

Model for Assessing the Economic Security of an Enterprise

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The purpose of this article is to assess the economic security of the enterprise, determine the necessary and sufficient conditions for its provision, and also analyse the interaction of all persons interested in the operation of the enterprise. The existing point of view reflects the interests of management, not the owner, and is to identify threats to the activities of the enterprise. The article assumes that the economic security of an enterprise depends on timely and far-sighted management decisions. Moreover, each management decision has not only positive, but also negative consequences that pose threats to the enterprise. Thus, it is argued that the modern theory of economic security of an enterprise is focused not on the causes, but on the consequences of managerial decisions. The article proposes to consider the economic security of the enterprise from the point of view of timely fulfillment of mutual obligations by the enterprise on the one hand, and by the owner, staff, customers, partners, the state on the other. Then a necessary condition for the economic security of the enterprise is the preservation of property as a means of generating income, and a sufficient condition is the effective use of this property to generate income by the owner. With this approach to determining the economic security of an enterprise, the interests of the owner, first of all, are protected, but the application of the proposed model makes it possible to measure the appetite of the owner and the real possibilities for achieving them. Thus, the interests of management are also protected from unreasonable claims of the owner. The article proposes a mathematical model that allows you to evaluate the income of the owner, the efficiency of use of property, as well as the adequacy of investments to obtain a given income. The proposed mathematical model implies that the enterprise is focused on mass production, the sale of which is associated with a certain risk. The model assumes that the company produces several types of products for different strategic business areas. The proposed model allows us to assess the feasibility and effectiveness of innovation and investment policies, their attractiveness and effectiveness. The article provides recommendations for the practical use of the model.

Key words: *Economic security of the enterprise, interests of the owner and management, mathematical model, risk, threats.*

Introduction

In the current conditions of instability of the world economy, one of the most important tasks of science and practice is the development and implementation of a system for ensuring the economic security of an enterprise. Business entities are forced to adapt to the conditions of political and socio-economic instability, to search for adequate solutions to complex problems and ways to reduce threats to their functioning (Kasperovich & Derbinskaya, 2016; Razavi SM. et al, 2019).

The prevailing views on the economy see it as an economy of private enterprise (or a free market economy or capitalism). Currently, this is the predominant method of organizing the economy for the production of goods and services. In the existing economic system, production is carried out by enterprises owned by private individuals. Decisions at each enterprise are made in accordance with the benefit for the owners of this enterprise, and the distribution of resources in the economy is decentralized, as they are located between a large number of markets for goods and services (GIA, 2013). Based on the interests of the owners, the market should synchronize the actions of sellers and buyers, establishing a balance between output and price. From this point of view, the economic security of the enterprise consists in the guaranteed receipt of income that satisfies, first of all, the owner. But each enterprise acts on the market not only as a seller, but also as a buyer. Therefore, its existence, i.e. safety, depends on other sellers. Therefore, acting both as a seller and a buyer, an enterprise can ensure its safety through the effective use of the property at its disposal. Therefore, the preservation and enhancement of property, as well as its effective use to generate income by the owner, is the main task of ensuring the economic security of the enterprise. Therefore, the economic security of the enterprise cannot be considered in isolation from the economic space (Neu & Wolf, 1994; Luo C, et al., 2018).

But the existing approach to ensuring the economic security of an enterprise, as a science, is to protect property. The security of the wallet not only does not mean the safety of its contents, but also does not ensure its filling. Observing property, we must not forget that this is only a means of generating income. The economic security of the enterprise is, first of all, in the guaranteed receipt of income by the owner, sufficient from his point of view. Since the enterprise in the course of its activities interacts with customers (buyers), partners (suppliers, creditors, etc.), the state, the economic security of the enterprise depends on the timely fulfillment of mutual obligations by the company on the one hand, and the owner, staff, customers, partners and the state on the other hand.

