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*Kuchkova Olga, Bilousov Yaroslav, Kovalova Marina***PREVENTION OF CRISIS PHENOMENA AT THE ENTERPRISE THANKS TO THE
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The article examines the role of scientific knowledge in the formation of a comprehensive policy for ensuring the socio-economic security of an enterprise in the face of increasing instability and turbulence of the economic environment. The author focuses on the fact that modern enterprises face a wide range of crisis threats – from financial imbalances and disruptions in production processes to social risks associated with personnel policy, organizational culture, and the level of internal communication. Under these conditions, the integration of scientific methods of analysis, diagnostics, and forecasting becomes a necessary prerequisite for increasing the strategic stability and adaptability of the organization. Particular attention is paid to the use of economic-mathematical modeling, statistical analysis, risk monitoring, systemic and cybernetic approaches, which allow the enterprise not only to identify potential threats but also to form effective scenarios for crisis prevention. It is shown that a scientifically grounded policy of socio-economic security contributes to the optimization of management decisions, ensures an increase in the level of internal control, the development of flexible anti-crisis strategies, and the improvement of the risk management system. The analysis proves that the scientific approach to crisis prevention creates conditions for reducing the negative impact of external and internal factors, ensures the balanced development of the enterprise, increases its competitiveness, and contributes to stable functioning in the long term. The integration of science into management practices is identified as one of the key factors in forming a modern model of socio-economic security, at the center of which are predictability, resilience, and the enterprise's ability to respond timely to the challenges of the market environment.

Keywords: socio-economic security, economic security of the enterprise, anti-crisis management, crisis.

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Introduction and Problem Statement

In the context of modern global transformations, such as climate change, technological transformations, geopolitical instability, and economic volatility, socio-economic security is becoming not just a priority, but a fundamental prerequisite for the sustainable

development of any state. It reflects a state of the economy and society in which the protection of the vital interests of citizens, society, and the state from internal and external threats is ensured, and stability, sovereignty, and the possibility of self-development are guaranteed.

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Modern socio-economic problems – from rising unemployment and inequality to structural crises in industries – are complex, multifactorial, and interconnected phenomena that cannot be effectively solved using intuitive decisions or reactive “firefighting” policies. A proactive, scientifically grounded approach is necessary, capable of not only reacting to crises but also preventing their appearance and minimizing potential harm.

The relevance of integrating scientific knowledge into the formation of a crisis prevention policy is driven by two key factors. Firstly, the complexity and dynamism of threats require the use of modern methods of modeling, forecasting, and systemic analysis, which can only be developed within the framework of scientific research. Secondly, the limitation of resources requires that state interventions be as precise and effective as possible, which is only possible with their deep scientific validation.

Thus, the main strategic goal is the transition from the concept of reaction (elimination of consequences) to the concept of prevention (prevention of the emergence of threats). This requires the creation of a reliable early risk detection system, built on objective quantitative and qualitative indicators developed by scientists.

Analysis and research of publications

The issues of socio-economic security of an enterprise occupy an important place in modern scientific research, since the instability of the economic environment and the aggravation of global risks determine the need for deeper theoretical justification and practical implementation of mechanisms for preventing crisis phenomena. In the publications of domestic and foreign scientists, a systematic approach to understanding socio-economic security as a comprehensive state of protection of the key resources of an enterprise – labor, financial, informational and production – can be traced.

A significant contribution to the development of theoretical foundations was made by such scientists as O. Amosha, L. Shemaieva, T. Vasylytsiv, Z. Varnalii, who consider socio-economic security as an element of strategic management and one of the basic factors of enterprise competitiveness. In their works, the importance of combining economic, organizational and social instruments for the formation of an effective security system is emphasized.

A separate group of studies is devoted to the issues of integration of scientific methods into the policy of preventing crisis phenomena. In particular, in the works of V. Heiets, O. Kuzmin, M. Kyzim, the role of scientific analysis, mathematical modeling, forecasting and risk management in the formation of

effective managerial decisions is emphasized. The authors note that the use of scientific knowledge tools makes it possible to timely identify the prerequisites of a crisis, minimize probable threats and ensure the stability of the enterprise’s functioning.

Works in which socio-economic security is considered through the prism of behavioral aspects and corporate culture deserve attention. Researchers, among whom it is worth highlighting D. North and R. Akerlof, prove that the effectiveness of the security system largely depends on the level of staff motivation, the degree of trust in the organization, the transparency of communication processes and the presence of feedback mechanisms.

Scientific publications also emphasize the need to form new mechanisms of anti-crisis management in the context of digitalization. In the works of Ye. Rudenko, S. Illiashenko and other researchers, the importance of using information-analytical systems, artificial intelligence, big data and digital platforms for risk monitoring, scenario modeling and forecasting of crisis threats is emphasized.

