

Iryna P. Otenko¹, Olena S. Preobrazhenska²
**ANALYTICAL TOOLS OF ENTERPRISE ECONOMIC
SECURITY MANAGEMENT**

The article considers the concept and the technology of modelling and evaluation of economic security factors. Modelling the factors of economic security envisages the compliance of the development of essential properties and relations within the enterprise system to the processes of changes of its financial and economic status.

Keywords: strategic management; analytical tools; enterprise development; economic security.

**Ирина П. Отенко, Елена С. Преображенська
АНАЛІТИЧНИЙ ІНСТРУМЕНТАРІЙ УПРАВЛІННЯ
ЕКОНОМІЧНОЮ БЕЗПЕКОЮ ПІДПРИЄМСТВА**

У статті представлено концепцію і технологію моделювання та оцінювання чинників економічної безпеки підприємства. Моделювання факторної системи економічної безпеки підприємства передбачає адекватність процесам зміни його фінансово-економічного стану, відбиття істотних властивостей і зв'язків у системі підприємства.

Ключові слова: стратегічне управління; аналітичний інструментарій; розвиток підприємства; економічна безпека.

Рис. 1. Табл. 1. Літ. 21.

**Ирина П. Отенко, Елена С. Преображенская
АНАЛИТИЧЕСКИЙ ИНСТРУМЕНТАРИЙ УПРАВЛЕНИЯ
ЭКОНОМИЧЕСКОЙ БЕЗОПАСНОСТЬЮ ПРЕДПРИЯТИЯ**

В статье представлены концепция и технология моделирования и оценки факторов экономической безопасности предприятия. Моделирование факторной системы безопасности предприятия предполагает адекватность процессам изменения его финансового состояния, отражение существенных свойств и связей в системе предприятия.

Ключевые слова: стратегическое управление; аналитический инструментарий; развитие предприятия; экономическая безопасность.

Introduction. Economic security of an enterprise is characterized by its economic status that ensures sustainability of its operations and development, its financial and commercial success. The problems of security arrangements, being recently the matter of importance, are presented in the world scientific literature from the perspective of risk coverage and assessment of its consequences. In practice there are certain ways of enterprise economic security development and in most cases they are strategically directed, accompanying the processes of qualitative organizational, innovative and investment changes and creating conditions for enterprise's stable and effective activities.

Latest research and publications analysis. A variety of problems of enterprise economic security as well as the ways of their solving are highlighted in the works of national scientists, namely V. Heiets, M. Kyzym, T. Klebanova et al. (2006), M. Yermoshenko and K. Goriacheva (2010), H. Kleiner et al. (1997), L. Shemaieva (2010), V. Vitlinskyi et al. (2004), V. Zabrodskyi and N. Kapystin (1999), Y. Zhalilo

¹ Kharkiv National University of Economics, Ukraine.

² Kharkiv National University of Economics, Ukraine.

(2004) and others. The results of their research have developed a certain methodological framework for management of national enterprises' economic security. Alongside with that, the problems of security arrangements for strategic development processes, monitoring and diagnostics of these processes, designing the effective management tools, are not fully solved. The lack of coordination between approaches, methods of enterprise economic security and strategic management of its activity stipulates the necessity for further studies in the area of risk factors, their influence on enterprise activity, the development of methodical support.

The analysis of scientific publications allows distinguishing several approaches to defining the essence of the term "economic security" and its management. A number of researches, including V. Heiets (2006), M. Kyzym, T. Klebanova et al. (2006), represent economic security as a "property", "a set of properties" that provide "an opportunity to achieve the objectives of the whole system" "ability to self-survival and development". Some scientists, such as V. Shlemko (1997), S. Lokshin and A. Svinarenko (1994), consider economic security as "a status, situation, conditions of economic system".

While managing economic security, the assessment of the threats to enterprise sustainable operations and development is the most difficult thing. A. Gradov et al. (2000) describe enterprise economic security in terms of "catastrophe theory" and considers it as "a condition in which strategic potential of an enterprise isn't located near the line of adaptability, and the threat of loss of economic security is growing in case the level of adaptability of strategic potential is reaching the line". Thus, the author associates economic security with "weak points" in the strategic potential of an enterprise, which makes it incapable to use existing investments efficiently and ensure its sustainable development. The scientists H. Collins (1993), A. Pettigrew and R. Whip (1991) presume sustainable development is connected with identifying the threats to economic security and valuable opportunities to cope with them. In practice these opportunities coincide with managerial capabilities and knowledge.