In modern conditions, the problem of economic security is relevant, because enterprises operate in different external and internal risks, and the competitive economic environment hides numerous threats. This circumstance requires enterprise management entities to build an integrated system aimed at improving the level of economic security. The current crisis situation and the processes of modernization of the country determine the conduct of targeted activities in the field of ensuring economic security of enterprises (Il'yinyh, 2016).

In the current conditions of instability of the world economy, business entities are forced to adapt to the conditions of political and socio-economic instability and seek adequate solutions to complex problems and ways to reduce threats to their functioning. The high moral and physical depreciation of fixed assets, the lack of financial resources, and the breakdown of cooperation ties put the majority of enterprises in the real sector of the economy in a difficult financial situation. As a result, the problem of creating and implementing systems of ensuring economic security arises, which can create conditions for reducing the level of threats to the activities of enterprises, which becomes one of the most important tasks of science and practice.

“Economic security of the enterprise,” is a complex concept that includes a combination of factors related not so much to the internal state of the enterprise itself as to the impact of the external environment, with its subjects, with which the enterprise comes into relationship (Kozivkin, 2016; Salazar FW et al., 2019).

There are two main approaches to determining the essence of the concept of "economic security of the enterprise." According to the first approach, the economic security of the enterprise can be considered as a hypothetical absence of danger and the possibility of any threats to its functioning. The second approach to the definition considers the economic security of the enterprise as its real protection from danger, i.e., the ability to maintain its own independence and realize its interests, despite the presence of adverse factors.

So, V.K. Senchagov defines the economic security of an enterprise as the protection of its scientific, technical, technological, industrial and human potential from direct (active) or indirect (passive) economic threats, for example, associated with an ineffective scientific and industrial policy of the state or the formation of an unfavorable external environment, and the ability to reproduce it (Senchagov, 2012).

As part of this approach to the definition of this category, it is worth noting that the state of security of the enterprise is dynamic; internal threats to the security of an enterprise are no less dangerous than external ones, and the system of economic security of an enterprise is closely connected with the system of ensuring economic security of the state (Kozivkin,

2016). There are various classifications of threats to the economic security of the enterprise. In relation to the subject, threats can be external and internal. External threats are caused by the impact of the external environment:

- Political and economic instability;
- Increase by consumers of requirements for the quality of enterprise products while reducing consumption;
- Changing the structure of the market for goods and services;
- Changing financing conditions and complicating the process of attracting credit resources;
- Breaking economic ties between enterprises that make up a single technological chain;
- Imbalance between the manufacturing, procurement and processing industries;
- Low level of resource saving;
- Aggravation of global environmental problems, etc.

Internal threats are caused by the state of the enterprise itself. At the same time, internal factors can both strengthen and weaken the effect of external threats, and vice versa. The internal threats to the economic security of an enterprise should include:

- An increase in the cost of production as a result of inefficient organization of production and management processes;
- Significant managerial expenses as a result of the lack of optimization of budget management systems, management accounting policies, financial planning and financial analysis at the enterprise;
- Slow response and adjustment of production and management processes in the event of changes in environmental requirements, etc.

Threats can be indirect in nature, act under certain additional conditions, and manifest directly, directly causing negative changes. Threats to the economic security of an enterprise, depending on the source of occurrence, are divided into objective and subjective. Objectives arise without the participation and in addition to the will of the enterprise or its employees and are not dependent on management decisions. Objective threats include the state of the financial situation, scientific discoveries, force majeure circumstances, etc. Subjective threats are generated by intentional or unintentional actions of people, various bodies and organizations, including state and international competing enterprises. That is why their prevention is largely related to the impact on subjects of economic relations (Dvoryakina & Novikova, 2010; Bogomolov, 2014; Oleinikov, 2005).

In turn, the sources of threats to economic security can be external and internal (Gorbachev, 2014).

