ECONOMIC SECURITY OF THE STATE AND ECONOMIC ENTITIES

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STRENGTHENING THE FINANCIAL SECURITY OF UKRAINE'S CRITICAL INFRASTRUCTURE ENTERPRISES UNDER MARTIAL LAW

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Introduction. In the context of the full-scale armed aggression against Ukraine, the issue of ensuring the financial security of critical infrastructure enterprises has become particularly relevant. The resilience of these enterprises directly affects not only the continuity of vital services provision to the population and economic entities, but also the state's ability to maintain macrofinancial stability, defense capability, and social cohesion during the period of martial law [1]. Under these circumstances, the financial security of critical infrastructure enterprises is transforming from a local element of corporate governance into an integral component of national economic security.

Martial law is accompanied by a significant increase in financial risks, among which asset losses caused by physical destruction, disruptions of logistics chains, liquidity shortages, restricted access to financial resources, as well as heightened regulatory and fiscal pressure prevail. For critical infrastructure enterprises, these risks are systemic in nature, as their financial instability may generate multiplicative effects at both regional and national levels, exacerbating socio-economic imbalances and reducing the overall adaptive capacity of the economy [2].

Despite the substantial body of academic research devoted to the issues of economic and financial security of enterprises, the problem of ensuring financial security specifically in the context of the functioning of critical infrastructure facilities under martial law remains insufficiently systematized. Most existing approaches are based on assumptions of relative stability of the external environment and do not adequately account for the specificity of wartime threats, the asymmetry of risks, and the need to combine market-based mechanisms with instruments of state support and regulatory intervention. In this context, the development of conceptual frameworks for strengthening the financial security of critical infrastructure enterprises, taking into account wartime challenges, becomes increasingly relevant.

Analysis of recent achievements and publications. The issue of enterprise financial security has been the subject of analysis in numerous fundamental studies, which examine both general approaches to defining the essence of this concept [3] and specific risk components that affect the financial stability of business entities [4]. In particular, Karbivskyi V. [5] systematized contemporary approaches to the definition of "enterprise financial security," highlighting the key elements that shape its content in the context of external and internal threats to the economic activity of business entities. In the study by Butkevych T. [6], modern threats that disrupt the financial equilibrium of enterprises are identified, and the necessity of adaptive risk management mechanisms is substantiated. In the research by Butenko V. and Muzyka S. [7], financial security issues are considered in the context of global transformations and martial law, emphasizing the growing role of adaptive strategies and corporate flexibility in ensuring financial resilience.

It is worth noting that the scientific work by Onyshchenko S., Maslii O., and Dribna A. [8] demonstrates an increasing scholarly interest in assessing the level of financial and economic security specifically of critical

infrastructure enterprises. The authors propose an approach to evaluating internal and external threats and the strength of their impact on the stability of critical infrastructure enterprises during wartime. In the context of developing financial security management models, a significant contribution is made by Blyzniuk T., Ovsiuchenko Y., and Peresada O. [9], who propose an integrated management model that combines anti-crisis and strategic approaches to enhance the financial stability of enterprises under conditions of external uncertainty.

Individual studies, such as the work by Pletenetska S. and Didenko O. [10], expand the academic discourse by focusing on the financial security of small enterprises during wartime, emphasizing the importance of state support, income diversification, and flexible financial risk management mechanisms.

The existing body of scientific research indicates that contemporary approaches to studying enterprise financial security are gradually evolving from classical models of financial condition assessment toward comprehensive integrated management mechanisms under conditions of high uncertainty caused by war and transformational changes. At the same time, the issue of adapting these approaches to critical infrastructure enterprises under martial law requires further in-depth research.

Objectives of the article. Development of directions for strengthening the financial security of critical infrastructure enterprises in Ukraine under martial law, taking into account systemic financial risks, the specific nature of wartime threats, and the role of state economic policy in ensuring their financial resilience and continuity of operations.

The main material of the study. A strategically important and system-forming component of the economic security of critical infrastructure enterprises is their financial security, especially under conditions of martial law, deepening global instability, and structural transformation of the national economy. The financial component occupies a leading position in the management system of critical infrastructure enterprises, as it directly affects their ability to ensure continuity of operations, restore production capacities, and implement strategic development objectives. At the same time, financial security, as a fundamental element of economic security, is aimed at maintaining financial stability, enhancing competitiveness, and creating conditions for attracting investment resources [11].

