

METHODOLOGY FOR ASSESSING THE LEVEL OF ECONOMIC SECURITY OF AN ENTERPRISE

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Abstract. The mounting impact of both external and internal risks on the stability of economic activity necessitates the assurance of sustainable development in an unstable economic environment, as well as the necessity for effective strategic management tools. The significance of scientific research in the field of economic security lies in the development of unified approaches that facilitate the timely identification of threats and enhance the adaptability of enterprises. The *subject of the present study* is the level of economic security of the enterprise. The *article aims* to develop a methodology for assessing and testing the level of economic security of an enterprise. *Methodology.* The theoretical and methodological basis of the study relies on the dialectical approach to understanding economic phenomena, the principles of systems analysis and synthesis, and a set of general scientific and specific methods, including: statistical data processing used to analyse the enterprise's input information and calculate baseline values of economic security indicators; the grouping method applied to structure and systematize indicators by relevant spheres of activity; normalization and score-summing methods employed to determine the integral indicator of the enterprise's economic security proactivity and to construct the scale of economic security levels; and the method of scientific abstraction, which served as a tool for generalizing the research results and formulating well-substantiated conclusions. *Results.* Analysis of existing tools for assessing the level of economic security of enterprises indicates significant heterogeneity in the methods and indicators used. Most approaches focus on narrowly specialised sectoral aspects or consider only one component of economic security: mainly the financial one. This creates a need for a universal methodology that comprehensively covers all areas of enterprise activity and meets modern economic challenges. Since each area of business activity has its own threats and characteristics relating to economic security, it is advisable to divide business activity into six key areas: production processes, sales and distribution processes, information processes, personnel support, legal support for economic activity and social responsibility processes. As outlined in the proposed methodology, economic security indicators are to be ranked according to the following areas. This approach enables a structured assessment and substantiated analytical conclusions. The indicators thus form the basis for calculating the integral indicator of the enterprise's economic security proactivity. Moreover, the incorporation of expert evaluation facilitates the establishment of a scale of economic security levels that is adapted to the prevailing state of the research object. This approach ensures that the methodology is comprehensive and adaptable to the specifics of enterprises of various sizes, sectors and levels of integration into foreign economic activity. It also takes into account the presence or absence of economic security structures. *Practical implications.* The proposed concept is intended to contribute to the establishment of a scientifically grounded, transparent, and practically oriented system for assessing the general level of economic security of an enterprise. This system is designed to be universal in nature, with the aim of ensuring its applicability to enterprises across all industries. *Value / Originality.* The methodology is original in that it includes six stages: identification of the enterprise's functional areas and key business processes; classification of security types according to the enterprise's main processes; grouping of indicators according to security type; determination of assessment indicators within each group; calculation of the enterprise's economic security proactivity indicator; and determination of the enterprise's economic security level.

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The consistent implementation of these stages ensures the adaptability of the methodology to enterprises of various industries, scales, and operational specificities, as well as allows for the consideration of environmental variability. This approach establishes a foundation for proactive risk management in accordance with the requirements of a modern economy focused on resilience and strategic stability. An important component of the methodology is the grading scale of economic security levels, which is based on expert assessment. The scale includes four levels – critical, low, sufficient and high – enabling clear differentiation of security status and well-founded managerial decision-making.

Keywords: economic security, enterprise, indicator system, assessment, assessment methodology, level of economic security, proactive management.

JEL Classification: C13, C43, D81, L29, M11

1. Introduction

In the contemporary context of globalisation, digitalisation, and mounting economic turbulence, the issue of ensuring economic security for an enterprise assumes particular significance. Economic security is recognised as a pivotal element in ensuring the stable functioning and long-term development of business entities. It is a crucial factor in safeguarding an enterprise's capacity to withstand internal and external threats, adapt to evolving market conditions, and optimise the utilisation of its own resources.

Increasing competitive pressure, currency and financial market volatility, supply risks, cyber threats and social and environmental challenges mean that enterprises need effective mechanisms for monitoring and assessing their economic security status. Integrating sustainable development principles into the economic security system is especially important in order to maintain short-term stability and achieve long-term resilience while taking into account economic, social and environmental components.

The rapid transformation of the global environment demands new approaches to both social systems and business. In response to these changes, businesses are reconsidering their development and protection strategies, adopting a more proactive approach to security. In this context, the enterprise's economic security system is increasingly being perceived as a strategic business partner. Consequently, the traditional approach to developing such a system is changing.

Modern companies focus on elements such as enterprise resilience, proactive security, indirect losses, business process continuity, system flexibility, incident costs, economic efficiency, strategic planning, security performance management, economic security metrics, international standards, transparency and innovation. The glossary of enterprise economic security is shaped through interaction with company representatives and based on current business interests. In accordance with a coordinated approach, an economic security strategy is formulated. This strategy is integrated into the overall business strategy with

a view to achieving corporate goals by protecting company interests. The economic security unit plays a pivotal role in this process as a strategic business partner.