External sources of threats include: market situation; changes in demand, exchange rates, product line, cost of loans, increased competition; unfair competition and other illegal actions of third parties directed against the enterprise; threats to the company's reputation for country, political, religious and other reasons, emanating from government bodies and public organizations; industrial disasters, accidents, terrorist acts, natural disasters.

Internal sources of threats include: staff actions; disclosure of confidential information, intentional violations of control procedures for theft, negligence, sabotage; imperfection or lack of control mechanism in the enterprise.

In order to understand and evaluate the level of economic security of an enterprise, it is necessary to know the factors that determine it. Factors of economic safety of an enterprise are a set of environmental conditions affecting safety parameters. Allocate external and internal factors. External factors can be divided into three subgroups, according to Volkova M.N. (2015):

- Macroeconomic: the stage of development of the country's economy, the stability of economic legislation, inflation, currency parity, purchasing power of the population, the state of the financial system, state policy (antitrust, investment, tax, innovation, external non-economic, price);
- Market: consumer and production demand, the price level of raw materials and finished products, the dynamics of competition in the region and industry, the behavior of competitors, market capacity, and solvency of counterparties;
- Other: the pace of scientific and technological progress, demographic trends, the criminal situation, natural and climatic factors, etc.

The set of internal factors of economic security can be divided into the following groups, according to Volkova M.N. (2015):

- Financial: structure and liquidity of assets, capital structure, security with own working capital, level of profitability, profitability of investment projects, dividend policy;
- Production: use of circulating and fixed assets, condition and structure of fixed assets, quality control system, cost structure;
- Personnel: organizational structure of management, personnel motivation, payroll parameters, the presence of a development strategy, qualifications and personnel structure, level of rationalization activity, social events;

- Material and technical support: the level of diversification of supplies of raw materials, the quality of supplied raw materials, the rhythm of supplies, the use of modern supply technologies;
- Investment and technological: availability of investment resources, level of innovative activity;
- Sales: product range, pricing policy, order portfolio, degree of consumer diversification, settlement policy with
- Consumers, marketing research;
- Environmental: the introduction of new technologies, the implementation of environmental measures (Masataeva, 2015; Fomina SN et al 2018).

The level of economic security of an enterprise depends on how effectively its management is able to prevent the emergence of internal and external threats and eliminate the harmful effects of certain negative components of the external and internal environment.

The main goal of managing the economic security of the enterprise is to ensure its sustainable and efficient functioning in the current conditions, creating the potential for development and growth in the future.

The main functional goals of managing the economic security of the enterprise include: the formation of the necessary corporate resources (capital, personnel, rights, information, technology); strategic and tactical planning of the financial and economic activities of the enterprise; tactical planning of economic security according to its functional components; functional analysis of the level of economic security.

The implementation of each of the above goals of economic security of the enterprise is essential to achieve its main goal. In addition, each of the functional goals of economic security has its own structure of sub goals, determined by the functional expediency and nature of the enterprise.

The main tasks of the enterprise's economic security system include: protecting the legitimate rights and interests of the enterprise and its employees; collecting, analyzing, evaluating data and predicting enterprise development; preventing the penetration of competitors' economic intelligence structures, organized crime and individuals with unlawful intentions; ensuring the preservation of material values and information constituting a commercial secret of the enterprise; collecting the necessary information to develop the most optimal managerial decisions on the strategy and tactics of the economic activity of the company; physical and technical protection of buildings, structures, territory and vehicles; increasing the loyalty of the population and business partners to the enterprise, contributing to the implementation of

economic activity plans; monitoring the effectiveness of the functioning of the security system, improving its elements.

Given the above tasks, the conditions of competition, the specifics of the enterprise, its system of economic security is being built. It should be noted that, despite common features, the economic security system of each enterprise is individual. Its completeness and effectiveness largely depends on the state's legislative base, material and technical and financial resources allocated by the head of the enterprise, the understanding by each of the employees of the enterprise of the importance of ensuring its economic security, and also on the decisions made by the management when building the system economic security.

