DOI: 10.58423/2786-6742/2025-11-126-152
UDC 332.1:711:330.3:334.06:316.4:159.9

Viktoriia MYKYTENKO
Dr. of Econ. Sciences, Professor,
Chief Research Fellow at the Department of Spatial Development and Quality of Life,
Mykhailo Ptukha Institute of Demography and Quality of Life Research, NAS of Ukraine,
Kyiv, Ukraine
ORCID ID: 0000-0002-8212-9777
e-mail: vmikitenko@ukr.net
(Corresponding author)

Dmytro MYKYTENKO
Dr. of Medical Sciences, Professor,
Professor of the Department of Physical Therapy,
Academician Yuriy Bugay International University of Science and Technology,
Mykytenko Mother and Child Genetic Center,
Kyiv, Ukraine
ORCID ID: 0000-0003-4277-4592

Nataliia SHELUDKO
Dr. of Econ. Sciences, Professor,
Chief Research Fellow of the Department of Socio-Economic Security,
Mykhailo Ptukha Institute of Demography and Quality of Life Research, NAS of Ukraine,
Kyiv, Ukraine
ORCID ID: 0000-0001-6936-3158

RECOVERY OF MONOFUNCTIONAL SYSTEMS: AN INTEGRATED MODEL OF SOCIO-ECONOMIC AND COGNITIVE RESILIENCE

Abstract. *The study was conducted in the context of the urgent need to ensure the recovery of socio-economic systems affected by polycrisis challenges, particularly those stemming from wartime transformations. Special attention is given to overcoming the syndrome of acquired helplessness and the associated cognitive deformations that emerge under prolonged crisis shocks and threaten both spatial and institutional resilience. The aim of this work is to develop an Integrated Model of Socio-Economic and Cognitive Resilience, which combines the concepts of war-induced monofunctionalization, institutional transformation, and reconstructive spatial development. The model is conceptual-analytical and methodologically prognostic, accounting for the polycrisis context by integrating cognitive, socio-ecological-economic, and demographic factors, and is designed to neutralize systemic barriers such as loss of diversification, institutional dysfunction, and criminogenic–corruption risks. The methodological foundation of the study is scenario modelling of war-induced monofunctionalization, within which a spatial-territorial typology of seven macro-regional zones was carried out. This approach allowed the identification of critical nodes of spatial recovery, the diagnosis of cognitive deformations in society, and the substantiation of opportunities for forming polycentric models of regeneration of monofunctional systems. The proposed model is*

structured into three blocks: economic diversification, cognitive regeneration, and strengthening institutional integrity, thereby enhancing the adaptability and resilience of the national economy under polycrisis and post-crisis conditions. Empirical testing (using the case of Ukraine) confirmed that the application of Integrated Model of Socio-Economic and Cognitive Resilience reduces tése negative effects of syndrome of acquired helplessness and Stockholm syndrome, lowers institutional vulnerability, and creates a foundation for reconstructive spatial development. The findings demonstrate that overcoming polycrisis determinants of war-induced monofunctionalization is possible only through a systemic approach that integrates demographic, social, ecological, cognitive, institutional, and economic instruments, making the proposed model universal for application in states undergoing wartime or post-war transformational conditions.

Keywords: *socio-economic and cognitive resilience; integrated resilience model; acquired helplessness syndrome; war-induced monofunctionalization; economic diversification; spatial recovery; polycrisis conditions; institutional integrity; scenario modeling; monofunctional systems.*

JEL Classification: A13, C52, E62, H56, I31, J11, O11, Q56, R13, R58

Absztrak. *A kutatás arra a sürgető társadalmi-gazdasági igényre reflektál, hogy biztosítani kell a polikrízisek, különösen a háborús átalakulások által érintett rendszerek helyreállítását. Kiemelt figyelmet kap a szerzett tehetetlenség szindrómájának és az ezzel összefüggő kognitív torzulásoknak a leküzdése, amelyek tartós krízishelyzetekben alakulnak ki, és veszélyeztetik a térbeli és intézményi ellenállóképességet. A munka célja egy integrált társadalmi-gazdasági és kognitív rezilienciamodell kidolgozása, amely egyesíti a háborús monofunkcionalizáció, az intézményi átalakulás és a rekonstruktív térfejlesztés koncepcióit. A modell koncepcionális-analitikus és módszertanilag prognosztikus jellegű, figyelembe veszi a polikrízis környezetét, és integrálja a kognitív, szocioökológiai-gazdasági és demográfiai tényezőket. Célja a rendszerszintű akadályok semlegesítése, amelyek a diverzifikáció elvesztéséhez, az intézményi diszfunkcióhoz, valamint a kriminalizációs és korrupciós kockázatok erősödéséhez vezetnek. A kutatás módszertani alapját a háborús monofunkcionalizáció szcenárióalapú modellezése képezi. Ennek keretében térbeli-területi tipológia készült hét makroregionális zónára vonatkozóan, amely lehetővé tette a térbeli regeneráció kritikus csomópontjainak azonosítását, a társadalom kognitív torzulásainak feltárását, valamint a monofunkcionális rendszerek policentrikus regenerációs modelljeinek megalapozását. A szerzői modell három blokkból áll: gazdasági diverzifikáció, kognitív regeneráció és az intézményi integritás erősítése, ami biztosítja a gazdasági rendszer alkalmazkodóképességének és stabilitásának növekedését többválságos és válság utáni körülmények között. Az eredmények asprobációja (Ukrajna példáján) azt mutatja, hogy az integrált társadalmi-gazdasági és kognitív stabilitási modell alkalmazása hozzájárul a megszerzett tehetetlenség szindróma és a stockholmi szindróma negatív hatásainak minimalizálásához, az intézmények sebezhetőségének csökkentéséhez és a rekonstruktív térbeli fejlődés alapjainak megteremtéséhez. Bebizonyosodott, hogy a háborús monofunkcionalizáció többszörös válságot okozó tényezőinek leküzdése csak olyan rendszeres megközelítéssel lehetséges, amely egyesíti a demográfiai, társadalmi, ökológiai, kognitív, intézményi és gazdasági eszközöket, ami a javasolt modellt univerzálissá teszi a háborús vagy háború utáni átalakulási folyamatban lévő államok számára.*

Kulcsszavak: *társadalmi-gazdasági és kognitív stabilitás; integrált stabilitási modell; szerzett tehetetlenség szindróma; katonai monofunkcionalizálás; gazdasági diverzifikáció; térbeli helyreállítás; többszörös válsághelyzet; intézményi integritás; forgatókönyv-modellezés; monofunkcionális rendszerek.*

Анотація. *Дослідження виконане у контексті нагальної потреби забезпечення відновлення соціально-економічних систем, що перебувають під впливом полікризових викликів, зокрема воєнних трансформацій. Особливу увагу зосереджено на подоланні синдрому набутої безпорадності та пов'язаних із ним когнітивних деформацій, що формуються в умовах*

тривалих кризових потрясінь і загрожують просторовій та інституційній стійкості. Метою роботи є розроблення інтегрованої моделі соціально-економічної та когнітивної стійкості, що поєднує концепти воєнної монофункціоналізації, інституційної трансформації та реконструктивного просторового розвитку. Модель є концептуально-аналітичною і методологічно-прогностично та враховує полікризовий контекст, інтегрує когнітивні, соціо-еколого-економічні та демографічні фактори і орієнтована на нейтралізацію системних бар'єрів, які зумовлюють втрату диверсифікації, інституційну дисфункцію та криміногенно-корупційні ризики. Методологічною основою дослідження – є сценарне моделювання воєнної монофункціоналізації, у межах якого здійснено просторово-територіальну типізацію семи макрорегіональних зон, що дозволило виокремити критичні вузли просторового відновлення, визначити когнітивні деформації соціуму та обґрунтувати можливості формування поліцентричних моделей регенерації монофункціональних систем. Авторська модель структурована у три блоки: економічна диверсифікація, когнітивна регенерація та посилення інституційної доброчесності, що забезпечує підвищення адаптивності та стійкості господарської системи у полікризових і посткризових умовах. Результати апробації (на прикладі України) засвідчили, що застосування інтегрованої моделі соціально-економічної та когнітивної стійкості сприяє мінімізації негативних ефектів синдрому набутої безпорадності та стокгольмського синдрому, зниженню вразливості інституцій та створенню підґрунтя для реконструктивного просторового розвитку. Доведено, що подолання полікризових детермінант воєнної монофункціоналізації можливе лише за умови системного підходу, який об'єднує демографічні, соціальні, екологічні, когнітивні, інституційні та економічні інструменти, що робить запропоновану модель універсальною для використання у державах, що перебувають у воєнних або поствоєнних трансформаційних умовах.

***Ключові слова**: соціально-економічна та когнітивна стійкість; інтегрована модель стійкості; синдром набутої безпорадності; воєнна монофункціоналізація; економічна диверсифікація; просторове відновлення; полікризові умови; інституційна цілісність; сценарне моделювання; монофункціональні системи.*

Introduction. The contemporary world is experiencing a polycrisis – a multilayered systemic crisis that simultaneously encompasses economic, social, ecological, and security challenges. Under such conditions, conventional political and managerial instruments lose their effectiveness, highlighting the urgent need for new integrated approaches to spatial as well as socio-ecological-economic development. International studies emphasize [1–2] that a key prerequisite for the recovery of *monofunctional systems* (MFS) is the recognition of the inherent interconnectedness of natural-resource, social, and economic processes that together shape a coherent system of interactions. This implies that any recovery strategies must account for the integral character of spatial, ecological, and cognitive-social determinants that define systemic resilience under polycrisis conditions. Accordingly, the guiding principle in this domain is the concept of resilience – the ability of systems to adapt and recover after crises. This corresponds with the logic of constructing integrated models based on multilevel risk analysis and systemic integration of the full spectrum of factors – from demographic and economic to cognitive and institutional. Resilience thus emerges at the intersection of economic, social, ecological, cognitive, and institutional dimensions, and requires scenario-based governance mechanisms.

