for sustainable business development. Ecological entrepreneurship enables regions to attract investment, to adapt to global challenges, and to ensure balanced economic development, considering their sustainable environmental priorities.

L. Raimi, based on practical solutions in the public, private, and social sectors, argues that ecological entrepreneurship is closely connected with economic sustainability and the development of a green economy [19, p. 23—46]. At the same time, other researchers have noted that entrepreneurship in the regions is accompanied by an increase in environmental problems. It has both positive and negative effects, depending on the level of technology development, compliance with environmental standards, and the specifics of industrial processes. The negative impact of economic activity is caused by industrialization, which leads to significant emissions of harmful substances into the air, water, and soil, land degradation, and waste accumulation. Statistical analysis of the ecological state of Ukraine's regions shows this (Table 1).

An analysis of ecological problems in the regions of Ukraine showed that by February 2022, the major ecological problems in Ukraine were typical for an industrialized country: emissions of pollutants into the air from stationary sources and waste generation. In particular, emissions of pollutants into the air from stationary sources in 2021 amounted to 2,242.0 thousand tons; waste generation in the same year in Ukraine totaled 493,271.1 thousand tons. At the same time, environmental protection costs amounted to UAH 44,804.92 million. Due to the full-scale invasion of Ukraine by Russia, emissions of pollutants into the air decreased by 2,125.8 thousand tons in 2023 compared to 2014, which is 63.46 %. The largest reduction occurred in the industrialized regions — Luhansk (–100 %), Donetsk (–84.5 %), Zaporizhzhia (–74.8 %), Kharkiv (–74.15 %), Mykolaiv (–64.78 %), Chernihiv (–64.44 %), and Sumy (–52.22 %). This is due to the fact that many industrial enterprises have been destroyed, and some have completely closed down. In addition, their level was significantly affected by the termination of the provision of information on air pollutant emissions by major polluters whose industrial facilities are located in the occupied regions. However, it should also be noted that there was an increase in this indicator. For example, in 2023, compared to 2014, there was an increase in air pollutant emissions from stationary sources in Odesa (+19.83 %), Khmelnytskyi (+9.94 %) and Volyn (+2.33 %) territories, due to increased business activity as a result of relocation, as well as non-compliance by enterprises with the technological regime of operation of dust and gas cleaning equipment; low rates of implementation of advanced emission reduction technologies, etc.

The regional ecological situation directly depends on the level of funding for environmental protection measures. In general, in Ukraine, environmental

Table 1: The main indicators characterizing the ecological state of Ukraine's regions in 2014, 2021, and 2023

Regions	Air pollutant emissions from stationary sources, thousand tonnes			Waste generation, thousand tonnes*		Environmental protection costs, UAH million		
	2014	2021	2023	2021	2023	2014	2021	2023
Ukraine	3,350.0	2,242.0	1,224.2	493,271.1	176,289.8	21,925.6	44,804.9	37,597.7
Vinnyska	124.5	79.3	80.5	1,108.9	1,115.8	125.8	408.1	1,179.5
Volynska	4.3	5.6	4.4	515.8	399.7	75.1	384.2	558.8
Dnipropetrovska	855.8	537.6	385.1	321,734.5	131,069.8	6,575.1	17,163.1	11,763.4
Donetska	1,043.0	744.1	161.7	23,467.9	5,099.6	1,524.1	2,839.7	718.7
Zhytomyrska	10.9	11.9	7.4	421.1	391.3	101.9	293.1	428.7
Zakarpatska	3.9	2.8	2.8	139.1	161.6	76.6	321.2	624.6
Zaporizka	206.7	148.2	52.1	5,592.9	1,418.4	2,156.0	3,467.1	1,916.2
Ivano-Frankivska	228.8	172.4	147.7	790.5	729.2	326.5	875.9	921.1
Kyivska	96.2	59.3	55.5	1,937.8	936.3	4,217.9	1,776.7	1,715.3
Kirovohradska	11.8	11.1	7.5	488.0	517.2	105.2	451.2	442.1
Luhanska	197.8	35.1	0.0	269.7	–	750.4	491.9	1.4
Lvivska	100.2	75.4	57.9	3,212.2	2,855.9	390.8	1,459.3	1,851.7
Mykolaivska	15.9	12.2	5.6	2,498.5	345.5	800.1	1,233.7	723.3
Odeska	23.2	35.9	27.8	370.1	194.2	218.1	7201	744.4
Poltavska	62.9	52.4	30.3	121,823.1	22,907.7	768.7	1,272.8	846.5
Rivnenska	11.6	9.4	7.6	719.3	487.9	294.4	724.2	1,221.6
Sumska	27.0	18.3	12.9	922.1	448.8	191.5	883.1	756.8
Ternopil'ska	8.2	8.3	8.0	380.0	1,354.4	19.4	56.3	138.2
Kharkiv'ska	150.5	73.4	38.9	1,249.1	750	705.1	3,299.4	2,141.0
Kherson'ska	7.2	17.1	5.5	122.6	3.4	69.5	425.2	124.8
Khmelnyska	17.1	21.1	18.8	752.9	826.5	167.3	456.6	646.7
Cherkaska	66.7	47.6	61.8	1,301.4	1,525.3	223.5	286.6	620.5
Chernivetska	2.5	1.7	1.7	171.2	105.6	63.7	220.9	226.0
Chernihiv'ska	41.9	23.0	14.9	456.2	306.7	223.2	497.2	633.1
Kyiv	31.4	38.8	27.8	2,826.2	2,339	1,755.8	4,797.3	6,653.4