Under conditions of increased vulnerability of the national economy caused by full-scale military actions, geopolitical risks, and the disruption of established economic ties, the issue of strengthening the financial security of enterprises classified as critical infrastructure acquires particular strategic importance. Such enterprises are forced to operate in an environment characterized by numerous destabilizing factors, including the destruction of production and transport infrastructure, threats to the physical security of assets, reductions in domestic production volumes, import dependence, high volatility of global energy prices, depletion of the resource base, and an insufficient level of technological modernization. In this context, the formation of a specific "financial immunity" to these threats becomes a necessary prerequisite for ensuring the stability of operation of critical infrastructure enterprises.

Within the management system of critical infrastructure enterprises, the concept of financial security is closely related to the categories of financial sustainability, financial independence, liquidity, and solvency (Fig. 1). These categories should be considered not in isolation, but as an interconnected and interdependent system, in which financial security serves as an integral objective, while financial sustainability, liquidity, solvency, and independence perform the role of key instruments for achieving this objective and, at the same time, indicators of the enterprise's level of protection against internal and external threats. A comprehensive analysis of the interrelationships among these categories makes it possible to conduct an objective assessment of the current financial condition of critical infrastructure enterprises, identify zones of increased risk, and substantiate directions for strengthening their financial security under conditions of martial law.

The relationship between financial security and financial sustainability is dual in nature, as both concepts function simultaneously as the enterprise's objective and as a means of achieving it. On the one hand, financial security constitutes a necessary prerequisite for the formation of financial sustainability; on the other hand, financial stability represents a key factor ensuring the enterprise's financial security. The majority of scholars consider financial sustainability to be the principal determinant of an enterprise's financial condition and financial and economic performance [12], as it integrates a comprehensive analysis of the enterprise's financial results. Liquidity ensures the enterprise's ability to rapidly convert its assets into cash in order to meet current obligations. Solvency characterizes financial security as the enterprise's capacity to settle its debt obligations in a timely and complete manner. The financial independence of an enterprise is defined by the predominance of own sources of financing over borrowed funds. A low level of financial independence may result in an increased risk of insolvency and a shortage of financial resources necessary for stable development and normal business operations.

The close interrelationship among these categories indicates that the financial security of critical infrastructure enterprises integrates the economic entity's ability to maintain liquidity, solvency, and financial independence while