The MFS, highly dependent on narrow specialization, demonstrate particular vulnerability, being prone to lock-in effects and the *syndrome of acquired helplessness*

(SAH), which deepens social imbalances and undermines adaptive capacity. An additional barrier is posed by corruption- and crime-related determinants, alongside psychological dependency phenomena (SAH and *Stockholm syndrome* – SS), which erode the effectiveness of public governance and amplify community vulnerability. These dynamics create risks not only for local communities but also for broader security and recovery processes under conditions of *war-induced monofunctionalization* (WIMF).

The proposed approach integrates scenario-based transformation mechanisms, considers the influence of demographic, social, economic, ecological, institutional, psychological, and criminogenic–corruption factors, and is oriented towards ensuring the recoverability of MFS. The study seeks to advance scholarly understanding of the resilience phenomenon in a globalized world and to identify practical algorithms for overcoming WIMF and building long-term resilience and competitiveness of economies in polycrisis environments.

Literature review. The problem of the SAH in socio-economic systems has been examined by both foreign and domestic scholars, primarily in the context of the psychological consequences of traumatic events, protracted crises, and socio-ecological-economic maladaptation [3–6]. Recent works have focused on the impact of armed conflicts, forced migration, and economic instability on the widespread manifestations of SAH and the decline in quality of life in post-conflict societies [7–9]. Research on WIMF of territories has mainly addressed the transformation of economic structures, the degradation of social ties, and the loss of human potential [10–11]. Ukrainian scholars emphasize the urgent need for an integrated approach to spatial recovery and the application of scenario modeling that combines socio-ecological-economic and spatial dimensions [12–14]. At the international level, there is growing interest in cognitive-rehabilitation models aimed at overcoming traumatic experiences and enhancing community adaptive capacity [15–17]. However, existing studies remain fragmented and have not produced a comprehensive integrated model of resilience to WIMF at the scale of a nation-state. An additional challenge to resilience is posed by institutional and corruption-related factors, which are extensively documented in investigative journalism and analytical reports. Sources [18–23, 27] highlight systemic abuses in defense procurement, including inflated prices for food supplies, failed arms contracts, and corruption scandals that undermine institutional efficiency and public trust. At the same time, materials [24–25] demonstrate entrenched corruption in the judicial system, creating structural risks for the rule of law and weakening the institutional foundations of recovery. Finally, [26, 28] emphasize the role of media and civil society as key drivers of democratic resilience, while also underlining their vulnerability to political and economic pressures. Taken together, these sources identify critical groups of risks (defense procurement scandals, judicial corruption, and the fragility of independent media) that must be integrated into resilience models as essential institutional determinants.

The academic discourse has also substantiated the relevance of integrated models of sustainable development, including the concept of "*Sustainalism*" [29], which

harmonizes social, economic, and environmental dimensions. Nevertheless, the integrated model of socio-economic and cognitive resilience presented in this article expands the research field by emphasizing cognitive resilience, addressing SAH, and incorporating institutional–corruption risks, making it more relevant for WIMF conditions and post-war reconstruction.

Identification of Previously Unresolved Aspects of the General Problem. The lack of integrated approaches capable of combining economic, social, institutional, and cognitive dimensions prevents the formation of coherent mechanisms for the spatial recovery of monofunctional systems under polycrisis conditions. Although individual studies have highlighted important aspects of socio-economic regeneration, cognitive determinants shaped by war-induced monofunctionalization, the rise of criminogenic–corruption risks, and the accumulation of syndrome of acquired helplessness remain insufficiently explored.

Materials and Methods. This study is based on an interdisciplinary synthesis of the principles of cognitive economics, institutional resilience theory, the resilience concept, and models of social rehabilitation under WIMF in polycrisis environments. The integrated approach enabled the construction of a unified analytical framework that reflects the interaction of demographic, socio-ecological-economic, cognitive-behavioral, institutional, and criminogenic–corruption factors. The empirical base of the study included statistical data (State Statistics Service of Ukraine, Ministry of Social Policy of Ukraine, World Bank, Eurostat, OECD); strategic documents and national recovery programs; and empirical materials (expert assessments, content analysis). The analysis was carried out using aggregated composite indicators that reflect socio-ecological-economic dynamics, demographic changes, institutional and cognitive resilience, WIMF parameters, and trajectories of spatial recovery of multifunctionality. The analytical strategy was operationalized through methods grouped by functional purpose: Structural-functional analysis – to identify the features of WIMF and assess its impact on socio-economic dynamics; Scenario modeling – to construct hybrid scenarios of spatial transformation and MFS recovery, and to evaluate alternative development trajectories under multifunctionalization; Criteria–parametric approach – to measure the level of socio-economic and cognitive resilience of MFS using integrated indices; Comparative–statistical analysis – for cross-national comparisons and empirical verification of results. Reliability was ensured through a combined verification system: quantitative methods (index analysis, composite evaluations, normalization of indicators, multivariate statistics) and qualitative methods (expert assessments, content analysis of strategic documents).

Aim and tasks. The purpose of this article is to substantiate and develop an integrated model of socio-economic and cognitive resilience capable of overcoming the effects of war-induced monofunctionalization and the syndrome of acquired helplessness, ensuring multidimensional diversification of spatial development, and strengthening institutional trust. The specific objectives are to: Identify the key destructive determinants; Classify macro-regional zones; Construct scenario-based mechanisms of transformation; Define instruments of cognitive regeneration and

institutional integrity aimed at fostering the long-term resilience of the state.

Results. The contemporary global environment operates in a polycrisis regime, where economic, social, ecological, and security factors interact and reinforce each other, generating a unique field of systemic risks and threats. Studies conducted by international organizations (OECD, UNDP, World Bank, UN DESA) confirm that in countries affected by armed conflicts or large-scale crises, recovery processes are particularly vulnerable to the loss of diversification, the erosion of institutional trust, the spread of corrupt practices, and the emergence of cognitive distortions within society. In this context, the case of Ukraine deserves special attention. Large-scale military operations have triggered a profound structural crisis, combining the destruction of economic infrastructure, the systemic weakening of governance mechanisms, and the escalation of socio-psychological risks. According to the United Nations Development Programme (UNDP) and the World Bank [30, 31], direct losses from attacks on the energy sector alone exceeded USD 10 billion, while electricity production dropped by more than 63.0% following repeated strikes on critical infrastructure. Evidence from psychological research (Frontiers in Psychology and others) [32–36] highlights the rapid deterioration of the population's mental health, as constant shelling, property destruction, forced displacement, violence, and rising crime substantially increase stress and anxiety levels.

A defining challenge of the wartime period has become the phenomenon of total WIMF of the socio-economic space [37, 38], manifested in the narrowing of regional system functions (particularly within *macro-regional zones* – MRZs [14]), the loss of diversification in socio-economic relations, and the shrinking prospects for *reconstructive spatial development* (RSD). These processes undermine the foundations of spatial recovery and generate additional systemic risks for national resilience. Previous research [1–17; 29] has laid an important theoretical foundation but has not fully accounted for the complex interplay of destructive factors shaping a country's development trajectory during war. Among these factors are: demographic (depopulation, forced migration, loss of labor potential); social (growing inequality, declining quality of life, weakening solidarity); economic (deindustrialization, disruption of production chains); ecological (technogenic and war-related environmental risks); psychological (spread of the SAH, rising stress disorders); institutional (governance dysfunctions, low institutional efficiency); and criminogenic-corruption-related (marginalization of social relations, corruption, rising organized crime). Collectively, these challenges complicate the implementation of recovery and reconstruction strategies, erode public trust in state institutions, and heighten the risks of social fragmentation. In this context, there emerges an urgent need for the development of an *Integrated Model of Socio-Economic and Cognitive Resilience* (IMSECR), designed to: overcome SAH as a systemic barrier; restore the multidimensional functionality of the socio-ecological-economic space; combine mechanisms of socio-economic stabilization with instruments of cognitive regeneration of society; incorporate the full spectrum of destructive determinants that constrain the recovery of MFS.

Considering the interdisciplinary methodological novelty of the study, which is grounded in a comprehensive approach that incorporates multidimensional structural, social, and cognitive factors forming the basis of a new architecture for recovery in wartime and post-war periods, an algorithm for constructing IMSECR is proposed. The sequence of its steps within the dimension of ensuring socio-economic recovery and cognitive regeneration under the conditions of *Hybrid Military Factors* is presented in Table 1.

Table 1.

Algorithm of Research and Construction of the Integrated Model IMSECR

Stage	Title of Stage	Content and Sub-Steps	Expected Result
1st	Identification and classification of destructive determinants.	Collection of statistical and expert data. Identification of determinant groups (demographic, socio-ecological-economic, psychological, institutional, criminogenic-corruption) and systemic matrix of their interrelations.	Creation of a map of destructive determinants that reveals the multidimensio-nality of challenges.
2nd	Analysis of manifestations of WIMF.	Research on the reduction of socio-economic systems to “one-dimensionality”. Identification of spheres where poly-functionality is lost (labor market, production, social sphere, human potential, quality of life). Identifi-cation of risks linked to limited resource availability.	Identification of structural disproportions that determine crisis manifestations and systemic degradation.
3rd	Diagnosis of SAH.	Analysis of cognitive conditions in society: identification of signs of social apathy, lack of motivation for change, loss of trust, and deformation of public relations. Meas-urement of psychological resilience of the population.	Establishment of key SAH indicators and their role in halting recovery processes and lowering quality of life.
4th	Formulation of conceptual foundations of IMSECR.	Generalization of scientific approaches to resilience and recovery. Identification of principles for combining socio-economic and cognitive components. Development of the conceptual framework of IMSECR.	Formation of the theoretical and conceptual basis of IMSECR.
5th	Institutional and organizational support.	Assessment of competencies of government and public institutions. Mechanisms for combating criminogenic and corrupt practices. Reforming management systems.	Formation and structuring of institutional mechanisms for model implementation.
6th	Algorithm of implementation in spatial reconstruction.	Determination of the sequence of IMSECR implementa-tion at national, regional and local levels. Development of adaptive hybrid scenarios for macro-regional zones. Formation of a system of RSD measures.	Practical roadmap for introducing IMSECR into spatial recovery and RSD.
7th	Verification of applied effectiveness.	Testing in selected territorial units. Assessment of empi-rical outcomes of socio-economic and cognitive resilien-ce. Refinement of methodological, readiness for scaling.	Confirmation of IMSECR effectiveness and readiness for broad implementation.