Source: compiled by the authors based on [20]; * data for 2014 is not available.

protection expenditures in 2023 increased almost 1.7 times compared to 2014, amounting to UAH 16,720.9 million, and decreased by 16.9 % in value terms compared to 2021, amounting to UAH 7,207.25 million. The decrease in funding

for environmental protection in Ukraine in 2023 compared to 2021 is due to the transfer of a significant part of public funds to finance defense needs, humanitarian programs, restore damaged infrastructure, and support the country's economic resilience, which has led to a temporary reduction in expenditures on ecological initiatives.

One more problem for the ecological state of Ukraine's regions is the waste generated by entrepreneurial activities. Due to the hostilities, waste generation is decreasing in many regions. Thus, in 2023, compared to 2021, such volumes decreased by 64.26 % (316.98 thousand tons) in Ukraine as a whole, which was most affected by the reduction in the following regions: Kherson –97.23 %, Donetsk –78.27 %, Mykolaiv –86.17 %, Poltava –81.2 %, Dnipro –59.26 %. At the same time, there are regions where waste volumes have increased: Ternopil region by 3.56 times, Cherkasy region by 17.2 %, Zakarpattia region by 16.18 %, and Kirovograd region by 5.98 %. This is due to increased manufacturing capabilities in certain regions of Ukraine as a result of business relocation, which is explained by their relative security, export orientation (proximity to the western border), and logistics. In particular, under a government programme, 840 companies from the east and south moved to the western regions of Ukraine. The most attractive regions were L'viv (199 enterprises), Zakarpattia (120), Chernivtsi (78), and Ivano-Frankivsk (70 enterprises). The least number of companies relocated to Kirovograd (17 companies), Zhytomyr (6), and Odesa (3 companies) regions [21].

According to the presented data, the ecological state of Ukraine's regions depends to a significant extent on the level of business activity, particularly in industry, agriculture, and energy. In some regions, there is a high level of soil, water, and air pollution due to the usage of the outdated technologies, non-observance of ecological standards and excessive consumption of natural resources.

Regions of Ukraine have suffered critical environmental impacts in addition to traditional environmental problems due to the hostilities. Environmental crimes are also part of war crimes under the Geneva Convention. Currently, nuclear power plants, seaports, hazardous waste storage facilities (mineral fertilizers, polyurethane foam, paints, lubricants, etc.), industry, including chemical and metallurgical enterprises, are in the area of active hostilities. There have been fires burning at oil depots, petrol stations, and garbage dumps, and there have been cases of damage to heat and water supply facilities (sewage pumping stations, filtering stations). Additionally, there is a direct impact on ecosystems through fires and the destruction of rare species and their habitats, as well as nature reserves and ecosystems of forests, plains, and seas. According to the Ministry of Ecology and Natural Resources of Ukraine, as a result of the Russian military invasion, 3,106 facts of environmental damage were recorded and documented in the amount of UAH 3.151 trillion. In particular, emissions of pollutants into the air due to: forest fires amounted to 59.8 million tones total UAH 614.6 billion; oil burning — 10.8 million tones total UAH 138.75 billion; destruction of facilities —

