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METHODOLOGICAL APPROACH TO ASSESSING THE ECONOMIC SECURITY LEVEL OF STRATEGICALLY IMPORTANT ENTERPRISES IN THE OIL AND GAS SECTOR

The article substantiates the necessity of developing a methodological approach to assessing the level of economic security of strategically important enterprises in the oil and gas sector. It is argued that effective economic security management of such enterprises requires a comprehensive assessment toolkit capable of accounting for sector-specific characteristics, their functional role within the value chain, and contemporary security challenges. A methodological approach is proposed that advances the indicator-based method and is grounded in a multi-level system of indicators for assessing economic security. The system encompasses financial-economic, production-technological, investment-technological, infrastructural, and institutional dimensions of enterprise activity. The foundation of this system is the prior segmentation of strategically important oil and gas enterprises according to their functional role (extraction; transportation and storage; processing, supply, and asset management), which enables differentiation of the assessment focus depending on the dominant risk profile.

Keywords: economic security, oil and gas sector, strategically important enterprises, integrated assessment, indicator system, economic security management.

JEL classification: D81, L71.

МЕТОДИЧНИЙ ПІДХІД ДО ОЦІНЮВАННЯ РІВНЯ ЕКОНОМІЧНОЇ БЕЗПЕКИ СТРАТЕГІЧНО ВАЖЛИВИХ ПІДПРИЄМСТВ НАФТОГАЗОВОГО КОМПЛЕКСУ

У статті обґрунтовано необхідність розроблення методичного підходу до оцінювання рівня економічної безпеки стратегічно важливих підприємств нафтогазового комплексу. Доведено, що ефективне управління економічною безпекою таких підприємств потребує застосування комплексного інструментарію оцінювання, здатного враховувати галузеву специфіку, функціональну роль у ланцюгу створення вартості та сучасні безпекові виклики. Метою статті є обґрунтування та розроблення методичного підходу до оцінювання рівня економічної безпеки стратегічно важливих підприємств нафтогазового комплексу, що ґрунтується на системному поєднанні ключових показників діяльності з урахуванням галузевої специфіки та орієнтації на практичне використання результатів оцінювання в процесі управління економічною безпекою. Використані методи теоретичного узагальнення, систематизації та наукової абстракції, системного та структурно-функціонального аналізу. Запропоновано методичний підхід, що розвиває положення індикаторного методу, ґрунтується на багаторівневій системі індикаторів оцінювання рівня економічної безпеки, яка охоплює фінансово-економічні, виробничо-технологічні, інвестиційні-технологічні, інфраструктурні та інституційні аспекти діяльності підприємств. Базисом її формування правомірно визначено попередню сегментацію стратегічно важливих підприємств нафтогазового комплексу за функціональною роллю (видобуток; транспортування та зберігання; переробка, постачання і управління активами), що дозволяє диференціювати фокус оцінювання економічної безпеки залежно від домінуючих ризиків. Запропонований підхід дозволяє уникнути методологічних викривлень, пов'язаних із несумірністю фінансово-економічних показників, і забезпечує більш об'єктивну та аналітично обґрунтовану оцінку рівня економічної безпеки стратегічно важливих підприємств нафтогазового комплексу. Практична цінність запропонованого методичного підходу полягає у можливості використання результатів інтегральної оцінки для обґрунтування управлінських рішень, спрямованих на підвищення економічної

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стійкості стратегічно важливих підприємств нафтогазового комплексу та забезпечення стабільності функціонування енергетичної системи.

Ключові слова: економічна безпека, нафтогазовий комплекс, стратегічно важливі підприємства, інтегральна оцінка, система індикаторів, управління економічною безпекою.

Problem statement. The stable functioning of strategically important enterprises in the oil and gas sector under current conditions constitutes one of the key determinants of a state's energy independence and its capacity to withstand internal and external threats to the national economy [1]. In this context, the economic security of oil and gas enterprises transcends its microeconomic dimension and acquires systemic significance as an integral component of the state's economic and energy security.