L. Kostyrko (2002) determines the general concept of sustainability of economic entities as the balance position that concedes the timeliness and efficiency of adaptation to changes of internal and external environments of operation, preserving under condition of resources development and effectiveness of business activities, such as purposefulness, dynamism, adaptivity and manageability, are preserved. By this, according to H.A. Simon et al. (1995), financial sustainability is identified as a key component of the overall sustainability of an enterprise, since financial sustainability provides free maneuvering of enterprise assets and affects the way funds are used efficiently, thus facilitating the continuous process of production and sales as well as expansion and renewal of production.

The object of this research is strategic maintenance of enterprise economic security management.

The aim of the research is to form analytical tools for enterprise economic security management based on defining the key internal factors of economic security.

The methods of the research are abstract and logical, analysis and synthesis, theoretical generalization and factor analysis.

Defining the properties of enterprise economic strength. Modelling of factor system of enterprise economic security envisages the compliance to the processes of changes of its financial and economic status, development of essential properties and

relations within the enterprise system. The process of modelling and analysis consists of the following steps:

- the research concept is to be formed with the object of factors of changes of enterprise financial and economic status and a set of criteria and indicators which characterize these processes;
- the methods of mathematical modelling and evaluation of factors of economic security are identified;
- the results are interpreted and analyzed.

The basic idea of the research is that the identification of economic security factors involves the development of properties of enterprise economic strength – adaptivity, reliability, flexibility, mobility, adequacy and etc. It is necessary to consider the following:

- the main feature of economic strength is its integrity that results from the interaction of its components and determines the level of its development according to the weakest element;
- the priority of enterprise economic goals and economic results ensures the adequacy of all components within economic strength to achieve long-term development goals owing to enterprise efficient operations;
- the boundary value of adaptivity to the terms of changeable internal and external environment is determined by its stability and economic security.

The first and the second statements allow choosing among all the indicators of enterprise activity – those that ascertain profitability (resources usage, efficiency of business operations and economic activity). The third statement stipulates the necessity of using liquidity ratios and business solvency figures.

Information and statistical basis for forming the factor system of enterprises' economic security. In the system formed by the authors, all the indicators are grouped by the criteria of liquidity, business solvency and economic activity efficiency: current ratios (x_1), cash ratio (x_2) and quick ratio (x_3). The group formed by the criterion of business solvency includes: debt to equity ratio (x_4), asset coverage ratio (x_5), current assets to equity ratio (x_6). The group formed by the criterion of efficiency of economic activity and resources usage includes: return on net assets (x_7), product profitability (x_8), return on equity (x_9), profit margin (x_{10}), profitability of general (x_{10}) and primary activity (x_{11}) and working capital turnover (x_{12}) and turnover ratio (x_{13}).

The research was conducted at 28 industrial enterprises of Kharkiv region for the period of 5 years. Taking into account the volume of statistical data the method of factor analysis was chosen for modelling and evaluating the economic security factors. The task of determining the minimum number of factors sufficient to describe the base values and their correlations was solved by the method of principal components. According to the standard procedure a load matrix of weighted coefficients was obtained. Factor loadings determine the stochastic relation between original features and general factors. The interpretation of factors is presented in Table 1.

The first and the most significant factor is formed by the figures x_3 , x_1 , x_2 , x_8 , x_{11} . This sequence is formed by decreasing degree of factor load.

The presented figures and their sequence allow suggesting that this factor characterizes the state of adaptivity of enterprise economic strength in terms of liquidity

and business solvency. In such a case, the first 3 figures (x_3 , x_7 , x_2) are determined in standard value and any variations – decreasing or increasing – indicate a threat to economic security and the loss of adaptivity of enterprise economic strength. Thus, several areas which determine the state of the factor of adaptivity of enterprise economic strength can be identified.