** here and hereinafter – defined, substantiated, formulated and systematized by the authors.*

Prior to the representation of the IMSECR formation algorithm, it is reasonable to outline the fundamental provisions of the authors conceptual framework that ensure its theoretical and methodological substantiation. Namely:

- Multidimensional functionality of the socio-ecological-economic space – as a key to overcoming the adverse consequences of HMF and creating the prerequisites for diversified recovery and innovative modernization of the economy. In this context, multidimensionality is interpreted as the interaction of social, ecological, economic, and institutional dimensions forming an integrated development space. It presupposes: reducing dependence on narrowly specialized structures and energy resources; combining social rehabilitation, ecological regeneration, and economic modernization; introducing innovative mechanisms for the establishment of new production, educational, and cognitive clusters; strengthening institutional and cognitive resilience as the foundation of trust and effective governance;

- Cognitive resilience, as a new concept of regenerating the socio-ecological-economic space and overcoming the SAH, constitutes an integral characteristic of actors (individuals, communities, institutions), reflecting their ability to preserve and restore functional activity in poly- and post-crisis conditions. It is ensured through a combination of: cognitive-behavioral resources (knowledge, skills, critical thinking); socio-communicative mechanisms (collective memory, informational interaction, trust); institutional guarantees (legal certainty, transparency of public governance).

The integration of these two concepts provides the foundation for the formation of IMSECR, which makes it possible to perceive WIMF not only as a threat but also as an impetus for innovative transformation, spatial recovery, and diversification of the RSD of a state entity.

The proposed algorithm outlines the logic of constructing IMSECR, which integrates the diagnosis of destructive determinants, the analysis of manifestations of WIMF, and the SAH. In this way, the foundations are laid for the conceptualization of the multidimensional functionality of the socio-ecological-economic space, oriented toward diversification of recovery and strengthening of the adaptive potential of society. At the same time, the algorithm envisages the integration of results into applied mechanisms of RSD, combining social rehabilitation, ecological regeneration, and economic modernization. Accordingly, it enables not only the restoration of territorial polyfunctionality but also the establishment of cognitive and institutional resilience, aimed at enhancing trust in state institutions and forming new scenarios for innovative development. The tabular format represents the sequential algorithm of IMSECR construction and verification, oriented toward the conditions of WIMF triggered by polycrisis dynamics.

Each stage contains substantive sub-steps and expected results that ensure an iterative transition from the diagnosis of destructive determinants to the approbation of IMSECR (including at the regional level). Such logic corresponds to the approach of iterative research design, in which the results of preceding phases constitute the input data for subsequent ones, while the final approbation (Stage 7) generates feedback loops for the adjustment of indicators and governance decisions. In this way, the algorithm combines scientific verification and effective implementation, oriented toward renewing policy formats and creating a methodological architecture for the transition from reactive measures to a systemic policy of socio-ecological-economic

spatial recovery.

In the initial phase (Stage 1), statistical and expert data are collected and systematized in order to identify the key groups of determinants deforming the socio-ecological-economic space during wartime and post-war periods. Demographic, social, economic, ecological, psychological, institutional, and criminogenic-corruption determinants are distinguished, followed by the formation of multidimensional risk mapping with the determination of impact weights. The expected outcome is a determinants map (matrix), serving as the basis for scenario modeling and further parametrization of resilience mechanisms (Table 2). Expert-defined weight coefficients demonstrate that the highest values belong to economic (0.22) and demographic (0.18) factors, which directly determine the prospects for restoring polyfunctionality.

Table 2.

Matrix of Determinants' Impact Weights on the Restoration of Polyfunctionality

Group of Determinants	Coefficient (0–1.0)	Main Vector of Destructive Impact	Key Interrelations
Demographic	0.18	Decline in labor potential; dep-opulation; destruction of hum-an capital; migration losses.	Strong interrelation with social (aging, youth outf-low), economic (labor shortage), and psychological (population traumatization) determinants.
Social	0.15	Destruction of social instituti-ons; rising inequality; decline in quality of life; loss of trust.	Intersects with demographic (aging, depopulation), economic (degradation of social capital), and institu-tional (erosion of social mechanisms) determinants.
Economic	0.22	Destruction of infrastructure; production decline; rising unemployment.	The most integrated block: affects demographic (migration), social (living standards), institutional (tax potential, fiscal capacity), and criminogenic (shadow economy) determinants.
Ecological	0.10	Technogenic risks; mined territories; large-scale pollution; land degradation.	Interrelated with economic (declining agro-productivity), social (reduction in quality of life), demographic (out-migration), and ecological (ecosystem degradation) determinants.
Psychological	0.12	Mass traumatization; spre-ad of SAH; loss of motiva-tion for development.	Closely intersects with social (destruction of trust), demographic (decline in birth rates), and economic (reduction of labor productivity) determinants.
Institutional	0.13	Weakening of state gover-nance; low systemic policy capacity; legal uncertainty.	Strongly interrelated with economic (declining investment), social (weak social resilience), and criminogenic (corruption) determinants.
Criminogenic-Corruption	0.10	Shadow economy; corruption in defense and public sectors; criminalization of society.	Strongly interrelated with institutional (weak control), economic (loss of public resources), and social (erosion of trust) determinants.

** defined, justified, calculated and systematized by the authors.*

The resulting structure reveals network effects and hybrid risks, as well as the simultaneous layering of military, social, economic, psychological, institutional, and ecological threats.

At Stage 2, an assessment of WIMF within regional systems (*macro-regional zones* – MRZ) is carried out, which manifests in reduced production diversification, the disruption of value-added chains, and an increased dependence on external aid flows. To verify this process, indicators of spatial specialization are applied, enabling the quantitative measurement of the level of functional narrowing (i.e., WIMF) in the MRZ. The expected outcome is the identification of structural disproportions and zones of systemic risk that determine managerial priorities in the processes of spatial recovery of MFS. A generalized interpretation of Stage 2 – is presented in tabular form (Table 3) as an analysis of WIMF, where the manifestations, risks, threats, challenges, and corresponding indicators relevant for assessing the vulnerability of the seven MRZ of Ukraine are specified [14]. Within each MRZ, WIMF – is manifested in the narrowing of the economic functional base to one or two dominant functions (agricultural, industrial, logistical, defense-related, etc.), which in turn produces structural disproportions such as loss of diversification and heightened dependence on external flows and financing. The application of spatial specialization indicators makes it possible to quantitatively identify such imbalances as zones of systemic risk, which are directly relevant for the formulation of RSD strategies and the restoration of polyfunctionality.

Table 3.

Manifestations of WIMF in the Macro-Regional Zones of Ukraine

№ MRZ/ MRZ	Basic Manifestations of WIMF	Typical Risks for Spatial Recovery	Recommended Indicators for MRZ Assessment
1. Zone of Strategic-Mobilization Recovery.	Orientation toward the defense-industrial comp-lex; military logistics; repair of equipment.	Dependence on military orders; preservation of mono-orienta-tion; ignoring diversification; decline of the local market.	Herfindahl–Hirschman Index (sectoral concentration); employment rate in the defense-industrial complex.
2. Transit-Coordinating Zone of Spatial Development.	Over-specialization in transport-logistics functions; weak role of industrial development.	Vulnerability to blockades; disr-uption of supply chains and logi-stics networks; low sustainabi-lity of the local production base.	Localization coefficient of transport/warehousing; share of transport services in *gross regional product* (GRP).
3. Eastern Zone of Controlled Decompression.	Reduction of the resource-extractive economy due to wartime mobilization.	Destruction of industrial and hu-man assets; rising unemployme-nt; dependence on internat. aid.	Index of sectoral specialization; employment balance in industry/services.
4. Southern Zone of Controlled Decompression.	Orientation toward agro-export activities; limited development of high technologies.	Risks of port blockades; destruction of agro-industrial capacity; real ecological threats.	Export-dependence coefficient; share of agriculture in GRP; rural employment rate.
5. Western Zone of Economic Reorientation and	Focus on service functions (logistics, business relocation,	Predominance of infrastructure; risk of industrial stagnation;	Import/export ratio; share of small businesses in GRP.

№ MRZ/ MRZ	Basic Manifestations of WIMF	Typical Risks for Spatial Recovery	Recommended Indicators for MRZ Assessment
Compression.	trade); partial deindustrialization.	"transit economy".	
6. Central Zone of Infrastructure Modernization and Development.	Dominance of construction projects and building sector.	Risk of "construction economy"; low diversification; dependence on infrastructure financing.	Concentration index of construction companies; share of infrastructure investments in GRP.
7. South-Eastern In-dustrial Rhomb: Zaporizhzhia, Dnipro, Kryvyi Rih, Kremenchuk.	Hyper-specialization in heavy industry (metallurgy, mechanical engineering, energy, iron ore mining).	Vulnerability to destruction; degradation of productive assets; decline in technological renewal; weakening of cluster structures.	Herfindahl–Hirschman Index (sectoral concentration in metallurgy and mining); share of ferrous metal exports.