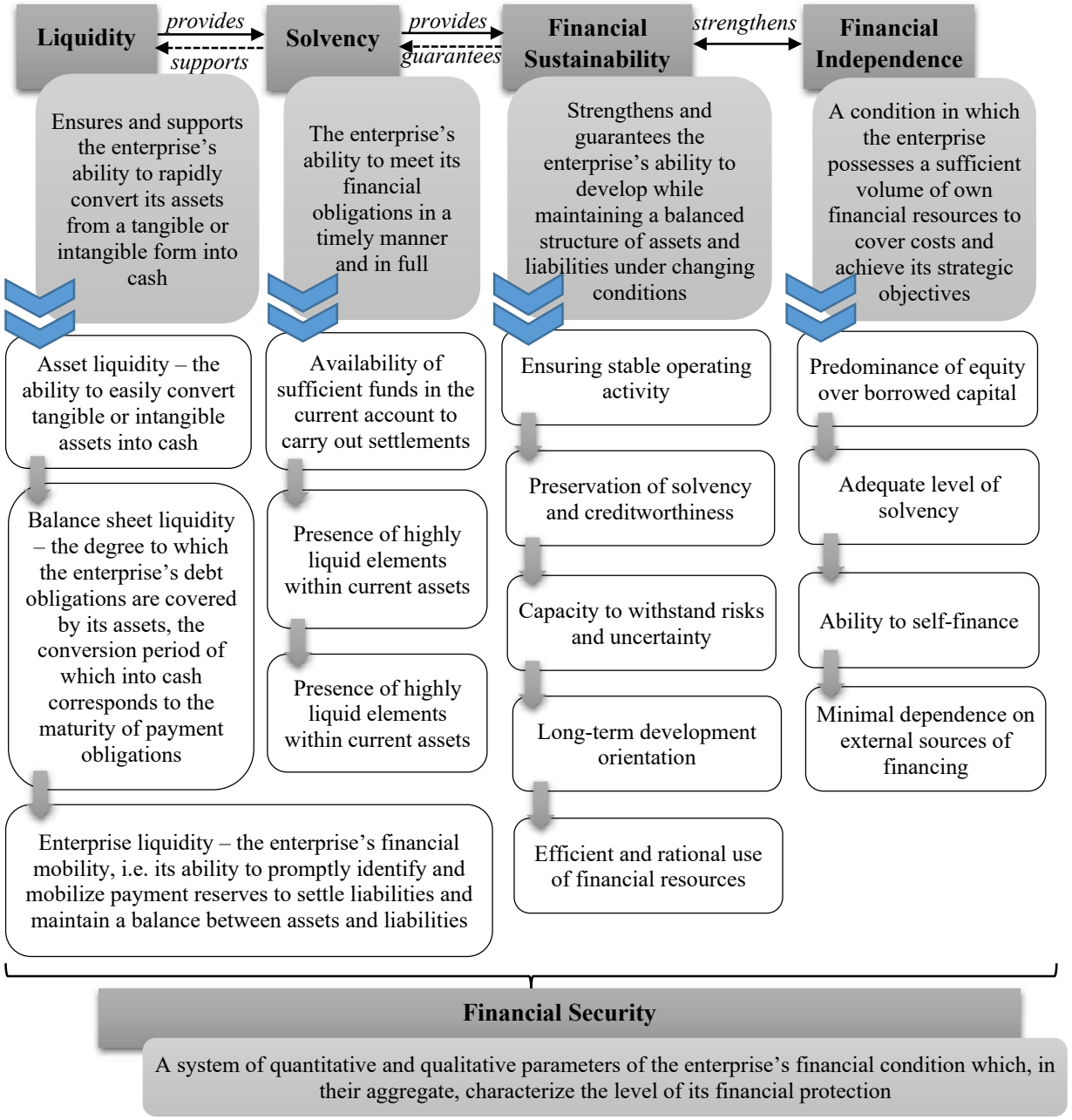

Figure 1. Interrelation between the concepts of "liquidity", "solvency", "financial stability", "financial independence", and "financial security"

Source: developed by the author

remaining financially sustainable. For critical infrastructure enterprises, maintaining these indicators constitutes a key prerequisite for long-term development and effective adaptation to an unstable external environment.

As a result of the full-scale armed invasion, the intensity and scale of risks affecting the financial security of critical infrastructure enterprises in Ukraine have increased significantly. Under current conditions, the stable and efficient functioning of such enterprises acquires not only an economic but also a security dimension, as it is directly linked to ensuring the national, energy, and social security of the state. Therefore, the issues of identifying, minimizing, and continuously monitoring destructive factors and threats to the financial security of critical infrastructure enterprises have become strategically important and form the foundation for the stable development of Ukraine's wartime and post-war economy [13].

In academic research, risks to the financial security of critical infrastructure enterprises are considered as a set of external and internal factors capable of causing a loss of financial sustainability, a decline in solvency, disruptions in liquidity, and limitations on long-term development opportunities [14]. The generalization of

existing approaches makes it possible to identify key groups of risks that are most significant under conditions of martial law.

First, military risks occupy a dominant position in the structure of threats to the financial security of critical infrastructure enterprises. The destruction of production, energy, and transport infrastructure, disruption of logistics chains, temporary occupation of territories, and active hostilities lead to the loss of control over production capacities, fixed assets, and working capital. This, in turn, results in direct financial losses, increased recovery costs, reduced production volumes, and constrained revenue-generating capacity.

Second, financial and economic risks are significantly intensified under conditions of macroeconomic instability and transformational processes. High volatility in global oil and gas prices adversely affects the predictability of financial results and complicates the formulation of strategic development plans for enterprises. Additional destabilizing factors include the deterioration of the investment climate, limited access to financial resources, instability in the foreign exchange market, rising inflationary pressures, declining consumer purchasing power, and reduced demand for the products and services of critical infrastructure enterprises.

Third, natural and technological risks, exacerbated by military actions, constitute a distinct group of systemic threats. Industrial accidents, hazardous material leaks, fires, and explosions resulting from missile strikes and sabotage, as well as the lack of capacity for timely repairs and emergency response, lead to increased financial costs, asset losses, and heightened operational risks. In the long term, these factors negatively affect the level of financial sustainability and the investment attractiveness of critical infrastructure enterprises.