231.56 thousand tones total UAH 5.99 billion; unorganized emissions of other pollutants or a mixture of such substances into the air — 0.356 thousand tones total UAH 7.37 million. The explosions of missiles, artillery shells of various types, high-explosive and vacuum bombs, drones, and missiles have caused the pollution of soil resources by destroying the top fertile soil that has been formed over centuries. The damage caused by soil contamination amounts to UAH 1.17 trillion over a total area of 22,041,480 m², and soil pollution — UAH 19.98 billion over a total area of 1,130,218 m². Water resources have also suffered, with damage from water pollution amounting to UAH 40.85 billion and from water pollution — UAH 8.99 billion. Damage from illegally taken and/or used water is estimated at UAH 26.77 billion. Damage from marine pollution is estimated at UAH 8.03 billion [21].

In general, war's consequences are catastrophic for the environment and the national economy, thus suggesting that they are called ecocide. One of the acts of ecocide was the explosion of the Kakhovka hydroelectric power station, which had disastrous consequences for both the environment and the regional economy. In particular, there was a significant reduction in industrial production in Kherson, Zaporizhzhia, and Dnipropetrovsk regions in such economic activities as agriculture, electricity, fuel supply, fish farming and industrial fishing, and in such critical infrastructure as housing, drinking and technical water supply, irrigation systems, transport infrastructure, and bridges. The direct impact of this disaster on agriculture was manifested in the waterlogging of agricultural land and a reduced water supply to irrigation systems. The destruction of land reclamation systems will require farmers to change their planting patterns and diversify into other agricultural activities. According to current estimates, more than 1.5 million hectares will not be available for agricultural cultivation over the next 5—7 years. The consequences of the Kakhovka hydroelectric dam explosion are estimated at UAH 146.4 billion. This will require the search for additional resources for socio-economic development in the medium and long term, the nature and amount of which will depend, the nature and scope of which will depend on the strategy pursued to recover the region's economy, where the development of ecological entrepreneurship practices is promising (Fig. 1).

It is worth noting that Ukraine is already implementing ecological entrepreneurship practices, some of which are listed in Table 2.

According to these data, despite the difficult military-political and economic problems, various types of ecological entrepreneurship are spreading in Ukraine, with a positive impact on the socio-economic development of the regions. A rather popular type is organic production, characterized by green organizational and technological business processes related to: obtaining products of higher quality; using a special production technology that differs from the traditional one by the refusal to apply mineral fertilizers, chemical protection agents, growth regulators, etc. Thus, the Ministry of Agrarian Policy of Ukraine data as of the



Fig. 1. Types of ecological entrepreneurship

Source: compiled by the authors based on data from [22].

Table 2. Successful practices of ecological entrepreneurship and directions of their growth in Ukraine

Type of ecological entrepreneurship	Successful practices in Ukraine	Directions for development
Organic production	<ol style="list-style-type: none">1. Vertically integrated group of companies “GALEKS-AGRO” (Zhytomyr region), including “Organic Milk” LLC, “Domashnya Kurochka” farm, and “Organic Meat Product” LLC;2. “Danube Agrarian” LLC (Odesa region) specialises in growing organic vegetables, fruits, cereals, melons, and root crops, including sweet potatoes.3. LLC “Skvyra Plant of Bread Products” (Kyiv region), TM “Skvyryanka” has a certificate of compliance with organic international standards of the EU, “Bio Suisse”, HALAL, “Kashrof”.	<ol style="list-style-type: none">1. Expansion of land for organic production.2. Provision of subsidies, concessional loans, and grants for farmers switching to organic production.3. Introduce tax incentives for organic enterprises.4. Establishment of farmers’ markets and specialized shops for the sale of organic products.5. Involvement of restaurants, hotels, and other establishments in cooperation with organic producers.
Ecotourism	<ol style="list-style-type: none">1. <i>Active Ukraine</i> (Kyiv) specialises in active and ecological tours throughout Ukraine, offering hiking, cycling, and cultural tours.2. <i>GoGreen Ukraine</i> (Lviv) offers environmentally responsible travel, including eco-tours to the Carpathians, kayaking, and exploring local culture and traditions.3. <i>Carpathian Biosphere Reserve</i> Tours (Rakhiv) organises excursions and tours in the Carpathian Biosphere National Park, introducing tourists to the unique flora and fauna of the region.4. <i>Greenways Ukraine</i> (Ivano-Frankivsk) offers routes for ecotourism (hiking and cycling tours).5. <i>UnexploredCity</i> (Odesa) organises excursions and tours highlighting the ecological and cultural heritage of Ukraine’s regions.	<ol style="list-style-type: none">1. Developing a modern transport infrastructure to enable visiting these tourist places.2. A reasonable pricing policy accessible to a wide range of low-income people.3. Effective organisation of ecological tours with the ongoing development of new routes to distant places of “wild” nature.4. Conservation of attractive and unique natural objects, which contribute to the ecological and aesthetic education of tourists who will visit them.