** defined, substantiated and systematized by the authors, taking into account the previous development [14].*

Stage 3 – focuses on cognitive-behavioral and social consequences, among which are: the decline of civic activity, distrust in institutions, the spread of apathy, and the SAH. To operationalize "cognitive resilience", combined methods are applied: sociological surveys, indices of trust and civic participation, welfare indicators, and expert panels. The expected result – is a set of indicators that links cognitive deformations with the dynamics and quality of spatial recovery. A generalized interpretation (Table 4) – presents indicators for diagnosing SAH in MRZ, which should be employed for statistical, sociological, and expert monitoring.

The key aspects of their interpretation are as follows: cognitive-behavioral indicators – reflect the internal state of citizens (levels of trust, expectations, anxiety, inclination toward apathy); social indicators – characterize external activity (participation in civic initiatives, electoral processes, practices of self-organization and integration). The basic sources of data include a combination of official statistics (State Statistics Service, Ministry of Social Policy, Ministry of Health), sociological surveys (KIIS, Rating, Info Sapiens), and international research panels (UNDP, USAID, UNICEF). Ultimately, these indicators made it possible to operationalize the very concept of "cognitive resilience" and to identify those MRZ where SAH poses a threat to spatial recovery.

Table 4.

Set of Indicators for Diagnosing SAH in MRZ of Ukraine (2024–2025)

MRZ №	Cognitive-Behavioral Indicators	Social Indicators	Potential Data Sources
1	Trust index toward defense institutions; level of mobilization readiness of the population.	Share of citizens engaged in volunteer and veterans' initiatives.	Sociological surveys; Ministry of Defense; veterans' associations.
2	Indices of cognitive resilience (optimism, expectations for recovery, civic activity).	Level of participation in local elections/public hearings; civic engagement index.	Central Election Commis-sion; local councils; sociological surveys.
3	Level of apathy/alienation	Share of migrant workers; number	Sociological surveys;

MRZ №	Cognitive-Behavioral Indicators	Social Indicators	Potential Data Sources
	(subjective well-being scales); trust index in local authorities.	of self-organization initiatives.	Ministry of Social Policy.
4	Index of perceived safety; level of psychological anxiety (PTSD- surveys).	Share of the population involved in recovery/ rehabilitation programs; local social capital initiatives.	Ministry of Health; local NGOs; sociological surveys.
5	Trust indices in local and central authorities; subjective life satisfaction.	Share of internally displaced persons (IDPs) participating in civic initiatives; level of community involvement.	Sociological surveys; Ministry of Reintegration.
6	Indices of economic expectations for recovery; civic participation index.	Share of population employed in reconstruction projects; trust index toward local authorities.	Sociological surveys; State Statistics Service; USAID; UNDP panels.
7	Indices of demoralization (loss of professional motivation); hopes for industrial recovery.	Share of youth that emigrated/plans to emigrate; index of professional activity.	Sociological surveys; youth organizations; international monitoring panels.

** defined, substantiated, identified and systematized by the authors.*

The presented set of indicators allows for an objective diagnosis of the state of socio-economic, cognitive, and institutional resilience in the MRZ of Ukraine in 2024–2025. For a comprehensive analytical interpretation, cross-national comparisons are essential (Fig. 1), as they allow the obtained indicators to be contrasted with the corresponding characteristics of leading EU countries. This ensures: the verification of empirical results (since the international dimension serves as a kind of control marker); the deepening of conclusions, as it reveals gaps and areas of potential convergence in development trajectories; and the enhancement of the practical significance of the analysis, as it provides benchmarks for adapting best practices in the processes of recovery and transformation of the national system. In this regard, Fig. 1 presents the comparative resilience indices of Ukraine and five EU countries, which makes it possible to integrate the internal and international perspectives of the study.

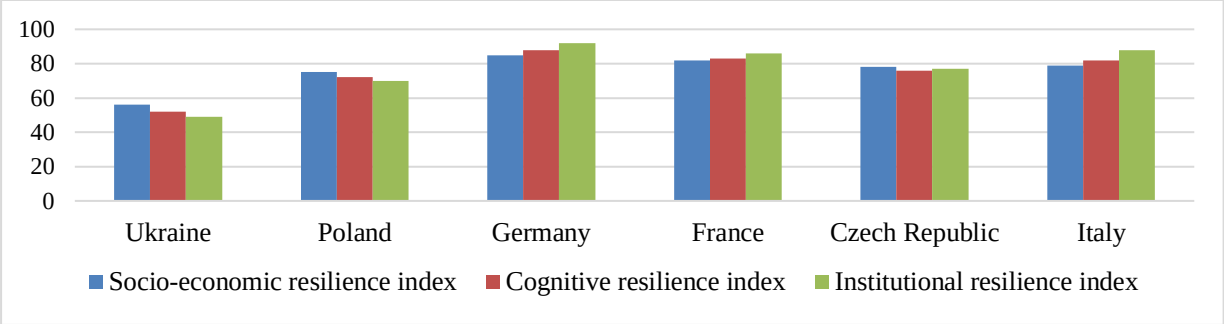

Fig. 1. Cross-national comparison of resilience indices of Ukraine and individual EU member states, 2024–2025 *(based on [39-44])*

For the comparison of countries' resilience indices, a comparative-statistical analysis is applied, based on the use of a system of integral resilience indices: socio-

economic, cognitive, and institutional. For each of these, primary statistical data were normalized on a scale from "0" to "100" points, followed by weighted averaging. The cross-national comparison for six countries (Ukraine, Poland, Germany, France, Czech Republic, and Italy) was conducted according to the following groups of indicators: socio-economic (GDP per capita, employment rate, inequality index, poverty level); cognitive (share of the population with higher education, innovation activity, digital literacy); institutional (rule of law index, trust in institutions, governance quality index). The comparative data show that the levels of socio-economic, cognitive, and institutional resilience in Ukraine are lower than in EU countries. The highest indicators are demonstrated by Germany and France (all indices exceeding 80–90 points). Poland and the Czech Republic occupy intermediate positions, while Ukraine lags behind in all indicators, particularly in institutional resilience, which underscores the critical need to strengthen the socio-economic, cognitive, and institutional foundations under polycrisis conditions. The obtained cross-national comparisons confirm that the resilience of state entities in polycrisis and post-crisis conditions is determined not only by military-mobilization resources but also by the level of socio-economic, cognitive, and institutional regeneration, which ensure the implementation of models, such as IMSECR.

As shown in Figure 2, most countries (Poland, Germany, Italy, Czech Republic, France) are characterized by a relatively balanced risk profile, whereas Ukraine demonstrates peak negative values for cognitive and institutional-corruption determinants.

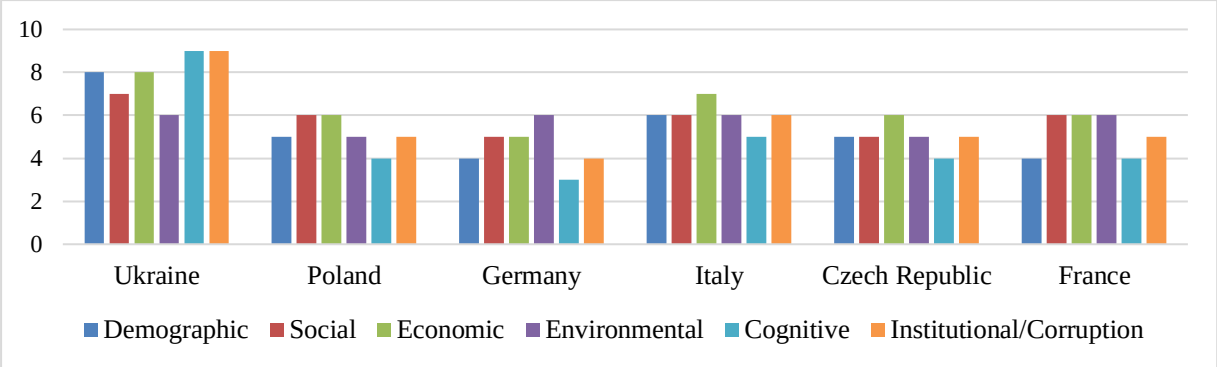

Fig. 2. Fig. 2. Identification of risks from an international perspective to highlight the distinctiveness of challenges faced by Ukraine *(based on [39-44])*

This confirms that the cognitive sphere and problems of institutional trust are the key barriers to spatial recovery and proves the necessity of implementing models such as IMSECR, oriented toward achieving socio-economic and cognitive resilience. The risk analysis highlights structural differences in the challenges faced by the studied group of countries: for the majority, the profile of demographic, social, economic, ecological, cognitive, and institutional risks remains relatively balanced; for Ukraine in 2024–2025, elevated values are observed in the domains of cognitive resilience and institutional-corruption threats. This determines increased vulnerability of both societal and governance systems. The results emphasize the appropriateness of

focusing on the cognitive and institutional dimensions in spatial recovery strategies and demonstrate the importance of integrating these determinants into comprehensive recovery models at the state level.

Stage 4. It envisages the development and substantiation of principles for combining and aligning socio-economic stabilization mechanisms with instruments of cognitive regeneration. On this basis, the conceptual framework of IMSECR is formed, incorporating three complementary blocks: a) socio-economic stabilization (diversification of the economic base, support for *small and medium-sized enterprises* (SME), development of local labor markets, infrastructural interventions); b) cognitive recovery (psychosocial support, educational and cultural practices, strengthening of social cohesion); c) horizontal mechanisms of good governance (transparency, accountability, digitalization of processes, anti-corruption instruments). The result – is a theoretical and methodological scheme (Table 5) that defines a coordinated logic of managerial actions and expected transformations. The presented compact scheme of IMSECR structures recovery processes within three complementary blocks that ensure a balance between economic, cognitive, and institutional factors. Thus, the socio-economic stabilization block – focuses on diversifying the economic base, supporting SME, developing local labor markets, and implementing infrastructural interventions. These measures create the foundation for economic resilience and the capacity of communities to withstand challenges associated with wartime transformations. The cognitive recovery block – is aimed at overcoming the consequences of psychological, cognitive, and social deformations caused by polycrisis. It encompasses psychosocial support for the population, the development of educational and cultural practices, and the strengthening of social cohesion.