Thus, the financial security of critical infrastructure enterprises under conditions of martial law is shaped by a complex set of interrelated risks, which necessitates the implementation of a systemic, risk-oriented management approach. Such an approach should integrate strategic financial planning instruments, continuous monitoring of key financial security indicators, scenario analysis, and state support mechanisms aimed at reducing systemic threats and ensuring the resilience of enterprises during both wartime and post-war periods.

Taking the above into account, it is appropriate to present a matrix illustrating the relationships between risks, corresponding financial security indicators, and the instruments for their mitigation (Table 1). This matrix allows for a systematic assessment of threats to critical infrastructure enterprises, linking each risk to measurable indicators and identifying targeted response mechanisms to ensure financial stability and resilience under conditions of martial law.

The proposed matrix allows for the systematic identification of threats to the financial security of critical infrastructure enterprises, linking specific risk categories with measurable financial indicators and appropriate response instruments. This approach facilitates the implementation of a proactive and adaptive financial security management system under conditions of heightened uncertainty.

The analysis of key risks to the financial security of critical infrastructure enterprises, their associated indicators, and corresponding response instruments provides a comprehensive understanding of the mechanisms for ensuring financial stability and protection. The conceptual model for strengthening financial security (Fig. 2) integrates the findings of the "risk → indicator → response instrument" matrix, systematizing external and internal threats, financial performance indicators, and effective management measures.

Table 1

Matrix "risk → indicator → response instrument" for critical infrastructure enterprises

Risk Category	Key Risk Manifestations	Financial Security Indicators	Response Instruments
1	2	3	4
Military risks	Destruction of infrastructure; loss of production assets; disruption of logistics; occupation of territories	Decline in fixed asset value; reduction in revenue; liquidity ratios deterioration; increase in unplanned expenses	Emergency financial reserves; insurance mechanisms; diversification of logistics routes; state compensation and guarantees; rapid asset reallocation
Financial and economic risks	Price volatility in energy markets; currency fluctuations; inflation pressure; deterioration of investment climate	Profitability ratios; cash flow volatility; exchange rate sensitivity; cost structure instability	Hedging instruments; flexible pricing policies; diversification of revenue streams; financial forecasting and scenario planning
Liquidity risk	Insufficient cash flows; delays in receivables; increase in short-term liabilities	Current ratio; quick ratio; operating cash flow	Cash flow management; optimization of receivables; short-term credit lines; reserve liquidity buffers

Continuation of table 1

1	2	3	4
Solvency risk	Growth of debt burden; inability to meet long-term obligations	Debt-to-equity ratio; interest coverage ratio; long-term solvency ratios	Capital structure optimization; debt restructuring; refinancing; attraction of long-term financing
Financial independence risk	Excessive reliance on borrowed capital; limited self-financing capacity	Equity ratio; financial leverage; autonomy coefficient	Increase in equity capital; retained earnings policy; reduction of debt dependence
Technological risks (aggravated by warfare)	Equipment damage; production accidents; inability to conduct timely repairs	Growth in operational costs; asset impairment; decline in production efficiency	Technological modernization; preventive maintenance programs; emergency repair funds; digital monitoring systems
Natural and technogenic risks	Accidents, explosions, environmental damage due to hostilities	Increase in insurance costs; unexpected financial losses; environmental liabilities	Risk insurance; emergency response plans; diversification of production facilities; compliance with safety standards
Institutional and regulatory risks	Changes in legislation; regulatory uncertainty; restrictions on operations	Increase in compliance costs; delays in investment projects	Regulatory monitoring; legal risk management; cooperation with public authorities