Renewable energy solutions/Investing in solar, wind, and geothermal energy technologies	<ol style="list-style-type: none"> 1. <i>Elementum Energy</i> (Kyiv) with 631 MW of renewable energy capacity. 2. <i>DTEK Renewables</i> (Kyiv) with a capacity of 1 GW, including solar and wind power plants. 3. <i>SunCapital</i> (Kyiv) is a Ukrainian company specializing in the construction and operation of solar power plants, capacity is 269 MW. 	<ol style="list-style-type: none"> 1. Complementing the legal, regulatory, and technical framework for renewable energy, considering the specifics of hydrogen energy. 2. Implementation of the framework of the government policy of economic incentives for renewable energy based on the implementation of a system of benefits for energy producers and consumers. 3. Implementation of investment protection mechanisms and development of public-private partnerships. 	<ol style="list-style-type: none"> 1. Complementing the legal, regulatory, and technical framework for renewable energy, considering the specifics of hydrogen energy. 2. Implementation of the framework of the government policy of economic incentives for renewable energy based on the implementation of a system of benefits for energy producers and consumers. 3. Implementation of investment protection mechanisms and development of public-private partnerships.
Disposal and recycling of waste	<ol style="list-style-type: none"> 1. <i>UkrEcoProm</i> (Kyiv) provides a full range of waste disposal and recycling services using the most powerful facilities in the country. 2. <i>UtiVtorProm</i> specialises in the processing and disposal of various types of waste, ensuring environmental safety and responsibility. 3. <i>Altfather Kyiv</i> (Kyiv) collects, removes, and disposes of industrial and household waste, implementing modern waste management technologies. 4. <i>SIC ECODAR</i> (Kharkiv) provides services for the collection, transportation, and disposal of hazardous waste, complying with high environmental standards. 4. <i>Bresson Reenergy</i> (Kyiv region) specialises in the disposal of hazardous, medical, and other waste in accordance with European standards, ensuring environmental safety. 	<ol style="list-style-type: none"> 1. The process of forming the regulatory framework for waste management should be completed by supplementing the framework law with sectoral regulations enabling effective regulation of the waste management process. 2. Introduction of mandatory separate collection of solid waste. 3. Introduction of extended producer responsibility in close cooperation with local authorities. 4. Increasing control and responsibility in waste management by significantly raising fines and imposing zero tolerance for violators. 5. Increasing public awareness of waste management culture at the household level. 6. Development and implementation of regional and local waste management plans, which should become practical roadmaps for stimulating the development of the waste management sector. 7. Practical implementation and application of the waste management hierarchy. 8. Renewal and development of waste management infrastructure facilities. 9. Ensure transparency of data in the waste management sector. 	<ol style="list-style-type: none"> 1. The process of forming the regulatory framework for waste management should be completed by supplementing the framework law with sectoral regulations enabling effective regulation of the waste management process. 2. Introduction of mandatory separate collection of solid waste. 3. Introduction of extended producer responsibility in close cooperation with local authorities. 4. Increasing control and responsibility in waste management by significantly raising fines and imposing zero tolerance for violators. 5. Increasing public awareness of waste management culture at the household level. 6. Development and implementation of regional and local waste management plans, which should become practical roadmaps for stimulating the development of the waste management sector. 7. Practical implementation and application of the waste management hierarchy. 8. Renewal and development of waste management infrastructure facilities. 9. Ensure transparency of data in the waste management sector.