Table 5.

Compact Format of the Triad of the Theoretical-Methodological Scheme of IMSECR

Blocks	Key Directions	Expected Effect
Socio-economic stabilization	Diversification of the economy; support for SMEs; development of local labor markets; infrastructural interventions.	Balanced economic structure; resilient labor markets.
Cognitive recovery	Psychosocial and medical support; educational and cultural practices; social cohesion.	Growth of cognitive resilience and societal trust.
Good governance	Transparency; accountability; digitalization; anti-corruption mechanisms.	Effective governance and restoration of trust in institutions.

** defined, substantiated, identified and systematized by the authors.*

Their consideration and implementation contribute to the formation of societal cognitive resilience, the enhancement of trust, and the reduction of social apathy, which directly affect the pace and quality of RSD. As for the horizontal mechanisms of good governance, they play a crucial role as the integrative framework for the two aforementioned blocks. Transparency, accountability, digitalization of managerial processes, and anti-corruption measures constitute systemic conditions that guarantee the effectiveness of socio-economic and cognitive interventions. Taken together, these

blocks form – a comprehensive theoretical and methodological model that provides a coherent logic of actions for post-war recovery and the strengthening of resilience in the MRZ of Ukraine.

Accordingly, the theoretical and methodological scheme of IMSECR is presented, combining socio-economic, cognitive, and institutional interventions into a single framework that ensures the systemic nature of managerial actions, their complementarity, and their alignment with the needs of post-war reconstruction. It will serve as a methodological tool for determining strategic priorities and practical steps in strengthening state resilience.

Stage 5. This stage is devoted to assessing the capacity of government authorities and communities to implement IMSECR, determining the roles of stakeholders, and setting up mechanisms of interaction in the "state–business–community" format. Particular emphasis is placed on instruments to counter criminogenic-corruption practices (compliance procedures), as these constitute a critical barrier to spatial recovery. The expected outcome – is an institutional support roadmap for each MRZ (Table 6) (regulatory decisions, managerial protocols, coordination and monitoring channels), which makes it possible to evaluate the nature of strategy, institutional mechanisms, and effects. Table 6 – demonstrates the differentiation of the seven MRZ by their functional-strategic role in RSD, in the restoration of polyfunctionality, and in the transformation of the economic system. Each zone has its own set of priorities (combining infrastructural, industrial, logistical, and socio-economic components along with specific institutional decisions) for shaping the logic of spatial recovery policy, taking into account both local needs and national challenges. An important component – is the use of coordination protocols, monitoring mechanisms, and digital management tools, which enhance trust in institutions and the effectiveness of international assistance.

Table 6.

Seven Functional-Strategic MRZ and Directions of Institutional Support

MRZ №	Main Priorities	Decisions and Protocols	Transparency Mechanisms	Expected Results
1	Defense-industrial comp-lex, critical infrastruct-ure, military logistics.	Mobilization regulations; priority restoration of defense facilities.	Military-civil audit; e-monitoring of resources.	Strengthening defense capacity and stabilization of frontline communities.
2	Transport corridors; logistics hubs; integration into EU routes.	Cross-border coordination protocols; development of nodes (railways, highways, ports).	Digital registries of flows; institutional cooperation with the EU.	Restoration of exports; consolidation of Ukraine as a transit state.
3	Industrial recovery; community reintegration.	Industrial parks; social adaptation regulations.	International reconstru-ction audit; financial control mechanisms.	Safe living conditions; step-by-step industrial recovery.
4	Ports; maritime infrastructure; agro-industrial complex;	Maritime strategies; agro-clusters; energy security programs.	E-register of cargo; anti-corruption compliance in	Export restart; recovery of the agro-industrial complex.

MRZ №	Main Priorities	Decisions and Protocols	Transparency Mechanisms	Expected Results
	energy security.		logistics chains.	
5	European integration; innovation clusters; creative economy; high technologies.	Cross-border transport corridors; regulatory frameworks; technology parks.	International financial audits; monitoring mechanisms.	Development of high-tech sectors; growth of innovation exports.
6	Transport; infrastructure reconstruction; local markets; SMEs.	Reconstruction programs; regulatory frameworks for SME support.	Digital cadastral registries; investment monitoring.	Investment attractiveness; balanced RSD.
7	Industrial production; metallurgy; machinery; innovative industries.	Industrial development programs; modernization and innovation investment projects.	International audit of industrial investments; anti-corruption monitoring.	Formation of the industrial core; structural moderniza-tion; job creation and export growth

** defined, substantiated, formulated and systematized by the authors.*

The focus is placed on mobilization capacity, transit potential, infrastructure modernization, industrial recovery, and the development of innovation clusters, thereby forming a multi-vector system of support in which each MRZ serves as a bearer of specific competences and a driver of structural change. The expected results encompass strengthening defense capacity and reintegration of territories, the formation of an industrial core, and the development of high-technology sectors. The integrative approach – underscores the interconnectedness of RSD vectors, shaping the architectonics of a hybrid scenario for restoring polyfunctionality. The scheme provides – a basis for scenario-forecast models that incorporate the specificities of MRZ, the scale of destruction, strategic potential, and the international context.

Ultimately, the system of seven functional-strategic zones outlines a coordinated architecture of support that combines defense and socio-economic priorities, serving as an integrative platform for national and regional interaction.

Stage 6. A sequence of practical steps for implementing IMSECR at the macro-regional and local levels is developed (Table 7): from diagnosing challenges and prioritizing interventions to piloting instruments, scaling them up, and ensuring continuous monitoring. Alongside this, scenarios are defined for different types of MRZ (reconstructive, stabilizational, restorative, rehabilitative, innovation-expansive [38]), as well as a system of criterial indicators for evaluating effectiveness, - with clearly established baseline values and target benchmarks.

Table 7.

Algorithm of IMSECR Implementation in Spatial Reconstruction (by Seven MRZ)

MRZ №	Sequence of Implementation Steps	Scenario Format	System of Effectiveness Criteria
1	1) Diagnosis of challenges in the defense-industrial comp-lex; 2) Formation of priorities for the restoration of produ-ction chains; 3) Piloting dual-	Reconstruc-tive	Indicators: share of restored def-ense enterprises; level of diver-sification of production

MRZ №	Sequence of Implementation Steps	Scenario Format	System of Effectiveness Criteria
	use projects; 4) Scaling mob-ilization solutions; 5) Monitoring and audit of results.		chains; Defense Resilience Index.
2	1) Assessment of transport-logistics nodes; 2) Prioriti-zation of supply corridors; 3) Introduction of digital flow management platforms; 4) Scaling of cross-border initiatives; 5) Regulatory monitoring of transport capacity.	Stabiliza-tional	Indicators: volume of transit; speed of logistics operations; efficiency index of transport logistics.
3	1) Diagnosis of humanitarian, medico-social, and security challenges; 2) Identification of priority recovery points (sites/facilities); 3) Piloting programs of de-occupation and reintegration; 4) Scaling of instruments of social stabilization; 5) Continuous monitoring of security risks.	Restora-tive	Indicators: level of territorial reintegration; Humanitarian Security Index; share of restored social infrastructure.
4	1) Diagnosis of risks to maritime security and agro-econo-my; 2) Prioritization of critical infrastructure; 3) Piloting agro-innovation and port projects; 4) Scaling maritime and agro-clusters; 5) Monitoring of external trade flows.	Restora-tive	Indicators: cargo turnover; Food Security Index; share of agricultural exports.
5	1) Assessment of investment potential; 2) Formation of priorities for innovation clusters; 3) Piloting high-tech and “green-tech” projects; 4) Scaling eco-strategy clusters; 5) Systemic monitoring of competitiveness.	Innovation-expansive	Indicators: volume of attracted investments; number of innova-tive enterprises; competitiveness index of regional clusters.
6	1) Diagnosis of the condition of transport and energy networks; 2) Identification of modernization priorities; 3) Piloting infrastructure upgrading programs; 4) Scaling smart infrastructure solutions; 5) Monitoring of institutional capacity and public health indicators.	Reconstruc-tive	Indicators: volume of infrastructure renewal; Transport Accessibility Index; Energy Security Index.
7	1) Diagnosis of industrial degradation; 2) Prioritization of industrial modernization projects; 3) Piloting “green” indu-stry programs; 4) Scaling industrial clusters; 5) Monitoring of employment, mobility, and socio-economic renewal.	Rehabilita-tive	Indicators: share of “green” industry; volume of industrial production; Employment Index; export share of industrial sectors.

** defined, substantiated, formulated and systematized by the authors.*

The expected outcome is an applied “roadmap” for spatial recovery, RSD, and regeneration of polyfunctionality for each MRZ. The algorithm of IMSECR implementation in the spatial reconstruction of the MRZ – reflects the logic of adapting different territorial formats to post-war recovery conditions. For each zone, a step-by-step sequence is identified (from diagnostics to the scaling of solutions, monitoring), which ensures the systemic nature and transparency of managerial actions. This logic makes it possible to address the specific challenges of each zone by integrating security, socio-economic, and infrastructural dimensions.

