INNOVATIVE STRATEGIES FOR REGIONAL DEVELOPMENT IN CONDITIONS OF WAR AND POST-WAR RECONSTRUCTION

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Annotation. *The theses consider key areas of innovative development in Ukraine in the context of war and post-war reconstruction. Emphasis is placed on smart specialization, innovative security, social innovations, digitalization, and international cooperation.*

Keywords: *innovation strategies, smart specialization, innovative security, social innovations, digitalization, international cooperation.*

Анотація. *У тезах розглянуто ключові напрями інноваційного розвитку України в умовах війни та поствоєнної реконструкції. Акцент зроблено на смарт-спеціалізації, інноваційній безпеці, соціальних інноваціях, цифровізації та міжнародній кооперації.*

Ключові слова: *інноваційні стратегії, смарт-спеціалізація, інноваційна безпека, соціальні інновації, цифровізація, міжнародна кооперація.*

Modern armed conflicts, in particular the full-scale war in Ukraine, cause not only physical destruction of infrastructure, but also profound transformations of socio-economic systems. Traditional development models lose their effectiveness under such conditions, which actualizes the need for innovative strategic approaches. War is not only a destructive factor, but also a catalyst for innovative transformations, since extreme risks and resource scarcity stimulate the search for quick, adaptive solutions.

According to the Fourth Rapid Damage and Needs Assessment (RDNA4), published by the World Bank, the European Commission, the UN and the Government of Ukraine in 2025, the recovery needs reach 524 billion USD for the next decade [1]. In 2022, Ukraine's GDP fell by 29.1%, the largest decline in the country's modern history. An additional challenge is the large-scale mine contamination of territories, the economic losses from which amount to about 11 billion USD annually.

At the same time, individual industries demonstrate high resilience: the IT sector remains a driver of exports and innovation, maintaining a significant share of foreign exchange earnings even during periods of military aggression [2]. This indicates that innovation strategies can play a key role in the recovery and further development of the economy.

The scientific literature has already begun to analyze certain aspects of this problem. In particular, the monograph edited by V. Omelyanenko [3] examines the concept of smart specialization as a tool for regional renewal. The article by Levytsky and Radynsky [4] focuses on the regulatory and institutional conditions of innovation and investment activity in the post-war period. The study by Bila and Posna [5] emphasizes the role of social innovations in supporting vulnerable groups. In «White Paper» on the transformation of the research and innovation system of Ukraine» emphasizes the need to transform universities into hubs of innovation activity and strategic thinking [1].

In international literature, in particular in the works of Del Castillo [6] shown that successful reconstruction requires a clear timing of reforms, a shift from donor assistance to investment, and the creation of «reconstruction zones». Tarasashvili [7] focuses on the challenges of coordinating donor assistance and local initiatives in post-conflict countries.

At the same time, the issues of substantiating the choice of innovative strategies for regional development, the role of social entrepreneurship in recovery, and mechanisms for international cooperation in the innovation sphere remain open.

The purpose of these theses is to systematize key areas of innovative development in the context of war and post-war reconstruction, with an emphasis on intersectoral interaction, digitalization, social innovation, innovative security, and international integration. The task is to substantiate the role of innovation as a multifunctional tool for economic sustainability, social cohesion, and strategic renewal.

The study found that war is not only a destructive factor, but also a catalyst for innovative transformations. In conditions of extreme risk and lack of resources, there is a need for fast, flexible solutions that are able to adapt to an unstable environment. This stimulates the development of dual-purpose technologies, mobile production, digital platforms for managing humanitarian flows and logistics. At the same time, it is important to emphasize that innovative activity has a pronounced regional dimension: some regions demonstrate resilience even in crisis conditions, while others experience a significant reduction in the volume of innovative products. To illustrate these differences, Table 1 shows the number of innovatively active enterprises and the volume of innovative products sold by regions of Ukraine in 2021 and 2024.

Table 1

Innovative activity of enterprises by regions of Ukraine in 2021 and 2024

Region	Number of innovatively active enterprises		Volume of innovative products sold (million UAH)	
	2021	2024	2021	2024
Kyiv	181	194	10.430	9.842
Vinnytsia region	36	38	1.120	1.050
Volyn region	24	26	640	610
Dnipropetrovsk region	97	101	6.580	6.210
Donetsk region	20	22	510	480
Zhytomyr region	27	29	730	690
Transcarpathian region	16	18	420	390
Zaporizhia region	65	61	2.310	2.410
Ivano-Frankivsk region	22	24	590	560
Kyiv region	44	47	1.870	1.740
Kirovohrad region	19	21	480	450
Luhansk region	11	12	210	190
Lviv region	89	93	3.670	3.420
Mykolaiv region	26	28	860	820
Odesa region	72	76	3.120	2.980
Poltava region	48	52	1.540	1.480
Rivne region	21	23	610	580
Sumy region	41	45	1.230	1.180
Ternopil region	27	31	720	700
Kharkiv region	102	108	5.120	4.870
Kherson region	17	19	390	360
Khmelnytskyi region	25	27	670	640
Cherkasy region	25	28	740	720
Chernivtsi region	15	17	410	380
Chernihiv region	20	22	530	510

These tables confirm that even in wartime, innovation processes maintain dynamics, but the nature of this dynamics is heterogeneous: while the number of innovatively active enterprises in most regions is gradually increasing, the volumes of products sold in 2024 are often lower than in 2021.