End of the table 2

Type of ecological entrepreneurship	Successful practices in Ukraine	Directions for development
Ecological fashion and accessories	<ol style="list-style-type: none"> 1. <i>KSENIA SCHNAIDER</i> (Kyiv) is a well-known brand that creates clothes from recycled materials, specifically denim, upcycling in fashion. 2. <i>Zerno</i> (Lviv) is a brand that produces clothing and accessories made from natural materials such as cotton, emphasising folklore elements. 3. <i>Potrib</i> (Kyiv) is an upcycling brand of backpacks, bags, and wallets made from leftover fabric, contributing to the reduction of textile waste. 	<ol style="list-style-type: none"> 1. Creating public understanding of sustainable consumer behaviour. 2. Educational programmes and promotion of ecological awareness. 3. Supporting local brands and start-ups. 4. Stimulating the export of eco-friendly products through participation in international exhibitions and fairs. 5. Participation in international organisations and projects related to sustainable fashion.
Ecological packaging	<ol style="list-style-type: none"> 1. <i>Ubi Pack</i> (Kyiv) offers a wide range of eco-friendly packaging solutions for various industries. 2. <i>Euroopttorg</i> (Lviv) is a company with one of the widest ranges of cardboard boxes in Ukraine, focusing on eco-friendly materials. 3. <i>Tetrapak Ukraine</i> (Kyiv) is an international manufacturer of packaging and container systems known for its environmental initiatives and sustainable solutions. 	<ol style="list-style-type: none"> 1. The use of biodegradable, compostable, and recyclable materials, development of alternative solutions based on natural components such as cellulose, corn starch, and plant fibres. 2. Develop an effective system of waste collection, sorting, and recycling. 3. Provision of government grants and concessional loans for projects that develop and implement eco-friendly packaging solutions.

Source: author's research.

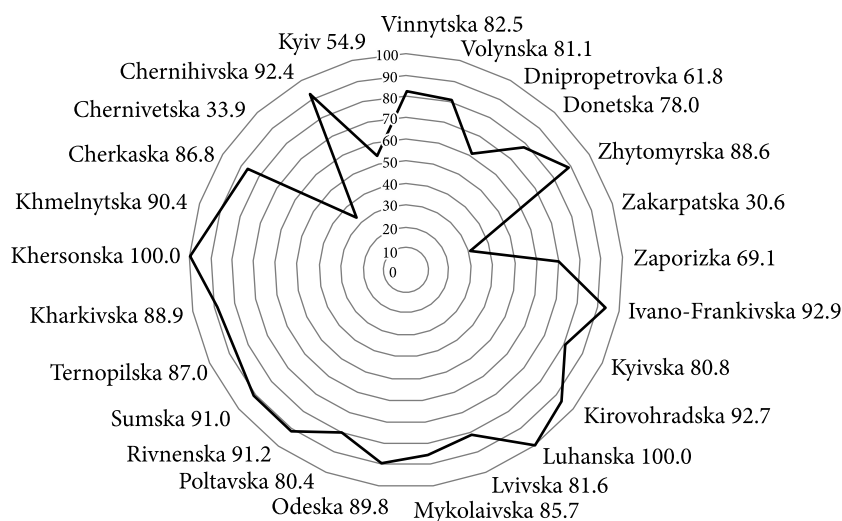


Fig. 2. Types of ecological entrepreneurship, % of the total number of employees in the region.
** Data in Zakarpattia and Chernivtsi regions exclude the share of employed workers in medium-sized enterprises. Data in Luhansk and Kherson regions exclude the share of employed workers in large enterprises*

Source: compiled by the authors according to the State Statistics Service [23].

beginning of 2024 showed that the total area of agricultural areas under organic production in accordance with the requirements of Ukrainian legislation amounted to 77 463 hectares, of which 71 728 hectares were certified as organic. The total number of certified organic market operators amounted to 152, including 134 agricultural producers.

The socio-economic development of a region requires a developed business sector, which forms the basis for economic growth, improved welfare, and social stability. Increasing the number of people employed in the business sector contributes to the growth of goods and services production, which increases the gross regional product and ensures the financial stability of the region (Fig. 2).