Thus, the analysis of scientific works indicates a high level of theoretical development of the problem of socio-economic security and at the same time the relevance of further research aimed at improving methodological and practical approaches to the integration of scientific knowledge into the formation of a policy for preventing crisis phenomena. The existing scientific heritage confirms that it is the synthesis of scientific methods, modern technologies and strategic management that creates the basis for ensuring the sustainability and development of enterprises in conditions of increased turbulence of the external environment.

The purpose of the article

The purpose of the article is the scientific substantiation and development of an integrated mechanism for using the results of scientific research and methods of quantitative assessment for the formation of a proactive policy of preventing crisis phenomena and ensuring the sustainable development of the socio-economic security of an enterprise.

Presentation of the Main Material

In a highly competitive environment characterized by dynamic market changes, technological risks and economic instability, the ability of an enterprise not only to function but also to develop sustainably depends directly on its socio-economic security (SES). Unlike the SES of the state, which focuses on the macro level, the SES of an enterprise is an integral characteristic of its ability to withstand internal and external threats while ensuring the achievement of strategic goals, the stability of

financial flows and the well-being of its personnel.

The key problem of security management at the enterprise level lies in translating the qualitative concept of "security" into measurable and controllable parameters. Without a clear, scientifically based toolkit, management is forced to make decisions intuitively, which in conditions of crisis or increased competition can lead to significant financial losses, loss of market share and even bankruptcy.

The definition and systematization of socio-economic security indicators is critically important for an objective assessment of the level of threats and the formation of a preventive policy. Indicators reflect the state of the key spheres of functioning of the economic and social system, and threshold values serve as quantitative boundaries, the exceeding of which indicates the emergence of danger (threat) and the need for immediate managerial intervention.

It is expedient to systematize indicators according to the main functional components of socio-economic security.

For an objective diagnosis of the socio-economic security (SES) of an enterprise, it is necessary to create a multi-level system of indicators that covers the main functional spheres. Each sphere has its own indicators that reflect its stability, and threshold values, the exceeding of which signals the emergence of a threat (risk).

It is expedient to carry out systematization according to five main functional components of security.

First. Financial security (the basis of stability). This component assesses the enterprise's ability to generate sufficient cash flow, maintain solvency and financial independence.

Table 1

Characteristics of financial security indicators

Indicator	Formula	Threshold value (safe limit)	Threat level
Current liquidity ratio (absolute liquidity)	Cash / Short-term liabilities	$\geq 0.2-0.25$	Inability to quickly repay debts
Financial autonomy (independence) ratio	Equity / Total assets	≥ 0.5	High dependence on external creditors
Return on assets (ROA)	Net profit / Average value of assets	\geq Industry average	Inefficient use of resources
Debt-to-equity ratio (D/E)	Liabilities / Equity	≤ 1.0 (optimal)	Excessive financial leverage

Second. Production or technological security (stability of processes). Assesses the continuity of production, its efficiency, the wear and tear of equipment, and innovative activity.

Table 2

Characteristics of production security indicators

Indicator	Formula	Threshold value (safe limit)	Threat level
Fixed assets depreciation ratio	Accumulated depreciation / Initial cost of fixed assets	≤ 50	High risk of accidents, increase in repair costs
Fixed assets renewal ratio	Cost of commissioned fixed assets / Cost of fixed assets at the end of the period	$\geq 10-12\%$	Technological lag, loss of competitiveness
Defect (scrap) rate	Cost of defective products / Total cost of production	$\leq 1-2$ (industry-dependent)	Loss of quality and reputation, increase in costs
Share of innovative products in total output	Volume of innovative products / Total sales volume	Trend toward growth	Risk of losing market positions due to lack of innovation

Third. Personnel or social security. This component reflects the quality, stability, and motivation

of personnel, as well as social cohesion within the team [1].

Table 3

Characteristics of personnel (social) security indicators

Indicator	Formula	Threshold value (safe limit)	Threat level
Staff turnover ratio	Number of dismissed employees / Average headcount	≤ 5–10% (industry-dependent)	Loss of qualifications, increase in recruitment costs
Personnel qualification level	Share of employees with higher/specialized education	≥ Industry average	Inability to implement new technologies
Ratio of labor productivity growth to wage growth	Productivity index / Wage index	≥ 1.0	Cost increase not supported by efficiency growth
Frequency of labor conflicts	Number of complaints/incidents per 1,000 employees	Minimization, preferably 0	Social tension, sabotage, decline in morale

Fourth. Marketing security determines market dependence on key customers, and competitive positions. Assesses the stability of market positions, advantages.