The intensification of military risks, destruction of production and transport infrastructure, volatility of global energy markets, limited financial and investment resources, as well as increasing regulatory and environmental pressure significantly complicate the operating environment of oil and gas enterprises. Traditional approaches to ensuring financial stability prove insufficient for achieving an adequate level of economic security, thereby necessitating a transition toward comprehensive security-oriented management at the enterprise level.

A key element of the economic security management system is the assessment of its level, the results of which constitute the informational foundation for managerial decision-making, identification of threats, and determination of priority directions for enhancing the resilience of strategically important business entities [2]. However, in practice, the methodologies applied to assess economic security are often characterized by fragmentation, excessive emphasis on financial indicators, and insufficient consideration of sector-specific features and contemporary security challenges.

In light of the above, the issue of developing a comprehensive methodological approach to assessing the level of economic security of strategically important enterprises in the oil and gas sector becomes particularly relevant, taking into account modern threats and the managerial need for practical application of assessment results.

Analysis of recent research and publications. The relevance of developing and advancing methodological approaches to assessing enterprise economic security is confirmed by the extensive publication activity of both domestic and foreign scholars, which reflects the growing importance of the security factor in the functioning of economic entities under conditions of instability. The academic literature presents a broad spectrum of approaches to determining the level of enterprise economic security, differing in their underlying logic, sets of indicators, and assessment tools.

A significant contribution to the systematization of methodological approaches to assessing the economic security of business entities was made by H.V. Kozachenko and Yu.S. Pohorelov [3], who summarized indicator-based, expert, functional, narrowly functional, comprehensive, and other approaches, emphasizing their evolutionary nature and the possibility of further development depending on the operating conditions of enterprises. The classification proposed by the authors reveals the multidimensional character of the economic security category; however, it simultaneously highlights the challenge of selecting an adequate assessment toolkit for practical application.

Further developing the provisions of the indicator-based approach [4], R.M. Skrynkovskiy [5] proposed diagnosing the level of enterprise economic security through the integral aggregation of individual indicators across specific components. The proposed methodology encompasses financial, personnel-intellectual, investment, innovation-technological, marketing-market, political-legal, accounting-analytical-information, and environmental dimensions of economic security, thereby ensuring a comprehensive assessment and enabling the identification of critical risk areas. At the same time, the use of a large number of indicators increases the requirements for informational support and methodological consistency in the aggregation procedures.

The comprehensive approach to assessing enterprise economic security developed by L.V. Frolova [6] is based on the formation of an extended system of indicators grouped according to five analytical dimensions (volume, dynamics, structure, ratios, and efficiency) within seven functional components of economic security (labor, financial, tangible and intangible resources, management, marketing, and production). Such an approach significantly refines the process of identifying problems in enterprise performance and enhances the analytical depth of assessment. However, it simultaneously complicates the practical implementation of the methodology, particularly under conditions of limited statistical data availability and high volatility of the external environment.

Issues related to incorporating sector-specific characteristics into the assessment of enterprise economic security are addressed in the works of H. Koshelok and H. Pudycheva [7], who emphasize the distinctive features of energy enterprises resulting from their involvement in energy logistics flows and the predominance of technological factors. The inclusion of such parameters in the assessment system increases the relevance of results for enterprises in the energy sector; however, it requires further adaptation to account for their strategic importance and contemporary security challenges.

Consideration of sector-specific characteristics in assessing economic security is also reflected in contemporary international studies devoted to the resilience of energy systems and the oil and gas industry. In particular, the study by Lixia Yao, Zhaoguo Qin, Yanqiu Wang, and Xiangyun Li, focused on constructing a resilience index for the oil and gas industry, proposes the use of a multi-component indicator system weighted through the entropy method and complemented by scenario-based forecasting of industry development [8]. This approach makes it possible to account for the high capital intensity, technological complexity, dependence on transportation infrastructure, and sensitivity to price and geopolitical shocks inherent in the industry. Such methodological principles are particularly relevant for adapting an indicator-based system to assess the economic security of strategically important enterprises in the oil and gas sector. A significant

contribution to the advancement of approaches to assessing economic security in the oil and gas sector is presented in study [9], where a multi-level structure of indicators is proposed within the 4R framework (resistance – recovery – innovation – transformation). The hierarchical organization of indicators enables a comprehensive reflection of the specific features of strategically important oil and gas enterprises in terms of their capacity to withstand shocks, restore operational performance, and implement long-term transformation amid structural changes in energy markets.