The number of people employed in the business sector has an impact on the regional socio-economic development: an increase in business jobs stimulates economic growth, improves the welfare of the population, develops infrastructure, and creates an innovative environment. The analysis showed that in 2023, the highest labour force participation in the entrepreneurial sector was in Ivano-Frankivsk (92.9%), Kirovohrad (92.7%), Chernihiv (92.4%), Rivne (91.2%), Sumy (91.0%), and Khmelnytskyi (90.4%) regions. The economic component of entrepreneurship development in the regions is characterised by the financial results obtained, which determine tax revenues, allowing for the financing of social programmes, infrastructure projects, and ecological programmes (investments in the greening of the region). For example, in those regions where successful prac-

tices of environmental entrepreneurship are developed (see Table 2), significant amounts of capital investment in environmental technologies are attracted. In particular, in 2023, the volume of capital investments in environmental technologies in Kyiv amounted to UAH 1,407.55 million, in the Kharkiv region — UAH 398.24 million; Lviv region — UAH 332.7 million; Kyiv region — UAH 213.28 million; Ivano-Frankivsk region — UAH 128.4 million; Zhytomyr region — UAH 47.74 million; and Odesa region — UAH 41.96 million. These figures demonstrate the unevenness of funding for environmental initiatives in different regions. In addition, there is a growing need for their implementation as a result of infrastructure and industrial facilities being damaged or destroyed, and environmental pollution caused by military operations. Green investment is also increasing due to the need to address strategic objectives to achieve energy independence and develop green energy; adapt Ukrainian enterprises to European environmental standards (ESG, Green Deal); and reconstruct cities and towns by implementing energy-efficient solutions in the construction of energy-efficient housing, which generally enhances the importance of supporting ecological entrepreneurship focused on waste recycling, eco-technologies and natural resource conservation.

At the same time, realities in Ukraine determine the specifics of doing ecological businesses. While in foreign countries, innovative approaches and strategies for sustainable development and environmental protection have already been implemented in regional development strategies, Ukraine is only updating them in accordance with European approaches. For example, Germany is actively promoting the concept of green entrepreneurship, which includes eco-friendly technologies, renewable energy, and sustainable development. One of the most illustrative examples is the development of renewable energy sources (wind and solar power plants) in the regions under the Energy Transition strategy (*Energiewende*), which enables the creation of new jobs, reduction of carbon dioxide emissions, and reduction of dependence on energy imports [24].

Successful experiences in Scandinavian countries include eco-tourism (Sweden, Norway, and Iceland), which preserves natural landscapes, strengthens local communities, and promotes regional development. For example, eco-friendly hotels and campsites are actively growing in Sweden, using renewable energy sources and offering eco-friendly services. Sweden was one of the first countries that developed an eco-tourism certification, supporting regional economies.

The Netherlands provides a successful example of supporting ecological entrepreneurship in rural areas, which has allowed it to become one of Europe's largest exporters of organic products. Subsidy programs for farmers, which start organic production and the development of green agribusinesses, create new jobs and protect the environment. Applying technologies for sustainable agriculture, combined with innovations in agribusiness, can preserve biodiversity while increasing productivity.

Denmark is actively implementing technologies that contribute to the recovery of ecosystems and reduce pollution. Ecological initiatives include the expansion of biogas plants, waste recycling, and the implementation of water and air purification technologies, which help reduce greenhouse gas emissions and stimulate the development of local economies through new jobs and technological innovations.

Italy is actively promoting agro-ecological initiatives, particularly in regions where there is a specialisation in organic agriculture, such as Tuscany and Sardinia. Support for organic farming enterprises allows for the development of the concept of a 'cultural landscape', where organic farmers combine farming traditions with ecological practices, which contributes to the development of sustainable tourism and local businesses.

Belgium is one of the leaders in Europe (79.2 % among EU countries) in waste recycling, including plastic and e-waste. To achieve this, the government promotes innovative projects that increase the efficiency of waste collection and recycling. Start-ups and businesses that process and convert waste into new, useful products are actively working in the country. Recycling facilities have high-tech sorting systems and complement a well-organised collection system for household and industrial packaging. As a result, it is expected that by the end of 2025, 75 % of plastic packaging produced in the country will be recycled. The high level of packaging recycling in Belgium is mainly due to the Extended Producer Responsibility Agreement, which was introduced in early 2008. This agreement, concluded between the Belgian federal government and regional governments, defines the responsibilities of producers in terms of packaging waste management. Compliance and implementation are controlled by the Interregional Packaging Commission, which consists of representatives of the three Belgian regions: Flanders, Wallonia, and the capital Brussels [25].