Despite the existence of various approaches and models, there is still no unified methodology that comprehensively accounts for all components of economic security – financial, informational, investment, human, environmental, and others – while reflecting the specific characteristics of an enterprise's activities. Moreover, such a methodology should be aligned with the principles of sustainable development, which highlights the need for its further refinement.

In this regard, the development and implementation of a modern methodology for assessing the level of economic security of an enterprise, based on sustainability principles, is a pressing task for both the academic community and management practitioners. The methodology under discussion should be based on a systematic approach, include relevant indicators, consider industry-specific features, and be aimed at enhancing the enterprise's adaptability, efficiency, and competitiveness in a dynamic and unstable environment.

The article aims to develop and test a methodology for assessing the economic security of enterprises.

The study is grounded in a theoretical and methodological framework that integrates a dialectical understanding of economic phenomena with the principles of systems analysis and synthesis. It employs a range of general and specialized scientific methods. Specifically, statistical data processing was applied to analyze the enterprise's input information and determine baseline values of economic security indicators. The grouping method was used to categorize and organize indicators by relevant areas of activity. Normalization and scoring methods were applied to assess the enterprise's economic security proactivity and to construct a scale of economic security levels. Finally, the method of scientific abstraction served to generalize the research findings and formulate well-substantiated conclusions.

The information and analytical base of the study was formed on the basis of statistical data from the enterprise "Optima 2011" LLC.

2. Literature Review

The issue of assessing the economic security of enterprises has received significant attention in scholarly works, establishing a broad methodological and theoretical foundation for the topic. The following significant academic contributions in recent years are worth highlighting:

A group of scholars – T. Beridze, Ie. Mishchuk, Z. Baranik, O. Galitsyna, and A. Buhra – proposed an approach to assessing the economic security of industrial enterprises using the statistical outlier method. The authors conceptualize economic security as information reflecting random fluctuations in the values of key economic indicators over time. The implementation of this approach facilitates the identification of critical deviations in the dynamics of parameters such as net income, cost, and profit before tax. The utilisation of a systemic-synergetic approach within the study is substantiated, a method that facilitates the consideration of internal factors and the timely identification of threats (Beridze, Mishchuk, Baranik, Galitsyna, Buhra, 2024). The methodology is distinguished by its simplicity of implementation; however, its sectoral application is limited and it relies exclusively on a small number of financial indicators.

In the study by L. Cherchyk, A. Shubalyi, N. Khumarova, and A. Cherchyk, a methodology for assessing the level of economic security of forestry enterprises was developed. This methodology took into account the specifics of the sector and was based on the determination of the enterprise's current state in relation to its strategic development goals. The proposed approach involves using traditional economic indicators, which are grouped into three categories of security: financial (absolute liquidity ratio, current assets turnover and financial stability); technical-technological (fixed asset wear ratio, material return and capital productivity); and human resources (material needs satisfaction ratio, staff stability and injury rate) (Cherchyk, Shubalyi, Khumarova, Cherchyk, 2020). The methodology's narrow sectoral focus limits its applicability outside the forestry sector. This specificity, however, has the effect of diminishing the analytical potential of the model for enterprises in other areas, which require a more universal approach to economic security assessment.

In the research by A. Cherep, D. Babmindra, L. Khudoliei, and Y. Kusakova (2020), an approach is presented for determining the level of financial and economic security of an enterprise. This approach is aimed at assessing its ability to resist challenges and identifying development potential. The methodology

employed is founded upon the processing of data from machine-building enterprises through the utilisation of an integral method, regression analysis, and normalisation procedures. The system of key parameters was formed through expert evaluation. Consequently, a selection of six representative indicators was made for the purpose of calculating the integral index of financial and economic security. The Harrington scale was then employed for the classification of enterprises according to their security levels (Cherep, Babmindra, Khudoliei, Kusakova, 2020). The proposed approach is somewhat limited by the number of indicators used, which does not fully reflect the multidimensional nature of financial and economic security. Narrowing the analytical coverage to six expert-selected indicators may lead to important aspects of internal stability or external risks affecting the enterprise's overall security level being omitted.

In the scientific works of D. Amiraslanova, L. Valiyeva, R. Gurbanova, and H. Kocharli, financial indicators of an enterprise are viewed as a key factor in ensuring its economic security, as they reflect the final results of activity and the ability to withstand threats. The importance of establishing clear criteria for assessing financial condition is emphasised, with these criteria providing a basis for management decisions and adaptation to environmental changes (Amiraslanova, Valiyeva, Gurbanova, Kocharli, 2024). However, such an approach is primarily concerned with financial security, overlooking other important components of economic security. This narrows the analytical capabilities for assessing overall business stability.