According to the formulated functional goals and objectives of the economic safety of the enterprise, it is advisable to highlight its functional components. The functional components of the economic security of an enterprise are a combination of its main directions, which significantly differ from each other in content.

The following functional components of the economic security of the enterprise are distinguished: financial (efficient use of corporate resources); intellectual (preservation and development of the intellectual potential of the enterprise); HR (effective personnel management); technical and technological (the degree of compliance of the technologies used at the enterprise with modern world analogues in the context of optimizing resource costs); regulatory (legal support of the enterprise); environmental (compliance with applicable environmental standards, minimizing losses from environmental pollution); informational (effective informational and analytical support of the economic activity of the enterprise); market (the degree to which the internal development opportunities of the enterprise correspond to external opportunities that develop in the market environment); power (ensuring the physical safety of employees of the enterprise and the safety of its property) (Economic security of an enterprise).

The results of the analysis and evaluation of the functional components of economic security should be the basis for the development of a set of measures aimed at countering threats and increasing the level of economic security of the enterprise and, accordingly, expanding its adaptive capabilities to changes in the conditions of economic activity, creating conditions for stable functioning and development.

The main areas of ensuring the economic security of the enterprise include: the creation of high financial performance, financial stability and independence of the enterprise; ensuring technological independence and achieving high competitiveness of the technical potential of the enterprise; achievement of high management efficiency, optimal and efficient organizational structure of enterprise management; achieving a high level of staff qualification and its intellectual potential; minimization of the devastating effect of the results

of production and economic activity on the state of the environment; high-quality legal security of all aspects of the enterprise (organization), ensuring the protection of the information field, trade secrets and achieving the necessary level of information support for the work of all departments of the enterprise and organization departments; effective organization of the safety of the enterprise personnel, its capital and property, as well as commercial interests. The implementation of directions for ensuring the economic security of the enterprise creates conditions not only for the stability of its functioning, but also for increasing the efficiency of its financial and economic activities, and also helps to increase the economic potential of the sectors of the economy.

Materials and Methods

Consequently, the economic security of the enterprise is the state of the enterprise, in which timely obligations are fulfilled by the enterprise on the one hand, and by the owner, personnel, customers, partners, and the state on the other. Thus, the economic analysis of the enterprise allows you to identify criteria that evaluate the timeliness of the fulfillment of mutual obligations (Table 1).

The owner's obligations are to provide sufficient funds to obtain the income necessary from his point of view. Interest in the results of the enterprise is determined by comparing with the alternative income generation options that are available to the owner. If his interest disappears, he can: close or sell the enterprise (in whole or in part), re-profile the enterprise or modernize production.

Table 1: Criteria for assessing the fulfillment of obligations

Defaulted party	Criterion	Liabilities
Customers	Availability and the amount of receivables	Default by buyers of products (customers)
Company	Availability and the amount of accounts payable	Failure to fulfill obligations to partners for supplied materials, raw materials, energy
Company	Untimely repayment of loans (delayed repayment by maturity and amount)	Failure to fulfill obligations to credit institutions
Company	The presence of tax arrears (time lag, amount)	Failure to fulfill obligations to the state
Company (staff)	Availability of finished products in warehouses (stocks, share of monthly output)	Out-of-production products
Company	Non-payment of dividends (date of	Failure to fulfill obligations to

	last payment, number of dividends)	the owner
State	No tax refund (date, amount)	State default
Partners	Stoppage of production due to non-supply of raw materials, according to contractual obligations, which indicate the terms, amount and terms of payment for delivery	Partners default

Thus, if the owner is not satisfied with the income from the activities of the enterprise, then he claims that the company incurs losses, or is unprofitable. Then he carries out staff reductions, sells fixed assets and the remnants of finished products, then it can declare the company bankrupt. In this case, the main value of the enterprise is fixed assets, residues of materials, finished products, which are often sold at low prices. In the best case, there may be a buyer of the entire enterprise that has a commercial idea that allows it to resume production.