Source: developed by the author

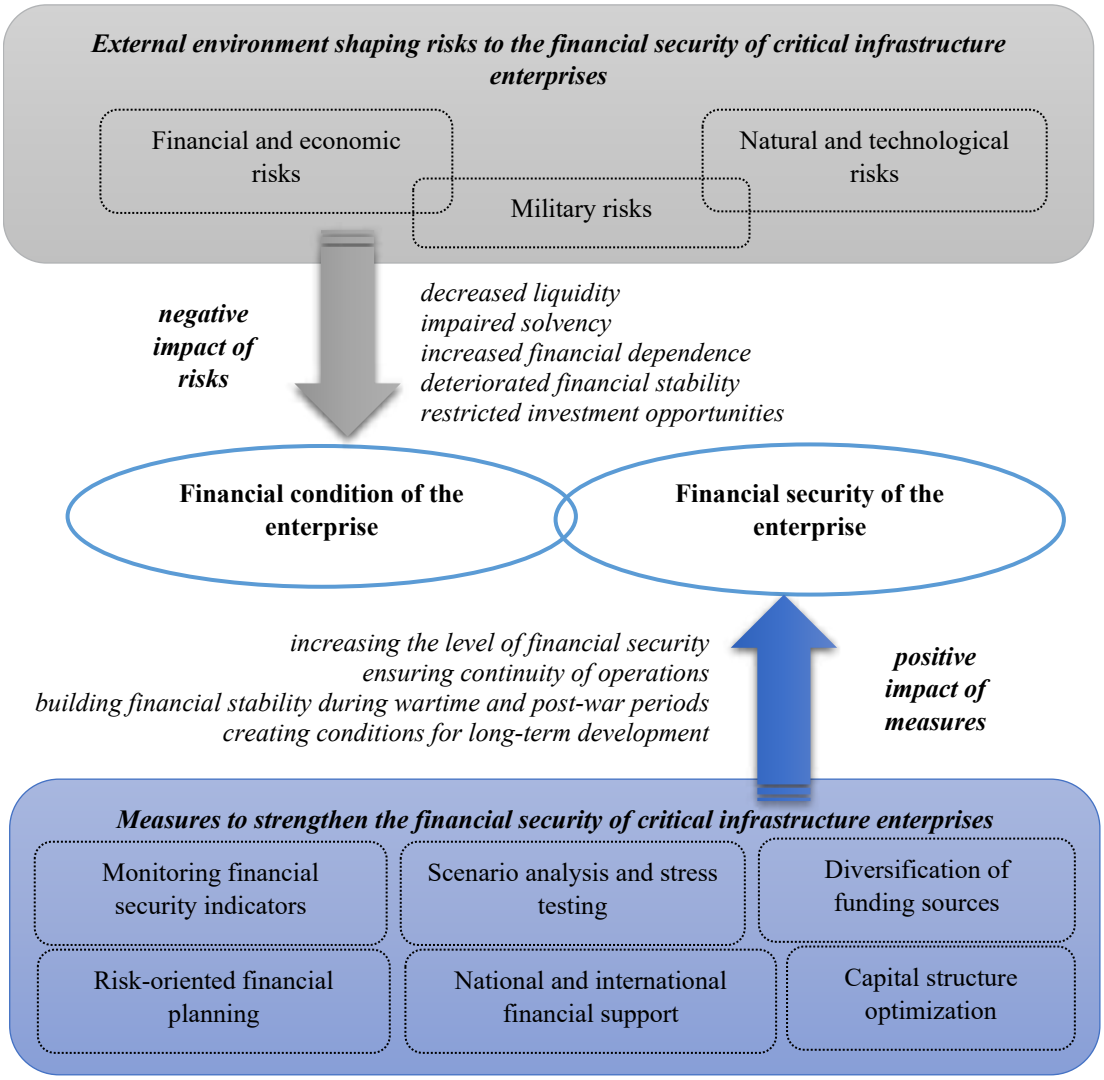

Figure 2. Conceptual model for strengthening the financial security of critical infrastructure enterprises

Source: developed by the author

The proposed conceptual model reflects the interrelations between military, economic, and technological risks, their impact on liquidity, solvency, financial independence, and sustainability, as well as the methods for mitigating adverse effects through strategic planning, monitoring, scenario analysis, and state support. This approach provides a holistic framework for enhancing the financial stability of critical enterprises during both wartime and post-war periods, creating the prerequisites for their long-term and uninterrupted operation.

Conclusions. The financial security of critical infrastructure enterprises in Ukraine under martial law is a multidimensional construct shaped by a complex interplay of external and internal risks, including military, economic, technological, and natural threats. The conducted analysis demonstrates that these risks directly affect key financial parameters such as liquidity, solvency, financial independence, and overall resilience, thereby determining the enterprises' ability to sustain uninterrupted operations and long-term development.

The proposed conceptual model, grounded in a risk-oriented approach, integrates strategic financial management tools, scenario-based planning, continuous monitoring of financial indicators, and state support mechanisms. This integrative framework allows for the systematic identification of vulnerabilities, the implementation of targeted response measures, and the enhancement of financial stability, adaptability, and resilience of critical infrastructure enterprises in the context of both wartime and post-war recovery.