Table 1. Factors of Enterprise Economic Security, developed by the authors

Symbolic notation	The factor contents	Equation
F_1	Sufficient extent of adaptivity	$F_1 = 0.96x_1 + 0.89x_2 + 0.99x_3 - 0.67x_8 + 0.29x_{11} - 0.27x_{12}$
F_2	Flexibility and maneuvering ability	$F_2 = 0.97x_4 + 0.85x_5 + 0.98x_6 + 0.3x_9 + 0.26x_{11}$
F_3	Efficiency of using and profitability of economic strength	$F_3 = 0.45x_4 + 0.83x_9 + 0.91x_{10} + 0.25x_{12}$
F_4	Mobility of economic strength	$F_4 = 0.24x_5 + 0.6x_7 + 0.32x_9 + 0.42x_{10} + 0.49x_{12} + 0.82x_{13}$

If liquidity ratios are within the range of standard values, this demonstrates an "excellent" financial and economic status of an enterprise, setting the conditions for strategic development. Dynamics of changes in the observed figures towards the most acceptable values, i.e. within the limits of standard values, determines the motion of the factor within the area of "adaptivity of economic strength" and identifies it as a factor of development.

If the value of liquidity ratios is low limited and the dynamics reflects the increasing deviations from standard values, this indicates a "poor" financial and economic status of an enterprise and the loss of adaptivity of its economic strength.

The exceeding values identify resource management as irrational and inefficient.

Among the figures of this factor product profitability or commercial margin (x_8) has a significant influence. Commercial margin is predominantly influenced by endogenous factors: price strategy and policy, cost amount and cost structure etc. Increase of this indicator characterizes the development of market share.

The structure of the factor (F_1) and the results of its evaluation (Table 1) are mainly indicating the unformed sufficient degree of adaptivity of enterprise economic strength and irrational assets management.

The factor of flexibility and manoeuvrability of enterprise economic strength (F_2) is formed by the figures: current assets to equity ratio (x_6), debt to equity ratio (x_4), asset coverage ratio (x_5), return on equity (x_9), primary activity turnover (x_{11}). The most influential are the figures which define the state of working assets.

Financial independence of an enterprise depends on the ability to maneuver its own assets, sufficient financial availability to ensure continuous business operations. The enterprise, which has lost its financial stability can be defined as "a candidate for bankruptcy". In terms of partnerships between businesses this factor can be considered as a criterion of reliability.

The structure of the factor of efficiency of using and profitability of enterprise economic strength (F_3) is defined by: profitability of general activity (x_{10}), return on equity (x_9), debt to equity ratio (x_4) and working capital turnover (x_{12}). Profitability performance profile identifies the efficiency of invested capital and enterprise activity. For example, return on equity ratio is very important for evaluation of share listing.

The factor of economic strength mobility (F_4) includes: turnover ratio (x_{13}), return on net assets (x_7), return on equity (x_9), working capital turnover (x_{12}), asset coverage ratio (x_5). This factor defines the commitment of cash which is the risk base. Mobility and usage rate of own capital influence the state of enterprise industrial and technical strength.

Thus, the formed factor system defines the complete structure of the processes of development of economic strength and identifies the most influential factors as well as defines the structure of every factor and relations among the figures within the factor (Table 1). The evaluation of factors by means of cluster analysis reflects the impact of every factor and its trends within every cluster (Figure 1). The conducted research allows identifying, systematizing and classifying the totality of factors, which determine the state of change processes in economic strength and to form analytical tools of enterprise economic security management.