A more comprehensive approach to assessing economic security is proposed by T. Zubko, who conducted a functional grouping of assessment indicators by six key components: market, technical and technological, financial, investment, innovative, and intellectual-human resources. This systematisation facilitates comprehensive coverage of the primary domains influencing the economic stability of an enterprise. The assessment employs a dual approach, incorporating quantitative financial data and qualitative expert judgments in dynamics, thereby ensuring adaptability to external environment fluctuations. The determination of indicator levels is carried out considering membership functions, which allows for linguistic interpretation of the enterprise's security level (Zubko, 2019). This approach is characterised by systematicity, flexibility and analytical depth. These features enable the evaluation of the quality of results and the justification of strategic management decisions.

The work by A. Milka, O. Artyukh-Pasiuta and Z. Kononenko presents a broad systematisation of methodologies for assessing economic security, introducing a comprehensive approach to analysing

functional components of security using a wide range of methods. These include expert assessments, regression and variance analysis, exponential smoothing, fuzzy systems theory and multivariate statistical analysis. These methods allow both the quantitative and qualitative characteristics of the enterprise's condition to be considered. The authors emphasise the importance of a systemic approach to ensure consideration of the interdependencies between the enterprise's internal processes and its external environment. Assessment is conducted through the analysis of indicator dynamics and the calculation of their change rates, facilitating the identification of trends and the comparison of the levels of individual functional components of economic security over time (Milka, Artyukh-Pasiuta, Kononenko, 2023). This approach serves to enhance the justification and practical value of the assessment for strategic management.

The broadening of scientific methods for evaluating the economic security of enterprises reveals considerable methodological diversity and substantial advancement in research related to the subject, underscoring its significant scientific and practical significance. Contemporary works employ a combination of classical quantitative methods (e.g., regression analysis, integral evaluations, and normalisation methods) and modern tools (e.g., fuzzy logic, expert modelling), facilitating the establishment of well-founded analytical assessments of the security level (Shynkar, Gontar, Dubyna, Nasypaiko, Fleychuk, 2020; Shilo, 2022). Concurrently, a distinguishing feature of the majority of studies is the emphasis on individual functional components of economic security, predominantly financial, which is frequently regarded as its fundamental or prevailing component. Furthermore, assessment approaches are usually developed with consideration for the specifics of a particular sector or enterprise. This ensures applied relevance but limits the possibility of forming a universal toolkit. This fragmentation lends credence to the proposition that further improvements are required in the methodological apparatus for assessing the economic security of enterprises. Such improvements should be developed in the form of integrated approaches that would cover all relevant types of security, align with sectoral specifics, and ensure adaptability to dynamic environmental transformations and contemporary challenges.

3. Main Research Material

The present scientific article proposes a methodology for the assessment of the economic security level of an enterprise. This methodology encompasses a wide range of diverse indicators, thereby providing a comprehensive evaluation of its condition irrespective of the industry in which the enterprise operates. The proposed methodology is both simple and

convenient to use, combining analytical depth with practical usability, making it suitable for use by enterprise managers and the relevant regulatory authorities alike. The assessment of the level of economic security of the enterprise is proposed to be carried out in accordance with six consecutive stages, presented in Fig. 1.

In the preliminary stage, entitled "Identification of functional areas and key business processes of the enterprise", an analysis of the organisational structure and operational activities of the enterprise is conducted for the purpose of identifying its primary functional areas and defining business processes of the utmost importance (for example, production, sales and distribution processes, informational, legal, human resource processes, corporate social responsibility processes, etc.).

The second stage of the research, entitled "Taxonomy of security types according to the main processes at the enterprise", involves the identification of the types of economic security (financial, energy, technical and technological, investment, marketing, informational, human resources, environmental, legal, social, etc.) relevant to each of the identified business processes. This concept facilitates the establishment of a structured approach to evaluating the overall state of security, incorporating its inherent characteristics such as the scale of activity, industry specificity, enterprise size, the presence of a system or a separate unit of economic security within the enterprise, and the degree of integration into foreign economic activity, among others.

The third stage involves grouping indicators according to the defined types of security. This allows for a qualitative assessment of their state and maximises the reflection of the enterprise's economic security effectiveness. Each type of security may correspond to one or several groups of indicators, depending on the need.

In the fourth stage, "Definition of analytical indicators of assessment within each group", specific analytical indicators are selected and developed to provide a comprehensive assessment of each group of indicators. This assessment is based on criteria such as relevance, reliability, timeliness, speed of data collection, comprehensibility to users, simplicity of calculations, reflection of threat dynamics, adaptability (the possibility of adding data) and goal orientation.