Overall, the European experience suggests that ecological entrepreneurship drives economic growth while preserving natural resources and promoting regional development. The key success factors are innovation in green technologies, support for sustainable business models, and cooperation between the state, business, and community.

However, in Ukraine, one of the problems in the development of ecological entrepreneurship, which partially restricts the possibilities of realising entrepreneurial potential, is its regulatory and legislative consolidation as a legal entity in the current Ukrainian law. In particular, the current regulatory framework does not define the types of ecological entrepreneurship entities, requirements for their legal status, including organizational and juridical forms of economic activity. According to G. Kupalova, the subjects of environmental entrepreneurship are entities regardless of organizational and legal forms of ownership, individuals engaged in entrepreneurial (economic) activity without establishing a legal entity, and other entities provided for by the laws of Ukraine that manufacture products,

perform works and services for environmental protection. At the same time, the author notes that neither at the international nor at the national level have clear uniform criteria been defined, the composition of environmental products, works and services by type, and their classification have not been developed [16, p. 38]. As such, ecological entrepreneurship is not distinguished as a category in the statistics.

Summarising the international and domestic experience of ecological entrepreneurship, it is necessary to distinguish the following promising directions for promoting its development in Ukraine.

1. *Green certification and ecological labelling*, including certification of products and services in accordance with international ecological standards (ISO 14001, EMAS, etc.); using ecological labels to identify ecologically safe products and services.

2. *Energy efficiency and renewable energy* sources through the installation of solar panels, wind turbines, and biogas plants for enterprises, which will optimise energy consumption through energy-efficient technologies and process automation.

3. *Environmental innovations and technologies* based on the adoption of innovative production processes that minimize environmental impact and involve the development of new products from recycled or organic materials.

4. *Waste management* through the establishment of separate waste collection, recycling, and disposal systems; development of closed production cycles for the re-use of materials.

5. *Investing in sustainable development* by attracting environmental funds, grants, and preferential financing for green projects; using green banking and green bonds.

6. *Education and raising awareness of environmental issues*: organizing trainings, seminars, and consultations on ecological entrepreneurship; developing and implementing internal and external educational programs for staff and customers.

7. *Cooperation with local authorities*, NGOs, and educational institutions; participation in national and international environmental programs and initiatives.

8. *Using digital platforms* to monitor the impact on the environment (e.g., IoT systems for emissions control, air quality monitoring, etc.); implementing software for ecological risk analysis and process optimization.

9. *Promote eco-friendly products* by developing strategies for promoting green goods and services through digital channels, highlighting the ecological benefits of products in marketing campaigns.

10. *Government incentives for ecological entrepreneurship* by providing tax incentives, subsidies, and grants; projects aimed at improving the ecological situation in the regions; cooperation with communities to jointly address environmental issues.

In our opinion, it is important to implement the proposed directions in the updated strategies of regional socio-economic development, which will help reduce the ecological burden, increase business competitiveness, and improve the socio-economic situation in the regions.

Conclusions and prospects of future studies in the field. As a result of the study, the possibilities of developing ecological entrepreneurship to ensure the resilience of Ukrainian regions are substantiated. It is determined that ecological entrepreneurship plays a crucial role in the socio-economic development of Ukrainian regions, ensuring the responsible usage of natural resources, reducing harmful ecological impact, and increasing the resilience of regional economies. The ecological indicators of the impact of entrepreneurship on the state of the environment in the regions of Ukraine are estimated, and the consequences of military actions are shown, which justifies the necessity of supporting sustainable development. Organic production is singled out as one of the priority areas of ecological entrepreneurship to recover entrepreneurial activity in the regions. Successful practices of ecological entrepreneurship in Ukraine and foreign countries are analyzed, which confirms the prospects of its implementation for sustainable regional development. Considering the European vector of Ukraine's development and its responsibilities within the framework of international ecological agreements, stimulating ecological entrepreneurship is a necessary element of government policy. It is noted that the effective development of this area requires solving a number of problems: improving the regulatory framework, creating incentives for business, supporting innovation, and ensuring access to resources for ecologically oriented enterprises.