An important contribution to the development of a methodological basis for identifying key threats characteristic of the oil and gas sector – such as price volatility, geopolitical risks, cyber threats, and infrastructure failures – was made by Justinas Jasiūnas, Peter D. Lund, and Jani Mikkola [10]. Incorporating these factors into the indicator system for assessing economic security enhances the relevance and practical applicability of results for managing strategically important enterprises within the sector.

A synthesis of the analyzed scientific approaches to assessing enterprise economic security, including indicator-based models adapted to the energy and oil and gas sectors, demonstrates the existence of substantial methodological advancements. At the same time, it reveals the absence of a universal assessment framework capable of comprehensively accounting for sector-specific characteristics, strategic significance, and contemporary security challenges affecting oil and gas enterprises. Existing methodologies tend either to focus on individual components of security or to exhibit excessive complexity and limited applicability for practical managerial use.

In this regard, there is a clear need to develop a methodological approach to assessing the level of economic security of strategically important enterprises in the oil and gas sector. Such an approach should integrate the advantages of the indicator-based method and integrated assessment, be grounded in a multi-level structure of indicators, and ensure the adaptation of assessment results to the requirements of economic security management under conditions of heightened uncertainty and sector-specific risks.

The aim of the article is to substantiate and develop a methodological approach to assessing the level of economic security of strategically important oil and gas enterprises, based on a systemic integration of key performance indicators, taking into account sector-specific characteristics and ensuring the practical applicability of assessment results in the process of economic security management.

To achieve this objective, an integrated assessment algorithm is developed, grounded in the formation of a multi-level system of indicators for evaluating the economic security level of strategically important oil and gas enterprises, with due consideration of their functional role within the value chain and the sector-specific risk profile.

Research methods. The study is based on the application of a set of general scientific and specialized methods. In particular, the methods of theoretical generalization, systematization, and scientific abstraction were employed to analyze existing approaches to assessing enterprise economic security and to formulate the conceptual foundations of the proposed methodological approach. The method of system analysis was used to examine the economic security of strategically important enterprises in the oil and gas sector as a multidimensional system integrating financial-economic, production-technological, investment-technological, infrastructural, and institutional components. The structural and functional analysis method was applied in segmenting oil and gas enterprises according to their role within the value chain (extraction; transportation and storage; processing, supply, and asset management).

Presentation of the main research results. One of the most widely used and methodologically substantiated approaches to assessing the level of enterprise economic security in contemporary research is the integrated approach, which involves aggregating a set of indicators into a single composite index [11]. The advantages of the integrated approach lie in its capacity to comprehensively reflect the multidimensional nature of economic security, ensure comparability of results across time and space, and provide applicability within monitoring systems and strategic management frameworks.

The integrated approach enables the combination of quantitative and qualitative characteristics of enterprise performance, captures the interrelationships among individual components of economic security, and produces a consolidated assessment that is convenient for managerial interpretation and the formulation of strategic directions for strengthening economic security. Accordingly, this approach is particularly appropriate for determining the level of economic security of strategically important enterprises in the oil and gas sector, whose activities are characterized by high capital intensity, technological complexity, dependence on critical infrastructure, and heightened sensitivity to price, geopolitical, and regulatory risks.

In view of the above, the methodological approach to assessing the level of economic security of strategically important oil and gas enterprises should be based on the indicator method and the integrated aggregation of indicators. This involves the step-by-step formation of a multi-level system of indicators, their normalization, the determination of weight coefficients, and the calculation of an integrated economic security index, thereby ensuring the analytical validity of the results and their suitability for managerial decision-making.

The structural logic and sequence of implementation of the proposed methodological approach are presented in Figure 1.

At the first stage, the development of an economic security indicator system for strategically important enterprises is carried out with due consideration of the sector-specific characteristics of the oil and gas complex. For this purpose, it is advisable to segment enterprises [12] into three key groups according to their functional role within the oil and gas value chain: extraction enterprises; transportation and storage enterprises; and processing, supply, and asset management enterprises. Accordingly, the formation of a multi-level system of indicators is based on the specific focus of economic security, which, in turn, depends on the group to which a particular enterprise belongs.