The fifth stage, "Calculation of the integral indicator of the enterprise's economic security proactivity", involves determining a synthetic, generalised indicator based on the formed system of analytical indicators. This indicator reflects the enterprise's ability to not only respond to threats, but also to anticipate and prevent them. It is calculated according to the formula:

$$a_j = \sum_{i=1}^n k_{ij} \quad (1)$$

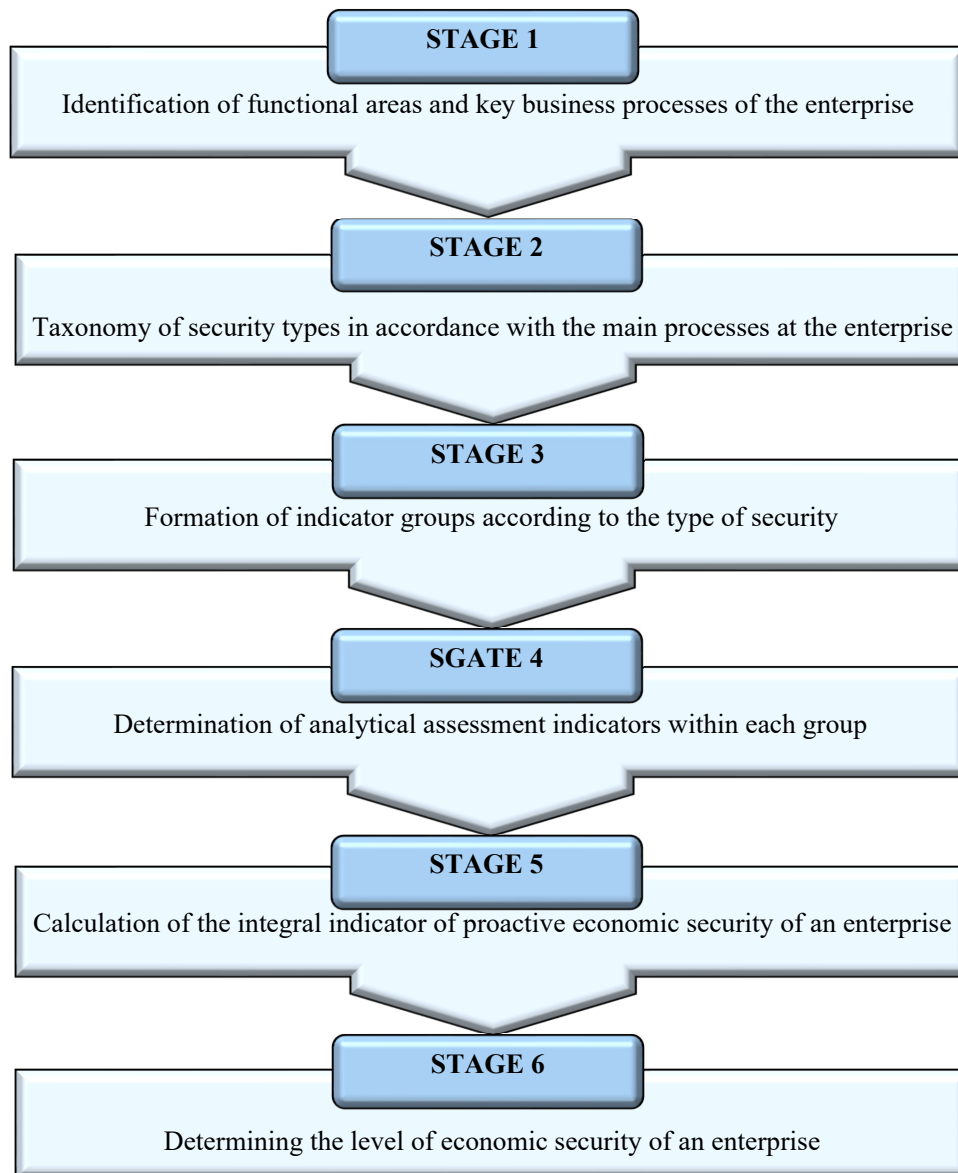


Figure 1. Stages of assessing the level of economic security of an enterprise

Source: developed by the authors

where a_j is an integral indicator of the proactivity of the economic security of the j -th enterprise;

k_{ij} is the value of the i -th indicator of the j -th enterprise;
 i is an indicator of the proactivity of economic security;

n is the number of indicators of proactive economic security.

It also provides for its conversion to a standardised value for the purpose of further determining the level of economic security. The calculation is performed according to the formula:

$$x_j = \frac{a_j}{\max a} \quad (2)$$

where x_j is the standardised value of the integral indicator of the proactivity of the economic security of the j -th enterprise;

$\max a$ is the sum of the maximum values of economic security proactivity indicators.

The sixth and final stage is the "Determination of the level of economic security of the enterprise", where the current level is identified according to the enterprise's economic security scale. The level may be critical, low, sufficient or high. A thorough analysis of the established overall level of economic security and its component elements provides a basis for well-founded managerial decisions aimed at strengthening the enterprise's vulnerable security areas.

The proposed approach to assessing an enterprise's level of economic security is systematic and analytically sound. It is also flexible, allowing the assessment methodology to be adapted to different enterprises and external conditions. Most importantly, it creates a basis for proactive risk management that meets the requirements of the modern economy.