Specifically, in the zones of strategic mobilization and infrastructure modernization, - the focus is on reconstructive scenarios aimed at restoring defense

capacities and modernizing transport and energy networks. Meanwhile, the transit-coordinating zone – functions in a stabilizational format, where the key task is to ensure the efficiency of logistics and cross-border flows. The Eastern and Southern zones of controlled decompression – follow a restorative scenario, where the main task is to integrate security, humanitarian, medico-social, and agro-economic priorities. The Western zone of economic – stimulation develops an innovation-expansive trajectory, oriented toward attracting investments, creating clusters, and supporting high-tech and "green-tech" projects. The South-Eastern industrial rhomb – applies a rehabilitative scenario aimed at overcoming industrial degradation and stimulating the "green" industry through clusters and resource- and energy-efficiency programs, thereby ensuring a balance between economic activation and restoration of productive potential.

The system of effectiveness criteria for each MRZ serves as an effective tool for measuring progress and adjusting managerial actions, and includes both general indicators and those specific to individual MRZ (e.g., Defense Resilience Index, Humanitarian Security Index, share of "green" industry). The presented procedures and their algorithmization make it possible to construct within IMSECR systems of permanent control over results, where spatial differences become the basis for differentiated mechanisms of institutional support and strategic interventions. Thus, the algorithm of RSD implementation and MRZ rehabilitation forms a comprehensive "roadmap" for recovery, which takes into account both national priorities and the specificities of MRZ. The combination of reconstructive, stabilizational, restorative, rehabilitative, and innovation-expansive scenarios – ensures a comprehensive approach, enabling the allocation of resources, coordination of managerial actions, and control of effectiveness. Developing a clear sequence of steps provides the foundation for the sustainable transformation of economic systems in the post-war period and strengthens the strategic integration of the country into the European economic and security space.

Stage 7. IMSECR is tested on pilot territories with different configurations of challenges, through comparative assessment of results (before/after), and adaptation of instruments following implementation. To increase validity, quasi-experimental approaches may be applied (comparison groups, "difference-in-differences"), as well as cost-benefit analysis and feedback cycles for policy adjustment. The expected result – is the confirmation of IMSECR's flexibility and scalability to the national level. The verification of the model's effectiveness presupposes the use of methods and procedures adapted to different levels of governance and the instrumental capacities of decision-making actors. The "method-procedure map of effectiveness verification" (Table 8) structures the approach to testing IMSECR on pilot territories by combining quasi-experimental methods, cost-benefit analysis, and feedback cycles. This makes the verification of results transparent, scalable, and suitable for before/after comparisons, allowing: the avoidance of functional duplication and the provision of analytical depth; greater coordination between state and territorial levels; integration of complex scientific-methodological instruments with simpler local mechanisms; testing

of IMSECR's scalability across different recovery contexts. The systematization of methods and procedures, grouped by levels and represented in Table 8, demonstrates that the effectiveness of the IMSECR model depends not only on the applied methods but also on institutional support, which enhances the legitimacy of decisions and builds trust in spatial recovery policy.

Table 8.

Method–Procedure Map for Verifying the Effectiveness of IMSECR (Stage 7)

Governance Level	Methods of Effectiveness Verification	Implementation Procedures	Focus on Crim-inogenic-Corru-ption Factors	Focus on the Spread of SAH	Expected Results
National	Quasi-experimen-tal approaches: co-mparison groups, "difference-in-differences"; cost-benefit analysis; national monitoring panels.	Selection of pilot territories (with different profi-les); coordination of interagency databases; national surveys and assessments.	Implementation of compliance systems; anticorruption audi-ts; prosecution of crimes; accountabi-lity for state resour-ces; economic/insti-tutional transparency.	Inclusion of indicators of institutional trust, popula-tion resilience, socio-psycho-logical monito-ring of SAH.	Validation of IMSECR scalability; definition of unified standards; policy recommendations.
Macro-regional zones	Comparative befo-re/ after analysis; regression and indicator modeling; SWOT analysis; sociological surveys and expert interviews.	Monitoring of changes across key sectors (infrastructure, labor market, ecology); regional panels; public forums and consultations.	Identification of cor-ruption schemes in regional and local governance; monito-ring of corruption-prone activities; strengthening anti-corruption compliance.	Monitoring so-cial trust; iden-tification of SAH through focus groups & surveys; asses-sment of social mobility and reintegration.	Differentiation of re-gional effects; adap-tation of recovery roadmaps to specific conditions (reconstru-ction, stabilization, recovery, rehabilita-tion, innovation-expansion).
Regional	Integrated indicators: economic, social, ecological; benchmarking with other regions; mapping of resources.	Regional public reports; local councils (open hearings); socio-logical studies of population resilience; roundtables with stakeholders.	Public analysis of financial flows; open reporting of mayors and local councils; strengthening accountability.	Indicators of public readin-ess for partici-pation in reco-very projects; moni-toring of psychosocial resilience, trust in institutions.	Identification of vulnerable localities; formation of spatial recovery priorities; strengthening of community resilience.
Community (local)	Surveys and focus groups; local before/ after analysis;	Data collection by communities; publication of re-sults in	Recording of corruption cases; publication of incidents in open	Identification of SAH thro-ugh local sur-veys; assessm-	Strengthening trust in institutions; creation of "live"

Governance Level	Methods of Effectiveness Verification	Implementation Procedures	Focus on Crim-inogenic-Corru-ption Factors	Focus on the Spread of SAH	Expected Results
	specific indicators (employment, workplaces, social capital, quality of life).	accessible formats; involvement of NGOs; citizen reporting; digital tools for participation.	sources; civic anti-corruption initiatives.	ent of trust in authorities; for-mation of self-help groups; activation of local organizat.	feedback mechanisms; reduction of social apathy; coordination of community needs with national policy.
Key table notes: National level – focus on mechanisms of monitoring, auditing, and accountability for state resources, preventing their criminal misuse and economic collapse. Macro-regional level – scenarios and monitoring procedures for detecting corruption risks and SAH indicators. Regional level – orientation toward openness, public reporting, and cooperation with communities. Community level – focus on self-organization, civic anti-corruption practices, and overcoming SAH through local participation.					

** defined, substantiated, formulated and systematized by the authors.*

Particular attention should be paid to two factors: criminogenic-corruption practices that undermine trust in institutions, and the spread of SAH among the population. Their integration into the effectiveness assessment system makes it possible to minimize the challenges of imbalance and the reproduction of marginalized destructive practices; to understand social risks; to reduce community apathy; and to scale IMSECR across different recovery scenarios, creating a "matrix of security and regeneration" as a safeguard against the re-entry of the state entity into a new polycrisis.Previous studies have laid an important theoretical foundation for analyzing spatial transformations; however, they have not sufficiently addressed the complexity of challenges faced under the polycrisis conditions of state entities' functioning. The present research demonstrates, that a multilevel analysis of the impact of socio-ecological-economic and cognitive-institutional factors, combined with criminogenic-corruption determinants, allows for an objective reproduction of the characteristics of polycrisis and post-crisis reality. Indeed, destructive processes not only undermine societal trust in state institutions and governance systems but also create systemic barriers to restoring the polyfunctionality of economic systems. Therefore, the obtained results have significant managerial implications.

At the national level, the priority is the introduction of anti-corruption instruments into strategic planning and the establishment of regulatory mechanisms for preventive control. At the macro-regional and community levels, the key task is to restore economic polyfunctionality through the diversification of production structures, the development of innovation clusters, and the strengthening of institutional integration into the European space. At the same time, an important direction of implementing the results is the establishment of a multilevel system of monitoring and evaluation of governance effectiveness, which should include not only economic indicators but also metrics of social cohesion, trust in public institutions, and a reduction in the prevalence of SAH. Such a system makes it possible not only to record the current state but also to adjust RSD trajectories in a timely manner.

The study has also revealed another critically important problem that deserves wide scientific discussion: the psychological barriers embodied in the interaction of SAH and SS within civilian communities. Under conditions of WIMF, society faces not only economic or institutional constraints but also medico-psychological traps. SAH – reduces the level of initiative and fosters a perception of environmental immutability, while SS – transforms cognitive attitudes, legitimizing destructive governance practices and tolerating corrupt abuses. The combination of these syndromes creates a dual barrier: on the one hand, citizens lose faith in their ability to influence change; on the other, they begin to rationalize and justify the actions of those forces that, in practice, block modernization and spatial recovery processes. This mutual reinforcement of SAH and SS deepens institutional inertia, conserves systemic crisis, and reduces the effectiveness of sustainable recovery strategies. It manifests in the toleration of opaque mobilization practices, the justification of distortions in the educational and scientific spheres, the acceptance of distorted models of governance and lawmaking, etc. As a result, society becomes a hostage to loyalty toward threats, including the erosion of constitutional rights and freedoms, which undermines both the social agency of citizens and trust in institutions.

In light of this, recovery governance models must account for the accumulation and mutual reinforcement of SAH & SS, requiring the combination of economic-organizational, psycho-educational, medico-social, and rehabilitative measures capable of restoring a sense of agency among the population and dismantling the irrational "systemic loyalty to destruction". Therefore, we propose the Integrated Matrix "Syndrome–Manifestations–Consequences–Interventions" (Table 9), which logically reproduces the cause-and-effect chain from diagnosing psychological barriers to managerial decisions aimed at overcoming them.

Table 9.