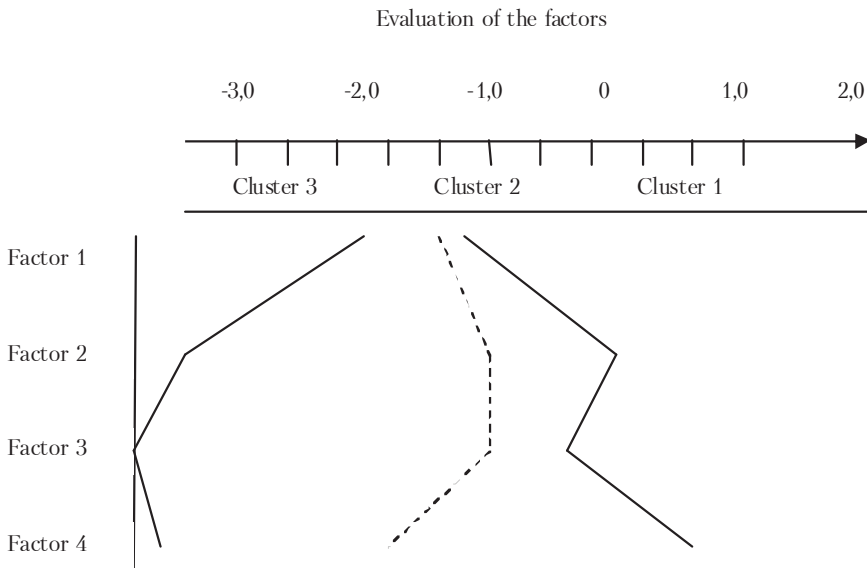


Figure 1. Graphical chart of factors score within the clusters of enterprise economic strength, calculated by the authors

Economic security evaluation is an integral management tool, as it creates an information base for making strategic management decisions to ensure a long-term performance of an enterprise. Such evaluations should be based on the cause-and-effect relations between the processes of production and economic activities for the complete consideration of all impact factors. For this purpose an economic security configuration of strategic enterprise development, which includes the following areas of evaluation: "interests", "economic and financial stability", "effective functionality" "organizational adaptability", "strategic competence", was formed.

Under the conditions of global integration and globalization the economic efficiency of modern industrial enterprise depends on establishing and maintaining close relationships with 4 types of partners: state, competitors, customers and suppliers, interest groups. According to the results of E. Derous (2000), H.A. Simon (1993),

peculiarities of such relationships reflect the interests of enterprise, form various types of strategies and can be organizationally expressed in the form of state protectionism, association, affiliation, alliance, league of public providers, political and technological strategies, political and trade-union strategies etc. By implementing such strategies, an enterprise may secure itself against a variety of possible risks, creating the so-called "niche security" where it is protected from competition and which allows entering competitive struggle at exposed markets.

In this sense there is a three-dimensional definition of a business strategy in a certain type of activity. Among the measurements it's important to mention the following:

- value or attractiveness of business areas;
- enterprise competence in this area of activity, which manifests itself as a competitive position;
- security, defined by the importance of existing organizational relations in order to avoid competition.

Indicators for the evaluation of enterprise's and its partners' interests include: the exchange index of best practices among partners; the activity index in cooperation with universities; state support index; the activity index in cooperation with competitors; the activity index in cooperation with customers.

Financial analysis is the primary task of effectiveness evaluation of production and economic activity according to the indicators: absolute, quick and current liquidity, autonomy, equity and return on assets.

Adaptivity is a state of organizational structure that allows responding flexibly to changes in the environment. The indicators for such evaluation are: the index of organizational experience gaining; the integration index; the index of productive diversification development; the specialization index; the index of outsourcing expenditures.

The component of adaptivity of organizational structure reflects the main results obtained by means of diversification, integration and specialization. Particular attention should be paid to the specialization index, calculated by the method of R. Rumelt which is detailed in the scientific work of A. Nalyvaiko (2001) in the context of research of productive diversification processes and systems of its effectiveness measurement.

Within the today's realities of Ukrainian machine-building, a set of indicators reflecting the effectiveness of the key functional fields of activity was formed: innovative development index, renewal product offering index, index of reduction of project design duration; index of increasing own innovative base; innovation development index.

Evaluation of enterprise strategic competence is based on the usage of such indicators: index of managerial staff education; management standartization index; index of return on costs for managerial knowledge development; index of managerial knowledge formalisation; index of bench-marketing costs.

Conclusions. Practical approval of this method was demonstrated at the premises of JSC "HARP", which specializes in manufacturing of bearings and is a member of UPEC (Ukrainian Industrial Energy Company) and JSC "Turboatom". The data for calculations were collected by means of observations and interviews with experts, top and middle management, personnel and administrative departments and were

based on the analysis of information in annual accounting statements and on the state website stockmarket.gov.ua.