4. System of Indicators for Assessing the Level of Economic Security of an Enterprise

A significant element of the methodology for evaluating the economic security of an enterprise is the system of indicators, which functions as its analytical core. The model provides both quantitative and qualitative reflection of the state of the main functional components of the enterprise's security, allowing for an objective diagnosis of its vulnerabilities and resilience potential. As the indicators represent the link between

the theoretical model of economic security and its practical measurement, a careful approach is required when selecting, justifying and grouping them.

The formation of the indicator system must take into account both the internal characteristics of the enterprise's activities and the external conditions of its operation, including industry specifics, risk dynamics, and transformations of the economic environment. A failure to include a sufficiently representative set of indicators, or an overly narrow set, can significantly distort the assessment results. This can make it impossible to detect threats in a timely manner. Consequently, the establishment of a balanced, comprehensive, and adaptive indicator system is imperative for a reliable assessment of the enterprise's economic security and for effective managerial decision-making.

The developed system of indicators has been constructed in accordance with the principle of correspondence between the functional areas of

Table 1
System of indicators of economic security of an enterprise

Security type	Groups of indicators	Indicators	Indicator value (1 or 0)
1	2	3	4
Production (operational) process			
Energy security	Proactive energy sustainability	Coefficient of Fixed Assets Renewal (k_1)	If $k_1 \geq 0,5$ or higher than 1 If $k_1 < 0,5$, then 0
		Availability of Alternative Energy Sources (k_2)	If "yes", then 1 If "no", then 0
		Compliance with Environmental Emissions Standards (k_3)	If "yes", then 1 If "no", then 0
Occupational safety	Proactive labour protection	Occupational Safety Unit Availability (k_4)	If "yes", then 1 If "no", then 0
		Zero Workplace Accidents (k_5)	If "yes", then 1 If "no", then 0
		Zero Occupational Diseases Cases (k_6)	If "yes", then 1 If "no", then 0
Technical and technological safety	Proactive technological security	Availability of a technical monitoring system (k_7)	If "yes", then 1 If "no", then 0
		Coefficient of the qualification level of technical personnel (k_8)	Depending on the industry (If $k_8 \geq 0.5$ and above, then 1 If $k_8 < 0.5$, then 0)
		Availability of timely preventive maintenance (k_9)	If "yes", then 1 If "no", then 0
		Timely implementation of innovative technologies (k_{10})	If "yes", then 1 If "no", then 0
		Accident rate coefficient (k_{11})	Depending on the industry (If $k_{11} \leq 0.2$, then 1 If $k_{11} > 0.2$, then 0)
Investment security	Investment proactivity	Availability of attracted investments (k_{12})	If "yes", then 1 If "no", then 0
		Use of investments as intended (k_{13})	If "yes", then 1 If "no", then 0

1	2	3	4
Environmental safety	Proactive green security	Coefficient of the level of environmental awareness of personnel (k_{14})	If “yes”, then 1 If “no”, then 0
		Availability of an environmental policy (k_{15})	If “yes”, then 1 If “no”, then 0
		Implementation of “green” technology elements (k_{16})	If “yes”, then 1 If “no”, then 0
		Availability of an environmental monitoring system (k_{17})	If “yes”, then 1 If “no”, then 0
The process of implementation and sales			
Market security	Proactive market protection	Market share of the enterprise (k_{18})	Depending on the field of activity and the size of the enterprise: If $k_{18} \geq 0.3$ or higher, then 1 If $k_{18} < 0.3$, then 0
		Availability of a marketing development strategy for the enterprise (k_{19})	If “yes”, then 1 If “no”, then 0
		Absence of customer complaints (k_{20})	If “yes”, then 1 If “no”, then 0
		Availability of innovative marketing activities (k_{21})	If “yes”, then 1 If “no”, then 0
		Brand reputation coefficient of the enterprise (k_{22})	If $k_{22} \geq 0.8$ or higher, then 1 If $k_{22} < 0.8$, then 0
Security of contractual activities	Proactive contract security	Share of contracts concluded without risk (k_{23})	If $k_{23} \geq 0,6$ or higher, then 1 If $k_{23} < 0,6$, then 0
		Availability of a system for contract control and audit (k_{24})	If “yes”, then 1 If “no”, then 0
Financial security	Financial stability	Autonomy ratio (k_{25})	If $k_{25} \geq 0,5$ or higher, then 1 If $k_{25} < 0,5$, then 0
		Financial risk ratio (k_{26})	If $k_{26} \geq 1$ or higher, then 0 If $k_{26} < 1$, then 1
		Equity maneuverability ratio (k_{27})	If $k_{27} \geq 0,3$ or higher, then 1 If $k_{27} < 0,3$, then 0
		Debt burden ratio (k_{28})	If $k_{28} \geq 0,5$ or higher, then 0 If $k_{28} < 0,5$, then 1
	Business activity	Accounts receivable turnover ratio (k_{29})	If $k_{29} \geq 4$ or higher, then 1 If $k_{29} < 4$, then 0
		Accounts payable turnover ratio (k_{30})	If $k_{30} \geq 1$ or higher, then 1 If $k_{30} < 1$, then 0
Information process			
Information security	Proactive information protection	Availability of information protection policies and procedures (k_{31})	If “yes”, then 1 If “no”, then 0
		Absence of information leakage incidents (k_{32})	If “yes”, then 1 If “no”, then 0
		Availability of a cyber risk management system (k_{33})	If “yes”, then 1 If “no”, then 0
		Availability of timely response to cyber incidents (k_{34})	If “yes”, then 1 If “no”, then 0
		Application of modern protection technologies (k_{35})	If “yes”, then 1 If “no”, then 0
		Application of artificial intelligence technologies (k_{36})	If “yes”, then 1 If “no”, then 0
Recruitment process			