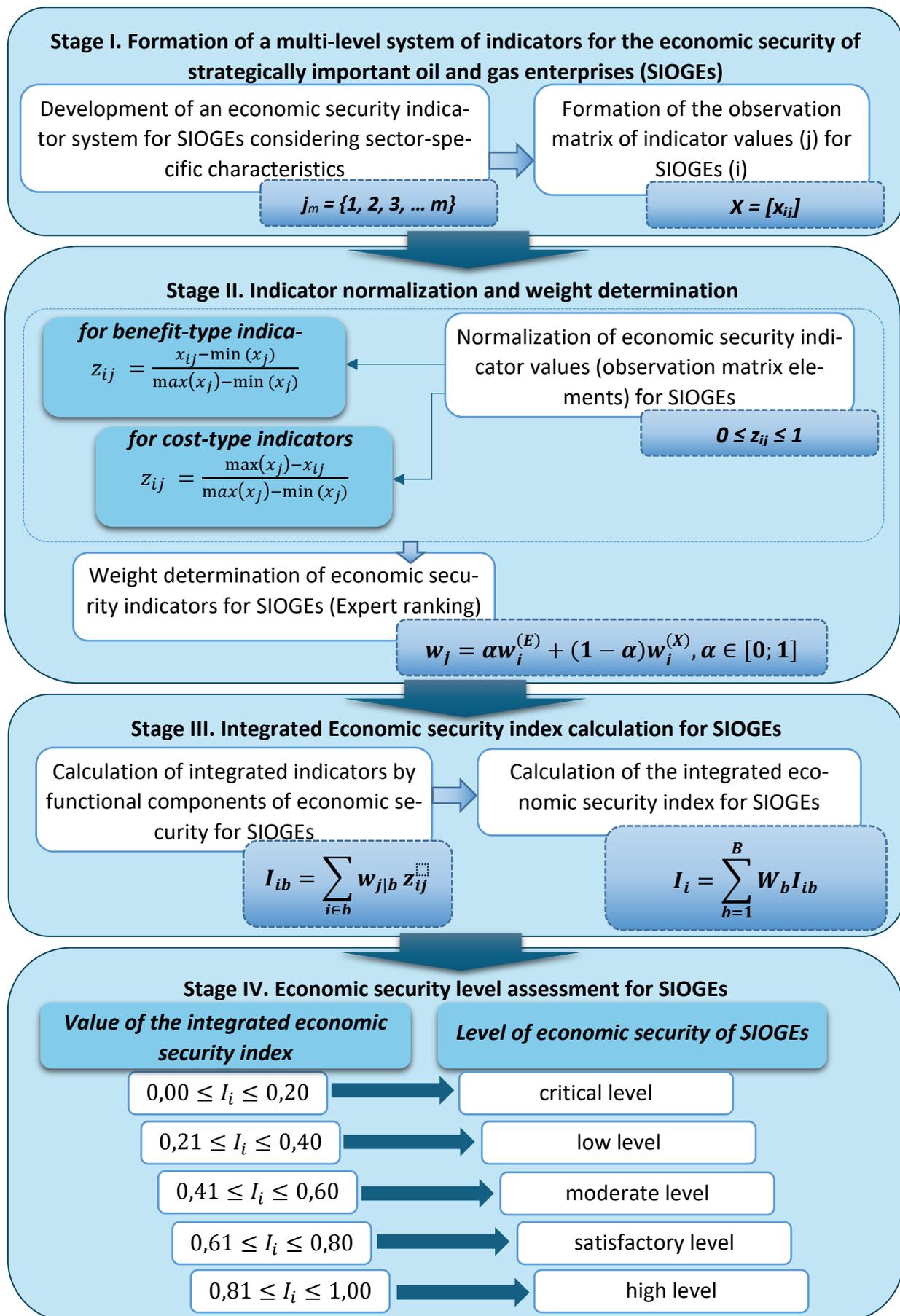


Fig. 1. Methodological approach to assessing the economic security level of SIOGEs
Source: developed by the author