Integrated Matrix "Syndrome – Manifestations – Consequences – Interventions"

Syndromes	Main Manifestations (Psychological/ Social)	Socio-Economic Deformations and Consequences	Managerial Interventions and Programs
Syndrome of Acquired Helplessness (SAH)	Decline in motivation for self-development and innovation; passive perception of change; loss of trust in personal capabilities.	Institutional inertia; loss of labor productivity and motivation; economic stagnation; absence of resource mobilization; lack of access to basic resources.	Psycho-social and educational support programs; medico-social and -genetic rehabilita-tion; counseling; activation of civic and local initiatives.
"Stockholm Syndrome" in Civil Communities (SS)	Loyalty to aggressors; tolerance of corrupt elites; manipulation & legitimization of destructive practices; dependence on external "patrons".	Legitimization of destructive political-economic practices; growth of corruption schemes; spread of informal destructive practices; reproduction of distorted governance and policymaking models.	Anti-corruption interventions; transparent governance mecha-nisms; management & compli-ance procedures; civic monitor-ing and control; formation of community culture of zero tolerance to abuses.
Combination	Passivity in overcoming	Consolidation of	Complex programs:

Syndromes	Main Manifestations (Psychological/ Social)	Socio-Economic Deformations and Consequences	Managerial Interventions and Programs
of Syndromes (SAH & SS)	challenges; loss of strategic vision; reduced motivation for education; social apathy.	monofunctio-nalized territories; social fragm-entation; transformation of civic identity; decline in social activi-ty; weakening of innovation pro-cesses; loss of trust in institut.	economic, socio-psychological, medico-social and rehabilitation measu-res; regeneration projects; civic self-organization mechanisms; integrat commun. intorecovery.

** defined, substantiated, formulated and systematized by the authors.*

Looking forward, the implications for recovery policy are as follows:

- Integration of psychosocial factors into recovery strategies. Spatial recovery under the polycrisis challenges of WIMF cannot be ensured solely by economic or institutional instruments. SAH, reinforced by SS, necessitates inclusion of psychological support, social adaptation, and programs to strengthen collective identity in state and regional strategies;
- Risk of legitimizing destructive practices. Citizens' passive acceptance of abuses, institutional erosion, and deviant behavioral models during crisis creates fertile ground for the entrenchment of corrupt and criminogenic practices in state and regional governance. Therefore, state policy must incorporate anti-corruption safeguards and transparent mechanisms of community participation in recovery processes;
- Priority of restoring community agency. A key objective must be the development of citizens' sense of influence over socio-ecological-economic processes, achieved through public participation in decision-making, the development of local self-government institutions, support for civic initiatives, and mechanisms of direct democracy;
- Implementation of hybrid governance approaches. Addressing the combined effects of SAH and SS requires the development of multi-level policies that integrate economic-organizational measures with cognitive, socio-psychological, medico-genetic, and institutional instruments. Only such hybrid action can adequately respond to the complexity of challenges under polycrisis and post-war conditions.

Thus, the study of destructive determinants and their interactions has made it possible to substantiate a set of instruments for effective governance under polycrisis and post-crisis conditions. Its results provide a real foundation for the transition from reactive measures to proactive multi-level governance capable of ensuring the sustainable reconstruction of macro-regions, the restoration of citizens' trust, and the strengthening of the resilience of the economic system of the state entity against hybrid threats.

The proposed IMSECR fits into current international scientific debates on the recovery of MFS in polycrisis conditions. Unlike traditional approaches, which focus either on economic stabilization or on social support in isolation, this study substantiates the necessity of systemic integration of several key determinants. Such an

approach corresponds to the modern understanding of "resilience" as a multidimensional phenomenon that combines economic efficiency, institutional adaptability, and psychosocial regeneration. In comparison with existing international practices (UNDP, OECD, EU recovery models), it becomes clear that Ukraine requires a hybrid model capable of overcoming structural socio-economic weaknesses and cognitive vulnerabilities of communities. The results demonstrate that cognitive-behavioral indicators (trust, expectations, anxiety, inclination to apathy) are no less critical for spatial recovery than classical socio-economic parameters.

The research expands methodological approaches by introducing the operationalized concept of "cognitive resilience". The developed IMSECR offers a way out of the threats of WIMF, providing for the diversification of the economic base in combination with mechanisms of psychosocial support and civic engagement. Such a dual-channel strategy reduces the risks of SAH and creates preconditions for increasing investment attractiveness and strengthening local development capacity. In the context of debates on recovery determinants, it is essential to consider the cyclicality of global economic processes, reflected in M. Armstrong's Economic Confidence Model (8.6-year cycle) [45]. According to this concept, societies and economies periodically pass through phases of rising and falling confidence, influencing investment flows, political decisions, and social behavior. For countries in a state of WIMF and post-war reconstruction, this effect has dual significance: it amplifies the risks of cognitive deformations while simultaneously reducing institutional resilience. Therefore, the need arises to establish preventive mechanisms of socio-economic and cognitive resilience, capable of smoothing fluctuations in confidence, countering SS and SAH, and restoring society's capacity for self-regulation and regeneration. Integrated models such as IMSECR in this dimension function not only as tools of adaptation to crisis impacts but also as strategic instruments for mitigating the effects of cyclical declines in confidence at national, regional, and supranational levels.

Within research [1–2; 14; 29–31; 37–38] it is emphasized that spatial recovery cannot rely exclusively on military capacity or solely on socio-economic instruments detached from the broader security context. Resilience can only be ensured through an integrated approach that combines defense, humanitarian, socio-ecological-economic, institutional, and cognitive dimensions, forming a unified architecture of adaptation to polycrisis challenges. The implementation of IMSECR establishes the framework conditions for enhancing societal adaptability, minimizing SAH, reducing tolerance of corrupt practices, restoring trust in institutions, and stimulating civic activity. At the same time, the military and mobilization component constitutes the "hard shell" of state resilience, without which any model remains vulnerable to threats. Thus, the combination of military and mobilization resources (hard power and soft/cognitive resilience) and their incorporation into the IMSECR ensures a: comprehensive approach to resilience, in which structural risks and external challenges are balanced by cognitive and institutional mechanisms of regeneration; forming polycentric models of regeneration of monofunctional systems [46]. This synergy creates the foundation

for spatial development and adaptive integration into European and global security architectures.

The significance of the research results is manifested in both theoretical and applied dimensions. Theoretically, they expand the discourse on resilience by offering an interdisciplinary framework that integrates demographic, socio-ecological-economic, psychological, institutional, and criminogenic-corruption components. Practically, they provide a structured toolkit for governance actors, oriented toward the combination of socio-economic stabilization with cognitive regeneration. Therefore, the developed polycentric model IMSECR – constitutes a scientifically substantiated and practically relevant instrument of spatial recovery under polycrisis conditions, facilitating the transition from narrowly economic to comprehensive hybrid-format strategies [37–38; 46], where the key determinants of resilience are not only economic and institutional factors but also the restoration of cognitive capacities and social activity of the population of a state entity.

Conclusions. The recovery of socio-economic systems under polycrisis and post-war conditions is possible only through an integrated approach that combines the socio-economic and cognitive components of resilience. The proposed IMSECR integrates conceptual foundations, analytical instruments, and methodological procedures that enable the diagnosis and overcoming of SAH, SS, and other multifactorial deformations within the socio-economic space of the state. Its application allows for the consideration of socio-ecological-economic, institutional, demographic, and psychological factors; the implementation of scenario forecasting; the development of adaptive managerial decisions; and the support of the resilience of the economic system. The study establishes the importance and necessity of accounting for criminogenic-corruption determinants as systemic constraints of RSD, which represent a significant factor in the erosion of societal trust. In response to these challenges, the concept of cognitive resilience is introduced as a key element for restoring community agency, fostering the capacity to resist destructive influences, and ensuring institutional renewal. The scientific novelty lies in the introduction of the concept of “cognitive resilience”, the construction of the integrated IMSECR model under wartime and post-war conditions, and the identification of criminogenic-corruption factors as structural barriers to the recovery of polyfunctionality in regional systems. This enables the combination of socio-economic stabilization with the cognitive regeneration of society under polycrisis challenges.

The prospects for further research include: the integration of medico-genetic, cognitive-informational, and ecological dimensions into the IMSECR model; empirical testing at the macro-regional level; the development of indicators for measuring cognitive resilience and practical tools for managing it; verification of IMSECR on communities and regions that have experienced large-scale war-related destruction; the creation of digital mechanisms to counter criminogenic-corruption factors; scenario modeling of RSD for adaptive strategies of MFS governance; and the development of practical recommendations for state policy in the field of implementing cognitive and anti-corruption mechanisms.