End of Table 1

1	2	3	4
Personnel security	Proactive HR management	Availability of a system for working with “objections” (k ₃₇)	If “yes”, then 1 If “no”, then 0
		Availability of an HR development strategy integrated into the overall enterprise strategy (k ₃₈)	If “yes”, then 1 If “no”, then 0
		Staff turnover rate (k ₃₉)	If k ₃₉ ≥0,05 or higher, then 0 If k _{39A} <0,05, then 1
		Availability of a “behavioural loop” system (k ₄₀)	If “yes”, then 1 If “no”, then 0
		Availability of a motivation system for employee engagement and retention (k ₄₁)	If “yes”, then 1 If “no”, then 0
Legal support of economic activity			
Legal security	Legal proactivity	Share of favourable criminal court decisions (k ₄₂)	If k ₄₂ ≥0,5 or higher, then 1 If k ₄₂ <0,5, then 0
		Share of favourable administrative court decisions (k ₄₃)	If k ₄₃ ≥0,5 or higher, then 1 If k ₄₃ <0,5, then 0
		Share of favourable commercial court decisions (k ₄₄)	If k ₄₄ ≥0,5 or higher, then 1 If k ₄₄ <0,5, then 0
		Availability of an enterprise economic security strategy integrated into the overall enterprise strategy (k ₄₅)	If “yes”, then 1 If “no”, then 0
		Availability of a full set of “permitting documentation” (k ₄₆)	If “yes”, then 1 If “no”, then 0
The process of social responsibility			
Social security	Social proactivity	Transparency of information through the publication of the enterprise’s sustainable development reports (k ₄₇)	If “yes”, then 1 If “no”, then 0
		Availability of communication channels (k ₄₈)	If “yes”, then 1 If “no” then 0
		Availability of implemented social projects for the community (k ₄₉)	If “yes”, then 1 If “no”, then 0
	Transparent impact of sustainable development	Availability of a monitoring system for achieving sustainable development goals (k ₅₀)	If “yes”, then 1 If “no”, then 0
		Availability of implemented non-financial reporting in accordance with ESG/GRI standards (k ₅₁)	If “yes”, then 1 If “no”, then 0
		Availability of an approved sustainable development policy (strategy) (k ₅₂)	If “yes”, then 1 If “no”, then 0

Source: developed by the authors

the enterprise's activities and the relevant types of economic security (see Table 1). Each type of security, which is indicative of the specifics of a certain area, corresponds to a set of indicators grouped according to substantively homogeneous characteristics. This approach ensures the structural consistency of the assessment system and allows for a multi-level analysis of the enterprise's economic security level.

The calculation of the enterprise's proactive economic security integral indicator is based on the values obtained from the developed system of indicators. This indicator performs two analytical functions. Firstly, it allows for the quantitative assessment of the overall level of economic security of the business entity. Secondly, it enables the identification of vulnerable elements within the enterprise's security structure that require priority managerial response. In particular, indicator values of zero or critically low indicate the presence of critical

risk zones, which form priority areas of activity for the economic security department.

The effective application of the integral indicator is predicated on a well-founded scale of economic security levels, which facilitates the interpretation of assessment results and serves as a basis for making strategic managerial decisions in the field of ensuring the sustainable functioning of the enterprise.

5. Determining the Scale of Economic Security of an Enterprise

As previously noted, the proposed methodology for assessing the level of economic security systematises various types of economic security according to the key areas of enterprise activity. In particular, the construction of a scale of economic security levels has been undertaken, with six functional areas being

identified for this purpose: production (operational) processes (AEA1), sales and distribution processes (AEA2), information processes (AEA3), human resource management (AEA4), legal support of economic activity (AEA5), and corporate social responsibility processes (AEA6).

Each of the aforementioned domains is regarded as a bearer of the corresponding types of security within the enterprise's overall economic security system. In order to ensure the objectivity of subsequent calculations, it is necessary to conduct an expert assessment of the significance of each area. This assessment forms the basis for the establishment of weighting coefficients. The weights obtained are then utilised in the establishment of a scale for measuring economic security levels. This scale enables a nuanced evaluation of the contribution of each functional area to the overall level of enterprise security.