For extraction enterprises, the primary risks to economic security include high capital intensity, geological risks, depreciation of fixed assets, price volatility, and military threats. Therefore, the level of economic security in this segment largely depends on financial stability, particularly the ability to replenish the resource base, production cost efficiency, and investment capacity. For strategic operators of pipeline and gas transportation infrastructure, classified within the transportation and storage segment, key economic security risks include infrastructure damage, transit-related risks, accident rates, and regulatory constraints. Accordingly, priority indicators should encompass operational metrics such as continuity of transportation, network reliability, and transmission losses. As for the third group – enterprises engaged in processing, supply, distribution, and corporate asset management – the key economic security indicators are appropriately represented by measures of profitability and financial stability.

Taking the above into account, the multi-level system of economic security indicators for strategically important oil and gas enterprises comprises five interrelated blocks: financial-economic, production-technological, investment-technological, infrastructural, and institutional indicators.

At the second stage, the indicators are normalized and their weight coefficients are determined. To ensure comparability of indicators measured in different units, normalization is performed taking into account the direction of their influence (benefit-type and cost-type indicators) [13]. The determination of weight coefficients is proposed to be carried out using the expert ranking method [14], which considers the prior classification of the enterprise within the defined segment of the oil and gas sector (in accordance with Stage I). The incorporation of weight coefficients makes it possible to reflect the relative significance of each indicator in shaping the overall level of enterprise economic security.

The third stage involves the calculation of integrated indicators by functional components of economic security and the formation of the overall integrated economic security index. At this stage, normalized indicators are aggregated into partial integrated indices corresponding to specific components of enterprise economic security. This enables the identification of strengths and vulnerabilities within each functional dimension and provides an analytical basis for subsequent integration. The partial integrated indices are then combined into a composite economic security index, reflecting the overall level of economic security of the oil and gas enterprise.

At the fourth stage, the results are interpreted and managerial decisions are substantiated. The obtained findings are used to identify priority directions for enhancing economic security, justify strategic and tactical management decisions, and formulate recommendations aimed at strengthening the resilience of strategically important oil

and gas enterprises.

Thus, the proposed methodological approach developed by the author combines analytical rigor with practical applicability in assessing the economic security level of strategically important oil and gas enterprises, thereby creating the basis for its effective implementation within the economic security management system.

Conclusions. The article substantiates the need to improve the methodological framework for assessing the level of economic security of strategically important oil and gas enterprises in the context of increasing security challenges, heightened uncertainty, and structural transformations of energy markets. It is demonstrated that the economic security of such enterprises extends beyond the microeconomic dimension and acquires systemic significance within the framework of ensuring the state's economic and energy security. A synthesis of scientific approaches to assessing enterprise economic security has made it possible to identify the limitations of existing methodologies, including their fragmentation, insufficient consideration of sector-specific characteristics, and limited applicability for managerial purposes.

Within the scope of the study, the author proposes a methodological approach to assessing the level of economic security based on the integrated assessment method, a multi-level system of indicators, and the differentiation of enterprises according to their functional role within the oil and gas value chain. The proposed approach involves the prior classification of strategically important oil and gas enterprises by area of activity and the application of differentiated assessment procedures. This makes it possible to avoid methodological distortions associated with the incomparability of financial and economic indicators and ensures a more objective and analytically grounded evaluation of the economic security level of each enterprise. The formalization of indicators and the step-by-step algorithm for their aggregation into partial and integrated indices, as components of the methodological approach, provide an analytical basis for identifying strengths and vulnerabilities in enterprise performance and for monitoring the dynamics of their economic security.

The practical significance of the proposed methodological approach lies in its applicability as a tool for substantiating strategic and tactical managerial decisions aimed at enhancing the resilience of strategically important oil and gas enterprises, mitigating sector-specific and external risks, and ensuring the overall stability of the energy system. Prospects for further research are associated with the practical testing of the proposed approach, refinement of the indicators within each block and their threshold values, and expansion of the assessment toolkit through the incorporation of scenario-based and risk-oriented analytical methods.

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