The calculated indices form an information base for managerial decisions on economic security enhancing and point at problems with risk probabilities etc. Such assessment should be made regularly as a part of economic security monitoring system and a logical component of its management tool.

For complete understanding of the state of processes of economic strength development it's necessary to conduct further research for the groups of enterprises (typical states of economic strength) and for separate enterprises (individual states of economic strength).

References:

- Вітлінський В.В., Великоіваненко Г.І.* Ризикологія в економіці та підприємстві: Монографія. – К.: КНЕУ, 2004. – 480 с.
- Єрмошенко М.М., Горячева К.С.* Фінансова складова економічної безпеки: держава і підприємство: Наук. монографія. – К.: Національна академія управління, 2010. – 248 с.
- Жаліло Я.А.* До формування категоріального апарату науки про економічну безпеку // Стратегічна панорама. – 2004. – №3. – С. 97–104.
- Жаліло Я.А.* Економічна стратегія держави: теорія, методологія, практика: Монографія. – К.: НІСД, 2003. – 368 с.
- Забродский В., Капустин Н.* Теоретические основы оценки экономической безопасности отрасли и фирмы // Бизнес-информ. – 1999. – №15–16. – С. 35–37.
- Капустин Н.* Экономическая безопасность отрасли и фирмы // Бизнес-информ. – 1999. – №11–12. – С. 45–47.
- Клейнер Г.Б., Тамбовцев В.Л., Качалов Р.М.* Предприятие в нестабильной экономической среде: риски, стратегия, безопасность. – М.: Экономика, 1997. – 288 с.
- Костирко Л.А.* Стратегія фінансово-економічної діяльності господарюючого суб'єкта: методологія і організація: Монографія. – Луганськ: СНУ ім. В. Даля, 2002. – 560 с.
- Лыкишин С., Свиначенко А.* Развитие России и ее реструктуризация как гарантия экономической безопасности // Вопросы экономики. – 1994. – №12. – С. 115–125.
- Моделювання економічної безпеки: держава, регіон, підприємство: Монографія / В.М. Геєць, М.О. Кизим, Т.С. Клебанова, О.І. Черняк та ін.; За ред. В.М. Гейця. – Х.: ІНЖЕК, 2006. – 240 с.
- Наливайко А.П.* Теорія стратегії підприємства. Сучасний стан та напрямки розвитку: Монографія. – К.: КНЕУ, 2001. – 227 с.
- Саймон Г., Смитбург Д., Томпсон В.* Менеджмент в организациях / Пер. с англ. – М.: Экономика, 1995. – 335 с.
- Шемаєва Л.Г.* Економічна безпека підприємств у стратегічній взаємодії з суб'єктами зовнішнього середовища: Автореф. дис... д-ра екон. наук: 21.04.02 «Економічна безпека суб'єктів господарської діяльності». – К., 2010. – 42 с.
- Шлемко В.І., Білько І.Ф.* Економічна безпека України: сутність та напрямки забезпечення. – К.: НІСД, 1997. – 120 с.
- Экономическая стратегия фирмы: Учеб. пособие / Под ред. А.П. Градова. – 3-е изд., испр. – СПб.: СпецЛит, 2000. – 588 с.
- Ansoff, I.* (1957). Strategies for Diversification. Harvard Business Review, 35(5): 113–124.
- Collins, H.* (1993). The structure of knowledge, social research. Social research, 60: 95–116.
- Derous, E.* (2000). De C-story: verhelderende verhalen... actuele stromingen en rode draden binnen de competentieliteratuur // The C-story: clarifying stories actual approaches and threads in competence literature // users.skynet.be.
- European guide to good practice in knowledge management / European Committee for Standardization. Management Centre: 14924-1:2004 (e). March 2004.
- Pettigrew, A.M., Whip, R. (1991). Managing Change for Competitive Success. Oxford: Blackwell. 254 p.
- Proposed draft of American national standard knowledge management vocabulary // Rhe competitiveness of nations in a global knowledge-based economy.

Стаття надійшла до редакції 21.10.2013.