Table 4

Characteristics of marketing security indicators

Indicator	Formula	Threshold value (safe limit)	Threat level
Market share	Enterprise sales volume / Total market volume	Trend toward stability/growth	Loss of competitive positions
Dependence on key customer ratio	Revenue from the largest customer / Total revenue	≤ 10–15%	Excessive risk of losing the main source of income
Sales market diversification ratio	Number of geographic markets / product segments	Trend toward growth	Vulnerability to changes in one segment/region
Customer loyalty level (NPS)	Net Promoter Score	≥ 50 (high loyalty)	Decline in reputation, customer migration to competitors

Fifth. Information and environmental security. enterprise’s activities on the environment, which forms non-financial risks. Assesses the protection of data and the impact of the

Table 5

Characteristics of information and environmental security indicators

Indicator	Formula	Threshold value (safe limit)	Threat level
Frequency of cybersecurity incidents	Number of successful attacks/data breaches per period	Minimisation, ideally 0	Loss of confidential data, reputational and financial damage
Share of information security expenditures in total IT budget	Information security costs / Total IT costs	≥ 7–10% (industry-dependent)	High vulnerability to cyber threats
Environmental responsibility ratio	Investments in environmental projects / Total investments	Trend toward growth, ≥ 3–5%	Fines, loss of social licence to operate, reputational risks
Level of compliance with environmental standards	Number of violations / Total number of inspections	0 violations	Legal sanctions, suspension of activities, environmental harm

The systematization of indicators and threshold values allows the enterprise to move from the general concept of “security” to a clearly measurable and manageable process. The integral assessment obtained on the basis of these indicators serves as scientific knowledge, which is a prerequisite for forming an effective policy of preventing crisis phenomena [2].

In modern conditions of dynamic market development and growing competitive pressure, enterprises are forced to seek approaches that increase the accuracy, predictability, and effectiveness of management decisions. Traditional intuitive or experience-based methods no longer provide the required level of effectiveness, so the use of scientific approaches comes to the forefront. It is the integration of scientific methods into all stages of the management cycle that makes the enterprise’s activities more manageable, logical, and transparent. This creates the basis for high-quality analysis, systemic control, effective risk management, and the formation of decisions based on objective data and models. Thus, the scientific approach becomes a key tool for increasing the resilience and competitiveness of the enterprise. Scientific methods can be directly integrated into the enterprise’s management cycles, making them more structured, substantiated, and effective. In modern management, it is the scientific approach that makes it possible to transform management from intuitive to systemic, ensuring a clear interconnection between analysis, control, risk management, and decision-making [3].

It all begins with a systemic approach, when the enterprise is considered as an integral structure consisting of interconnected subsystems. This makes it possible to evaluate any management actions not in isolation, but taking into account their impact on production, finance, logistics, or personnel. For example, the analysis of supply risk takes into account not only procurement indicators, but also the further impact on warehouse balances, production plans, and turnover of funds.

Management decisions are formed on the basis of analysis and synthesis: first, processes or problems are broken down into separate elements, and then combined into a generalized picture. This is how internal control can identify the causes of budget deviations or inefficiency of a certain area by comparing data on costs, revenues, and resource provision [4].

Statistical methods provide regular monitoring of performance results. The enterprise tracks trends, forecasts fluctuations, and assesses the probability of risks. Using statistical models, it is possible to determine the possibility of counterparty default, demand fluctuations, or equipment reliability.

Modern management is also impossible without economic-mathematical modeling. Optimization models make it possible to calculate the economically advantageous order size, the optimal allocation of resources, inventory levels, or probable financial risks. In risk management, the VAR model is widely used, which allows forecasting possible losses under different scenarios.

The method of scientific abstraction is manifested in the creation of internal policies and procedures. Complex enterprise processes are generalized in the form of clear regulations, control points, and responsibilities, which significantly simplifies their execution and control.

An important part of modern management is experiment and scenario modeling. An enterprise can test new solutions in pilot mode or model critical situations – from currency exchange rate fluctuations to supply disruptions. Such stress tests allow advance preparation for adverse events [5].

Logical and dialectical methods help in studying cause-and-effect relationships and making balanced decisions. For problem analysis, logical trees and cause-and-effect diagrams can be used, which makes it possible to more deeply understand the root of a risk or error in control.

A special place is occupied by the cybernetic approach, which essentially forms the basis of internal control systems. This is a closed cycle: information collection, comparison with the norm, analysis of deviations, decision-making, and further monitoring of results. The same principle is applied in risk management – the risk map is regularly reviewed and updated.

Finally, strategic management actively uses scientific methods for researching the external and internal environment – SWOT, PESTEL, morphological analysis. They allow assessing the impact of political, economic, and social factors, identifying the strengths and weaknesses of the enterprise, and forming the most substantiated strategies [6].