Effective tools for promoting the development of ecological entrepreneurship are identified, including certification and eco-labelling, energy saving, renewable energy sources, waste management, green innovations, education, awareness raising, and digital platforms. Recommendations for regional authorities, enterprises, and investors on the incorporation of ecological entrepreneurship into renewed strategies of socio-economic development, taking into account the natural resource potential, economic specialization, and ecological state of the regions, are proposed.

Further research could be aimed at developing tools and measures to adapt regions to the global ecological and economic challenges, which will contribute to their sustainable development. An important area of future research should also be the substantiation of areas of support for sustainable business initiatives, based on the specifics of economic activity and socio-demographic characteristics of the regions.

Thus, the successful integration of ecological entrepreneurship into the economic structure of regions can become a powerful factor in the modernisation of local economies, contribute to their competitiveness in domestic and foreign markets, and attract investments.

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ЕКОЛОГІЧНЕ ПІДПРИЄМНИЦТВО ЯК ЧИННИК СОЦІАЛЬНО-ЕКОНОМІЧНОГО РОЗВИТКУ РЕГІОНІВ

У статті визначено можливості екологічного підприємництва для соціально-економічного розвитку регіонів України, яке формує свідоме та відповідальне споживання природних ресурсів з мінімізацією шкідливого впливу на довкілля, впровадження екологічної політики, спрямованої на органічне виробництво, циркулярну економіку та використання альтернативних джерел енергії в економічній діяльності. Метою статті є обґрунтування можливостей розвитку екологічного підприємництва для забезпечення стійкості регіонів України.

Дослідження проводилось з використанням теоретичних та емпіричних методів: контент-аналіз та узагальнення наукової літератури — для вивчення сучасних підходів до екологічного підприємництва; системний аналіз — для оцінки екологічного підприємництва як комплексного явища, що поєднує економічну, соціальну та екологічну складові; абстрактно-логічний — для встановлення логічних взаємозв'язків між екологічним підприємництвом та сталим розвитком; статистичний аналіз — для оцінки показників розвитку екологічного підприємництва в регіонах; функціональний аналіз — для аналізу нормативних актів, аналітичних звітів, програм підтримки екологічного підприємництва; бенчмаркінг — для порівняння передового досвіду екологічного підприємництва в різних країнах. Новизна дослідження полягає у комплексному аналізі ролі екологічного підприємництва як ключового чинника соціально-економічного розвитку регіонів України шляхом виявлення взаємозв'язків між підприємництвом, захистом навколишнього середовища та підвищенням стійкості регіональних економік з урахуванням кращого європейського досвіду. Оцінено основні екологічні показники підприємницької діяльності та визначено вплив бойових дій на довкілля в регіонах України. Виділено види екологічного підприємництва та обґрунтовано можливості розвитку органічного виробництва як одного з пріоритетних напрямків відновлення підприємницької діяльності в регіонах. У статті проаналізовано успішні практики екологічного підприємництва в Україні та визначено напрямки їх розвитку в різних видах економічної діяльності в регіонах. Узагальнено зарубіжний досвід різних видів екологічного підприємництва, що уможливило підтвердження гіпотези про перспективність його поширення для забезпечення стійкості регіонального розвитку в Україні. Обґрунтовано інструменти сприяння розвитку екологічного підприємництва в Україні, серед яких: сертифікація та екологічне маркування; енергозбереження та використання відновлюваних джерел енергії; зелені інновації та технології; управління відходами; інвестиції в зелені проекти; освіта та підвищення обізнаності; співпраця з органами місцевого самоврядування, широке залучення регіональних стейкхолдерів; розвиток цифрових платформ; просування екологічно чистої продукції тощо. Зроблено висновки щодо перспективних напрямків подальших досліджень у сфері економіки довкілля в регіонах: напрацьовано рекомендації регіональним органам влади, підприємствам та інвесторам щодо пріоритетності екологічного підприємництва в оновлених регіональних та місцевих стратегіях соціально-економічного розвитку з урахуванням їх природно-ресурсного потенціалу, економічної спеціалізації та екологічного стану, що сприятиме адаптації регіонів до глобальних еколого-економічних викликів.

Ключові слова: екологічне підприємництво, стійкість, регіони, відновлювані джерела енергії; органічне виробництво; регіональні стратегії, інструменти сталого розвитку.