Moreover, the study underscores that ensuring financial security is not merely a managerial or economic objective but a strategic imperative directly linked to national, energy, and social security. Strengthening the financial resilience of critical infrastructure enterprises provides a foundation for sustainable economic recovery, effective risk mitigation, and the long-term stability of Ukraine's critical sectors under conditions of heightened uncertainty.

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Гавловський Євгеній Олександрович, здобувач третього (наукового) рівня вищої освіти, Національний університет «Полтавська політехніка імені Юрія Кондратюка». **Зміцнення фінансової безпеки підприємств критичної інфраструктури україни в умовах воєнного стану.**

У статті досліджено проблематику фінансової безпеки підприємств критичної інфраструктури України в умовах повномасштабного воєнного вторгнення та посиленої глобальної економічної нестабільності. Підкреслюється стратегічне значення фінансової безпеки як інтегрального елементу економічної стабільності підприємств. Обгрунтовано взаємозв'язок між рівнем фінансової безпеки підприємства та ліквідністю, платоспроможністю, фінансовою стійкістю, фінансовою незалежністю економічного суб'єкта. Систематизовано основні групи ризиків, що впливають на фінансову безпеку, серед яких військові, фінансово-економічні та природно-техногенні загрози, та розкривають їхній вплив на фінансові показники підприємств. Розроблено матрицю «ризик → індикатор → інструмент реагування», що дозволяє систематично ідентифікувати загрози фінансовій безпеці підприємств критичної інфраструктури, пов'язуючи конкретні категорії ризиків з вимірюваними фінансовими показниками та відповідними інструментами реагування. На основі аналізу сучасних підходів до оцінки фінансової безпеки запропоновано концептуальну модель, що базується на ризик-орієнтованому підході та інтегрує інструменти фінансового менеджменту й державної підтримки. Модель передбачає систематичний моніторинг ключових фінансових індикаторів, сценарний аналіз можливих негативних впливів, а також застосування механізмів державного регулювання для мінімізації фінансових загроз. Особлива увага приділяється взаємозв'язку між фінансовою стійкістю, ліквідністю, платоспроможністю та фінансовою незалежністю як основними компонентами фінансової безпеки, що дозволяє забезпечити безперервність функціонування підприємств критичної інфраструктури у воєнний та повоєнний періоди. Результати дослідження підкреслюють необхідність системного, комплексного підходу до управління фінансовими ризиками та визначають стратегічні напрями зміцнення фінансової безпеки підприємств критичної інфраструктури. Практичне значення отриманих висновків полягає у формуванні рекомендацій щодо адаптації фінансового управління до умов високої невизначеності та підвищення стійкості підприємств до зовнішніх загроз.

Ключові слова: фінансова безпека, підприємства критичної інфраструктури, фінансова стійкість, ліквідність, платоспроможність, воєнний стан, ризик-орієнтоване управління, державна підтримка.

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Yevhenii Havlovskyi, Third-Level Higher Education Applicant (Ph.D. Degree Applicant), National University "Yuri Kondratyuk Poltava Polytechnic". **Strengthening the financial security of Ukraine's critical infrastructure enterprises under martial law.**

The article examines the financial security of Ukraine's critical infrastructure enterprises under conditions of full-scale war and intensified global economic instability. The strategic role of financial security as an integral component of enterprise economic stability is substantiated. The interdependence between the level of financial security and liquidity, solvency, financial stability, and financial independence is theoretically justified. The study systematizes key groups of risks affecting financial security – military, financial and economic, and natural-technogenic – and reveals their impact on enterprises' financial performance. A "risk → indicator → response instrument" matrix is developed to enable systematic identification of financial security threats by linking specific risk categories with measurable financial indicators and appropriate response tools. Based on the analysis of contemporary approaches, a conceptual model grounded in a risk-oriented framework is proposed, integrating financial management instruments with state support mechanisms. The model emphasizes continuous monitoring of key financial indicators, scenario analysis, and regulatory instruments to mitigate financial threats and ensure the continuity and long-term resilience of critical infrastructure enterprises during wartime and post-war recovery.

Key words: financial security, critical infrastructure enterprises, financial stability, liquidity, solvency, martial law, risk-oriented management, state support.