Thus, scientific methods are integrated into management processes not formally, but in practice. They ensure the accuracy and objectivity of control, allow forecasting risks, optimizing resources, and make management decisions as logical and substantiated as possible. This transforms management into a truly effective tool for enterprise development.

Conclusion

The socio-economic security of an enterprise is impossible without the systematic integration of scientific knowledge into the processes of forecasting, assessment, and prevention of crisis phenomena. Scientific approaches – from systems analysis to

economic-mathematical modeling – provide the enterprise with the ability not only to respond promptly to threats, but also to form a long-term policy of sustainable development. Thanks to the use of analytical tools, risk assessment methods, scenario modeling, and evidence-based information, management gains the opportunity to build substantiated decisions aimed at preventing financial, production, social, and reputational crises.

The integration of scientific knowledge enhances the enterprise’s adaptability to changes in the external environment, contributes to increasing the efficiency of internal processes, and ensures the transparency of management actions. It is precisely the scientific foundation of the security policy that forms the platform for the timely detection of imbalances, vulnerabilities, and potential “stress points,” which in the long term makes it possible to minimize losses and ensure the stable functioning of the business entity.

Thus, a scientifically grounded system for preventing crisis phenomena is one of the conditions for maintaining the competitiveness of an enterprise and a guarantee of its resilient development in the context of modern economic uncertainty.

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ПОПЕРЕДЖЕННЯ КРИЗОВИХ ЯВИЩ НА ПІДПРИЄМСТВІ ЗАВДЯКИ ІНТЕГРАЦІЇ НАУКОВИХ ЗНАНЬ

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У статті розглядається роль наукового знання у формуванні комплексної політики забезпечення соціально-економічної безпеки підприємства в умовах зростаючої нестабільності та турбулентності економічного середовища. Автор акцентує увагу на тому, що сучасні підприємства стикаються з широким спектром кризових загроз – від фінансових дисбалансів і порушень виробничих процесів до соціальних ризиків, пов’язаних із кадровою політикою, організаційною культурою та рівнем внутрішньої комунікації. У цих умовах інтеграція наукових методів аналізу, діагностики та прогнозування стає необхідною передумовою підвищення стратегічної стійкості та адаптивності організації. Особливу увагу приділено використанню економіко-математичного моделювання, статистичного аналізу, моніторингу ризиків, системного та кібернетичного підходів, які дозволяють підприємству не лише виявляти потенційні загрози, а й формувати дієві сценарії запобігання кризам. Показано, що науково обґрунтована політика соціально-економічної безпеки сприяє оптимізації управлінських рішень, забезпечує підвищення рівня внутрішнього контролю, розробку гнучких антикризових стратегій та вдосконалення системи ризик-менеджменту. Аналіз доводить, що науковий підхід до попередження кризових явищ формує умови для зменшення негативного впливу зовнішніх і внутрішніх факторів, забезпечує збалансований розвиток підприємства, підвищує його конкурентоспроможність та сприяє стабільному функціонуванню у довгостроковій перспективі. Інтеграція науки в управлінські практики визначається одним з ключових чинників формування сучасної моделі соціально-економічної безпеки, у центрі якої – прогнозованість, стійкість і здатність підприємства своєчасно реагувати на виклики ринкового середовища.

Ключові слова: соціально-економічна безпека, економічна безпека підприємства, антикризове управління, криза.

PREVENTION OF CRISIS PHENOMENA AT THE ENTERPRISE THANKS TO THE INTEGRATION OF SCIENTIFIC KNOWLEDGE

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The article examines the role of scientific knowledge in the formation of a comprehensive policy for ensuring the socio-economic security of an enterprise in the face of increasing instability and turbulence of the economic environment. The author focuses on the fact that modern enterprises face a wide range of crisis threats – from financial imbalances and disruptions in production processes to social risks associated with personnel policy, organizational culture, and the level of internal communication. Under these conditions, the integration of scientific methods of analysis, diagnostics, and forecasting becomes a necessary prerequisite for increasing the strategic stability and adaptability of the organization. Particular attention is paid to the use of economic-mathematical modeling, statistical analysis, risk monitoring, systemic and cybernetic approaches, which allow the enterprise not only to identify potential threats but also to form effective scenarios for crisis prevention. It is shown that a scientifically grounded policy of socio-economic security contributes to the optimization of management decisions, ensures an increase in the level of internal control, the development of flexible anti-crisis strategies, and the improvement of the risk management system. The analysis proves that the scientific approach to crisis prevention creates conditions for reducing the negative impact of external and internal factors, ensures the balanced development of the enterprise, increases its competitiveness, and contributes to stable functioning in the long term. The integration of science into management practices is identified as one of the key factors in forming a modern model of socio-economic security, at the center of which are predictability, resilience, and the enterprise's ability to respond timely to the challenges of the market environment.

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