In order to construct a scale of economic security levels for the enterprise, it is necessary to determine the significance of the enterprise's areas of activity in terms of economic security. This should be based directly on expert evaluation. The generalised weighting coefficients of the areas of enterprise activity are calculated as the geometric mean of expert evaluations. The results of the expert assessment are presented in Table 2.

It is evident from the results of the calculation that the weighting coefficients for the company's areas of activity in terms of economic security are as follows: $K_1=0,31$, $K_2=0,22$, $K_3=0,13$, $K_4=0,14$, $K_5=0,13$, $K_6=0,07$.

The next stage in determining the economic security assessment scale involves applying a dispersion analysis to the alternative and nominal characteristics, and then determining the mean square deviation of the alternative distribution series of weighting coefficients for the company's areas of activity, in terms of economic security.

In order to assess the extent to which the actual weight values deviate from the ideal/nominal level (p), the formula for the mean square deviation is used:

$$\sigma = \sqrt{pq} \quad (3)$$

The smaller the value of σ , the more stable and consistent the distribution of weights is.

In this case, p acts as the proportion of unit values of the weighting coefficients of the enterprise's areas of activity in the context of economic security, which is calculated using the corresponding formula and makes it possible to determine the threshold (maximally critical) value of the economic security level scale:

$$p = \sqrt[6]{a_1 \cdot a_2 \cdot a_3 \cdot a_4 \cdot a_5 \cdot a_6}; \quad (4)$$

$a_i, i = 1, 6$ – weighting coefficients for the company's areas of activity in terms of economic security.

Accordingly,

$$q = 1 - p \quad (5)$$

The results of the calculations show the following:

$$p = \sqrt[6]{0,31 \cdot 0,22 \cdot 0,13 \cdot 0,14 \cdot 0,13 \cdot 0,07} = 0,31, \text{ then } q = 1 - 0,31 = 0,69.$$

$$\text{Thus, } \sigma = \sqrt{0,31 \cdot 0,69} = 0,46.$$

The calculated standard deviation of the weighting coefficients makes it possible to determine the length of the interval corresponding to the sufficient level of economic security of the enterprise, which amounts to 0.46. Applying the three-sigma rule (3σ), a scale is formed in units of fractions of the standard deviation, where the base value is taken as an interval of $\frac{1}{2}\sigma$. Thus, the length of the next level interval (low) is 0.23. In this case, the interval between the upper limits of the low and sufficient levels is defined as $2 \cdot \frac{1}{2}\sigma = \sigma = 0.46$, and the difference between the lower limit of the low level and the upper limit of the sufficient level is $3 \cdot \frac{1}{2}\sigma = 3/2\sigma = 0.69$.

Therefore, based on the results of the expert evaluation and the weighting coefficient calculations for the enterprise's areas of activity from the perspective of economic security, a scale for assessing the enterprise's level of economic security is formed (see Fig. 2).

Following the calculation of the integral indicator of proactive economic security of an enterprise, the standardisation of the developed assessment scale,

Table 2

The importance of the company's areas of activity from the point of view of economic security, according to experts' estimates

Areas of enterprise activity	Expert assessment, %																			
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
AEA1	25	23	23	20	25	35	40	38	35	38	30	25	42	38	30	35	25	40	32	25
AEA2	25	17	20	28	30	33	24	28	30	25	25	15	25	20	15	15	15	10	25	25
AEA3	10	10	10	15	15	10	15	15	10	15	10	15	10	10	10	15	10	15	10	10
AEA4	10	16	15	10	15	10	10	10	10	10	15	17	10	10	20	20	20	25	15	15
AEA5	15	19	17	17	10	10	10	7	10	10	10	15	10	12	20	10	20	9	10	10
AEA6	15	15	15	10	5	2	1	2	5	2	10	13	3	10	10	5	10	1	8	15

Source: developed by the authors

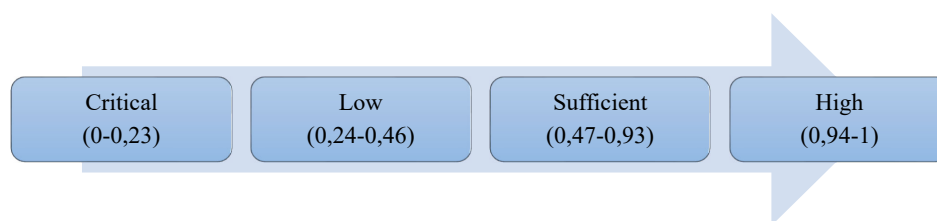


Figure 2. Scale for determining the level of economic security of an enterprise

Source: developed and calculated by the authors

and the application thereof, the appropriate level of economic security is established.