This indicates a transformation of innovation activity – from large-scale industrial production to more niche, quickly adaptive solutions focused on survival in wartime.

One of the key strategic tools is smart specialization, which allows regions to form their own innovation ecosystems focused on local resources, scientific potential and social needs. In the context of military challenges, smart

specialization takes on additional meaning: regions can integrate into their strategies not only traditional sectors, but also military and dual technologies that have prospects for further commercialization in the civilian sphere. This applies, in particular, to the production of unmanned systems, cyber defense systems and logistics platforms, which after the war can be transformed into components of new industries. Thus, smart specialization in Ukraine combines economic recovery with the formation of long-term competitive advantages.

Innovation security is another critically important component. It encompasses the state's ability not only to generate new technologies, but also to protect them, ensure legal protection of intellectual property, support knowledge transfer, and create institutional conditions for scaling innovations. Innovation security in post-war conditions is multi-level in nature. At the economic level, this includes ensuring financing for innovation projects and access to international investment programs. At the legal level, it includes protecting intellectual property rights, simplifying patenting procedures, and stimulating technology transfer. At the institutional level, it includes creating clusters, technology parks, and public-private partnership mechanisms that guarantee the scaling of innovations. This approach allows not only to generate new technologies, but also to integrate them into global markets, reducing the risks of dependence on external factors.

Universities and research centers play a special role in this process. They are transforming from educational institutions into hubs of strategic thinking, interdisciplinary integration, and practical experimentation. As shown in White Paper on the transformation of Ukraine's research system, scientific institutions can become key agents of post-war renewal, provided they have proper institutional support and integration with business.

Social innovations are another important area. They encompass new models of employment, education, and health services that are adapted to the needs of vulnerable groups. These can include social enterprises, digital platforms for psychological support, and inclusive educational solutions. The study by Bila and Posna (2023) emphasizes that social innovations contribute not only to humanitarian response, but also to the formation of a new culture of solidarity and interaction. Examples of social innovations during wartime include the creation of Veteran Hub as a space for supporting veterans, the DonorUA platform for blood donors, digital services for psychological assistance to displaced persons, and inclusive educational projects for children from IDP families. Such initiatives demonstrate that social innovations are becoming not only a tool for humanitarian response, but also a factor in forming a new culture of solidarity and mutual support in society.

Digitalization acts as an accelerator of reconstruction. The introduction of digital technologies – from blockchain to artificial intelligence – allows you to automate management processes, ensure cost transparency, coordinate logistics, and create new markets. The Diia.City platform is an example of a state initiative that stimulates the development of the IT sector and innovative business even in times of war. In addition to the Diia.City state initiative, digital solutions for defense and the humanitarian sphere are rapidly developing in wartime. Among them are drone control systems, platforms for tracking humanitarian cargo, and digital mine hazard maps. These technologies demonstrate an example of «military innovations», which over time can become the basis for the development of new sectors of the civilian economy.

International cooperation and innovative diplomacy are essential for scaling up innovative solutions. As shown in Tarasashvili's (2024) study, effective post-conflict reconstruction requires coordinated interaction between local initiatives and international donors, as well as the creation of mechanisms for transparent management of aid and investments. In Graciana's work Share Castillo (Oxford) Academic, 2016) emphasizes that successful reconstruction depends on the right timing and sequence of reforms, as well as on the transition from donor dependence to attracting investment through the creation of «reconstruction zones». An important component of recovery is the integration of Ukrainian innovations into international programs, such as Horizon Europe, COSME, USAID-entrepreneurship support initiatives and EBRD grant mechanisms. Participation in these programs provides access to funding, new knowledge and partner networks. At the same time, international cooperation in the field of innovation diplomacy contributes to the promotion of Ukrainian technological projects on global markets and the formation of a positive image of the country as a technological hub of Eastern Europe.

Thus, innovative strategies in war and post-conflict situations are multidimensional. They encompass technological, social, institutional, and international aspects, and require a comprehensive approach that combines local initiatives with global practices.

Innovation strategies in war and post-conflict situations have the potential to become the basis for the formation of a new economic paradigm – flexible, inclusive and focused on long-term sustainability. Further research should

be directed towards the development of indicators of innovation security, modeling of regional ecosystems of smart specialization, as well as analyzing the effectiveness of social innovations in the context of recovery. Special attention should be paid to studying the mechanisms of integration of Ukrainian innovation projects into global ecosystems through innovation diplomacy and transnational partnerships.

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MARKETING COMMUNICATIONS AND ANALYTICAL TECHNOLOGIES FOR HIGHER EDUCATION RESILIENCE

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Annotation. *This study explores the integration of marketing communications and analytical technologies as essential tools for ensuring higher education resilience during wartime. The research presents a comprehensive framework for implementing digital marketing strategies and data-driven analytics in universities. Practical applications and strategic recommendations for online educational institutions are provided.*

Keywords: *marketing communications, analytical technologies, higher education resilience, digital marketing, university analytics.*

Анотація. *У дослідженні розглядається інтеграція маркетингових комунікацій та аналітичних технологій як ключових інструментів забезпечення стійкості вищої освіти в умовах війни. Представлено комплексну систему впровадження цифрових маркетингових стратегій та аналітики на основі даних в університетах. Надано практичне застосування та стратегічні рекомендації для онлайн-освітніх закладів.*