References

1. Babu, G., & Satya, S. (2022). Understanding the inherent interconnectedness and other salient characteristics of nature crucial for sustainability. *Environment, Development and Sustainability, 26*(3), 1–13. https://doi.org/10.1007/s10668-022-02831-4
2. Lazar, N., & Chithra, K. (2022). Role of culture in sustainable development and sustainable built environment: A review. *Environment, Development and Sustainability, 24*(4), 5991–6031. https://doi.org/10.1007/s10668-021-01691-8
3. Seligman, M. E. P., & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology, 74*(1), 1–9. https://doi.org/10.1037/h0024514
4. Seligman, M. E. P. (1975). *Helplessness: On depression, development, and death*. San Francisco: W. H. Freeman.
5. Abramson, L. Y., Seligman, M. E., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*(1), 49–74. https://doi.org/10.1037/0021-843X.87.1.49
6. Peterson, C., Maier, S. F., & Seligman, M. E. P. (1993). *Learned helplessness: A theory for the age of personal control*. Oxford: Oxford University Press.
7. Hobfoll, S. E., Watson, P., Bell, C. C., Bryant, R. A., Brymer, M. J., Friedman, M. J., et al. (2007). Five essential elements of immediate and mid-term mass trauma intervention: Empirical evidence. *Psychiatry, 70*(4), 283–315. https://doi.org/10.1521/psyc.2007.70.4.283
8. De Jong, M. C., Nathan, H., Sotiropoulos, G. C., Paul, A., Alexandrescu, S., Marques, H., et al. (2011). Intrahepatic cholangiocarcinoma: An international multi-institutional analysis of prognostic factors and lymph node assessment. *Journal of Clinical Oncology, 29*(23), 3140–3145. https://doi.org/10.1200/JCO.2011.35.6519
9. Miller, K. E., & Rasmussen, A. (2017). The mental health of civilians displaced by armed conflict: An ecological model of refugee distress. *Epidemiology and Psychiatric Sciences, 26*(2), 129–138. https://doi.org/10.1017/S2045796016000172
10. Collier, P. (1999). On the economic consequences of civil war. *Oxford Economic Papers, 51*(1), 168–183. http://www.jstor.org/stable/3488597
11. Brück, T., & Schindler, K. (2009). Smallholder land access in post-war northern Mozambique. *World Development, 37*(8), 1379–1389.
12. Arkhypova, L., Vinnychenko, I., Kinash, I., Horoshkova, L., & Khlobystov, I. (2022). Theoretical substantiation of modeling of recreational systems. *Ecological Engineering & Environmental Technology, 23*(5), 99–108. https://doi.org/10.12912/27197050/151758
13. Libanova, E. (2024). Resilience of the socio-economic system of Ukraine to war-induced shocks: Formation and response features. *Demography and Social Economy, 58*(4), 3–23. https://doi.org/10.15407/dse2024.04.003 [in Ukrainian]
14. Mykytenko, V. V., Mykytenko, D. O., & Chuprina, M. O. (2025). Scenario modelling of spatial recovery of Ukraine's macro-regional zones: Socio-ecological-economic reconstruction priorities. *Demography and Social Economy, 59*(1), 109–132. https://doi.org/10.15407/dse2025.01.109 [in Ukrainian]
15. Davidson, R. J., & McEwen, B. S. (2012). Social influences on neuroplasticity: Stress and interventions to promote well-being. *Nature Neuroscience, 15*(5), 689–695. https://doi.org/10.1038/nn.3093
16. Ungar, M. (2018). Systemic resilience: Principles and processes for a science of change in contexts of adversity. *Ecology and Society, 23*(4). https://www.jstor.org/stable/26796886
17. Anderies, J. M., Janssen, M. A., & Schlager, E. (2016). Institutions and the performance of coupled infrastructure systems. *International Journal of the Commons, 10*(2), 495–516. https://doi.org/10.18352/ijc.651
18. Kyiv Independent. (2023, January 21). *Ukraine's Defense Ministry accused of buying soldiers' food at inflated prices*. https://kyivindependent.com/media-defense-ministry-purchases-food-for-soldiers-at-inflated-prices/?utm_source=chatgpt.com

19. Reuters. (2025, April 2). *Ukraine prepares corruption charges in high-profile procurement case*. https://www.reuters.com/world/europe/ukraine-prepares-corruption-charges-high-profile-procurement-case-2025-04-02/?utm_source=chatgpt.com
20. Reuters. (2023, February 2). *Ukraine court detains ex-defense official amid corruption probe*. https://www.reuters.com/world/europe/ukraine-court-detains-ex-defence-official-corruption-probe-2023-02-02/?utm_source=chatgpt.com
21. Financial Times. (2025, May). *Ukraine loses hundreds of millions on troubled defense contracts*. https://www.ft.com/content/0bac7e00-1cd1-4874-aab7-011122752d9c?utm_source=chatgpt.com
22. Reuters. (2024, February 21). *Ukraine's anti-graft police probing dozens of defence-related cases*. https://www.reuters.com/world/europe/ukraine-anti-graft-police-probing-dozens-defence-related-cases-2024-02-21/?utm_source=chatgpt.com
23. Reuters. (2025, January 28). *Top Ukrainian defence official sacked amid infighting over procurement*. https://www.reuters.com/world/europe/top-ukrainian-defence-official-sacked-amid-infighting-over-procurement-2025-01-28/?utm_source=chatgpt.com
24. Reuters. (2023, May 16). *Ukraine authorities expose piles of cash in Supreme Court corruption probe*. https://www.reuters.com/world/europe/ukraine-authorities-expose-piles-cash-supreme-court-corruption-probe-2023-05-16/?utm_source=chatgpt.com
25. Transparency International Ukraine. (2024, May 15). *Kniaziev case: a year since corruption scheme was exposed in the Supreme Court*. TI Ukraine. https://ti-ukraine.org/en/news/kniaziev-case-a-year-since-a-corruption-scheme-was-exposed-in-the-supreme-court/?utm_source=chatgpt.com
26. Reporters Without Borders. (2025, July). *Ten groundbreaking investigations by Ukrainian media outlets - and the urgent need for support*. https://rsf.org/en/ten-groundbreaking-investigations-ukrainian-media-outlets-urgent-need-support-investigative?utm_source=chatgpt.com
27. Kyiv Post. (2024, March 17). *"Egg-gate": how corruption scandals in food procurement expose systemic flaws*. https://www.kyivpost.com/post/29655?utm_source=chatgpt.com
28. Human Rights Watch. (2024, January 19). *Several investigative journalists under pressure in Ukraine, human rights group says*. HRW. https://www.hrw.org/news/2024/01/19/several-investigative-journalists-under-pressure-ukraine?utm_source=chatgpt.com
29. Hariram, N. P., Mekha, K. B., Suganthan, V., & Sudhakar, K. (2023). Sustainalism: An integrated socio-economic-environmental model to address sustainable development and sustainability. *Sustainability, 15*(13), 10682. https://doi.org/10.3390/su151310682
30. United Nations Development Programme & World Bank. (2025). *Ukraine energy damage assessment (April 5 report): Ukraine fourth rapid damage and needs assessment*, 195. https://documents1.worldbank.org/curated/en/099022025114040022/pdf/P1801741ca39ec0d81b5371ff73a675a0a8.pdf
31. World Bank. (2024). *Ukraine rapid damage and needs assessment* (p. 142). World Bank Group. https://documents1.worldbank.org/curated/en/099184503212328877/pdf/P1801740d1177f03c0ab180057556615497.pdf
32. Kurapov, A., Balashevych, O., Borodko, Y., Danyliuk, I., et al. (2025). Psychological wellbeing of Ukrainian civilians: A data-driven perspective. *Frontiers in Psychology, 16*. https://doi.org/10.3389/fpsyg.2025.1553555
33. Ahmed, S. H., Zakai, A., Zahid, M., Jawad, M. Y., Fu, R., & Chaiton, M. (2024). Prevalence of post-traumatic stress disorder and depressive symptoms among civilians residing in armed conflict-affected regions: A systematic review and meta-analysis. *General Psychiatry, 37*, e101438. https://doi.org/10.1136/gpsych-2023-101438
34. Aleksina, N., Gerasimenko, O., Lavrynenko, D., & Savchenko, O. (2024). Ukrainian adaptation of the generalized anxiety disorder scale (GAD-7): Diagnostic experience in the state of martial law. *Insight Psychological Dimensions of Society, 11*, 77–103. https://doi.org/10.32999/2663-970X/2024-11-5 [in Ukrainian]

35. Chudzicka-Czupała, A., Hapon, N., Chiang, S. K., Żywiołek-Szeja, M., et al. (2023). Depression, anxiety and post-traumatic stress during the 2022 Russo-Ukrainian war: A comparison between populations in Poland, Ukraine and Taiwan. *Scientific Reports, 13*, 3602. https://doi.org/10.1038/s41598-023-28729-3
36. Frankova, I., Senyk, O., Avramchuk, O., Rudys, A., et al. (2025). Psychometric properties of the revised Ukrainian version of the continuous traumatic stress response scale (CTSR) in the context of the Russo-Ukrainian war. *European Journal of Psychotraumatology, 16*, 2463186. https://doi.org/10.1080/20008066.2025.2463186
37. Mykytenko, V. V. (2024). Forecasted format of the hybrid scenario of spatial recovery: Information-technological architecture and socio-ecological-economic determinants. *Visnyk of Economic Science of Ukraine, 47*(2), 12–21. https://doi.org/10.37405/1729-7206.2024.2(47).12-21 [in Ukrainian]
38. Mykytenko, V. V., & Sheludko, N. M. (2025). Rehabilitation of monofunctional territories based on the model of cognitive-spatial recovery. *Ukrainian Society, 2*(93), 158–173. https://doi.org/10.15407/socium2025.02.158 [in Ukrainian]
39. Eurostat. (2024). *Database*. https://ec.europa.eu/eurostat
40. OECD. (2024). *OECD Data*. https://data.oecd.org
41. World Bank. (2024). *World development indicators*. https://data.worldbank.org
42. UNDP. (2024). *Human development data center*. https://hdr.undp.org/data
43. World Bank. (2024). *Worldwide governance indicators (WGI)*. https://info.worldbank.org/governance/wgi/
44. State Statistics Service of Ukraine. (2024). *Statistical yearbook of Ukraine 2023*. Kyiv: Derzhstat. https://stat.gov.ua/uk/publications/statystychnyy-shchorichnyk-ukrayiny-2023 [in Ukrainian]
45. Paumgarten, N. (2009, October 12). The secret cycle: Is the financier Martin Armstrong a con man, a crank, or a genius? *The New Yorker*. https://www.newyorker.com/magazine/2009/10/12/the-secret-cycle
46. Mykytenko, V. V., & Chuprina, M. O. (2025). Polyvector scenario-forecast model of reconstructive-spatial development of Ukraine in the post-war period. *Scientific Bulletin of the International Association of Scientists. Series: Economics, Management, Security, Technologies, 4*(1). https://doi.org/10.56197/2786-5827/2025-4-1-1 [in Ukrainian]

Отримано:	*01.09.2025*	*Beérkezett:*	*2025.09.01*	*Received:*	*01.09.2025*
Прийнято до друку:	*15.10.2025*	*Elfogadva:*	*2025.10.15*	*Accepted:*	*15.10.2025*
Опубліковано:	*17.12.2025*	*Megjelent:*	*2025.12.17*	*Published:*	*17.12.2025*