6. Result

The approval of the proposed methodology for assessing the level of economic security of an enterprise was based on the activities of LLC "Optima 2011". The company's primary activity is retail trade. The company's business areas also include non-specialised wholesale trade; retail trade in non-specialised stores, primarily of food, beverages, and tobacco products; retail trade of hardware, construction materials, and sanitary ware in specialised stores; and the rental and operation of own or leased real estate.

The results of applying the economic security assessment methodology to LLC "Optima 2011" are presented in Table 3.

The assessment of the economic security level of LLC "Optima 2011" utilising the point summation method and the normalization method has yielded positive results, indicating a favourable dynamic. The application of these methods ensured a comprehensive and objective approach to determining the integral indicator of proactive economic security.

In 2024, the enterprise successfully approached the upper boundary of the sufficient level, a feat attributable to the implementation of security measures in areas such as personnel, investment, technical-technological, and energy security. In particular, the enterprise's economic security level was enhanced by the following factors: the strengthening of human capital, the implementation of an effective personnel strategy, increased investment activity, the introduction of innovative technologies, and the renewal of fixed assets.

At the same time, further development of the economic security system requires improvements to be made to indicators relating to areas such as the market, finance, information, personnel and social security. Specifically, priority tasks include the expansion of market share, the mitigation of financial risks, the implementation of digital intelligent technologies, the development of an adaptive behavioural model for personnel management, and the advancement of sustainable development principles through increased

transparency, the implementation of a monitoring system, and the development of relevant policies. The implementation of these directives will serve to further enhance the enterprise's resilience in the face of mounting external challenges and intensified competitive pressures.

Overall, having a sufficient level of economic security indicates that critical risks to enterprise operations are absent and confirms positive trends in the management of internal resources, operational stability and financial resilience.

7. Conclusions

Taking into account current challenges, particularly the principles of sustainable development, the study of issues related to assessing the level of economic security of an enterprise is highly relevant for the formation of scientifically grounded approaches to strategic management, risk reduction, and achieving a harmonious balance between economic feasibility, environmental responsibility, and social stability. In this context, the proposed methodology for assessing the level of economic security is both applied and universal. It is based on a system of indicators categorised by the enterprise's main activity areas, ensuring comprehensive coverage of the key components of economic security.

The methodology is characterised by ease of application, transparency in interpreting results, and convenience for practical use by both enterprise management and regulatory bodies. Its utilisation facilitates not only the documentation of the prevailing state of the economic security system, but also the lucid identification of the dynamics of change and the discernment of areas of augmented risk, thereby enhancing the efficacy of management decision-making.

The approval of the proposed methodology, as demonstrated by the example of LLC "Optima 2011", confirmed its effectiveness and practical applicability. The adaptability of the developed approach to the conditions of enterprises operating in various industries and of different scales is indicative of the methodology's high potential for broad application within the economic security systems of business entities.

Table 3

Assessment of the economic security level of LLC "Optima 2011" for the period 2022–2024

Indicators	2022	2023	2024	max a
k ₁	0	0	1	1
k ₂	1	1	1	1
k ₃	1	1	1	1
k ₄	1	1	1	1
k ₅	1	1	1	1
k ₆	1	1	1	1
k ₇	1	1	1	1
k ₈	0	0	1	1
k ₉	1	1	1	1
k ₁₀	0	0	1	1
k ₁₁	1	1	1	1
k ₁₂	0	0	1	1
k ₁₃	1	1	1	1
k ₁₄	0	1	1	1
k ₁₅	0	1	1	1
k ₁₆	1	1	1	1
k ₁₇	1	1	1	1
k ₁₈	0	0	0	1
k ₁₉	1	1	1	1
k ₂₀	0	1	1	1
k ₂₁	1	1	1	1
k ₂₂	0	1	1	1
k ₂₃	1	1	1	1
k ₂₄	1	1	1	1
k ₂₅	1	1	1	1
k ₂₆	0	0	0	1
k ₂₇	1	1	1	1
k ₂₈	1	1	1	1
k ₂₉	1	1	1	1
k ₃₀	1	1	1	1
k ₃₁	1	1	1	1
k ₃₂	1	1	1	1
k ₃₃	0	1	1	1
k ₃₄	0	1	1	1
k ₃₅	0	1	1	1
k ₃₆	0	0	0	1
k ₃₇	0	0	1	1
k ₃₈	0	0	1	1
k ₃₉	0	0	1	1
k ₄₀	0	0	0	1
k ₄₁	1	1	1	1
k ₄₂	1	1	1	1
k ₄₃	0	1	1	1
k ₄₄	1	1	1	1
k ₄₅	0	1	1	1
k ₄₆	1	1	1	1
k ₄₇	0	0	0	1
k ₄₈	1	1	1	1
k ₄₉	0	1	1	1
k ₅₀	0	1	1	1
k ₅₁	0	0	0	1
k ₅₂	0	0	0	1
a _i	27	38	45	52
x _i	0,52	0,73	0,87	
Level of economic security	sufficient	sufficient	sufficient	

Source: developed and calculated by the authors

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