The behavior of customers as buyers is determined by their desire to acquire the products of the enterprise that must meet their requirements, i.e. have both a price corresponding to the solvency of consumers, and properties that allow the use of this product for its intended purpose (Du Toit, 2013). Therefore, the obligations of customers are the timely payment of products received at the proposed price. If the volume of products sold exceeds the break-even period, then the company carries out profitable activities, but this only allows you to cover costs and clearly does not provide the owner with a satisfying income.

To reach the breakeven point, it is required that the volume of production in physical terms be

$$Q = \frac{TFC}{P - AVC}$$

Then the breakeven point in cash equivalent

$$CVP = Q \times P$$

Where: *CVP* (cost-volume-profit) - break even;

TFC (total fixed cost) - fixed costs per unit of output;

AVC (average variable cost) - variable costs per unit of output;

P (price) - unit selling price.

But the income, which the owner expects, should significantly exceed the value of *CVP*. Owner satisfaction is determined by return on equity (ROE). This indicator, in contrast to return on assets (ROA), shows the effectiveness of not all assets (like ROA), but only those that belong to the owner of the enterprise.

$$ROE = \frac{Pr}{C} \times 100 = \frac{P - TFC - AVC - \text{taxes}}{C} \times 100$$

Where: Pr - net profit.

C – equity.

The amount of income sufficient for the owner is closely related to the state of business activity, the state of those areas of economic activity in which his interests are concentrated (Fehring, Hohhov & Johnson, 2007), i.e.

$$ROE \gg CVP.$$

The existence of a certain time lag between investments and income generation indicates that the owner acts on the basis of a whole list of forecasts:

- A promising product range from the point of view of the amount of demand and price required for the production required for profitable activity;
- Barriers to entry into promising strategic areas of management, their capacities and features;
- Production costs, including personnel who possess the necessary competencies and qualifications, etc.

Thus, the formation of the future production program of the enterprise is multivariate, which necessitates the development of several scenarios when creating a new one and assessing the prospects of the existing enterprise. Each scenario contains an assessment of the income received by the owner from the activities of the enterprise for a specific product range, output volume and price. When choosing one or another scenario, in addition to income, it is necessary to take into account the economic security of the business for the proposed solutions. It is proposed to evaluate economic security by the value of the risk of income by the owner

$$SP = \sum_{i \in I} \gamma_i p_i.$$

Where γ_i - specific weight of product the product $i \in I$ - in the volume of release for a given period ($\sum_{i \in I} \gamma_i = 1$), determined based on the adopted production program; p_i - the probability of the implementation of a given volume of output $i \in I$, determined on the basis of forecasting, using the trend and periodic (seasonal) fluctuations in sales (time series) (Excerpt from online foresight guide, 2014).

The likelihood of realizing a given volume of output is directly related to the current pricing policy and the estimated market share for which the company expects in each intended strategic business area. This indicator of economic security is relative and allows you to evaluate the economic security of the enterprise by comparing options for different volumes of output of different product ranges (Chomaa, Hanocha, Gummeruma & Hodsonb, 2003; Maragheh SP, et al 2019).

Partners providing the supply of components necessary for the activities of the enterprise and the promotion of its products on the market are interested in sustainable and cost-effective activities of the enterprise, since it is a source of their income. But the profitability of partners' activity directly depends on the scale of deliveries and timely receipt of payments for the delivered products.

Thus, the preservation of property, as a means of generating income, is only a necessary condition and sufficient conditions for generating income is the effective disposal of this property.

The decisive role in ensuring the economic security of the enterprise is played by the state, which, above all, must guarantee the protection of property. The state considers the enterprise as a single property complex and stands to protect its integrity. Each enterprise must have bookkeeping that controls the integrity of the property when making settlements with customers, partners, the state and personnel. The integrity of the property is designed to ensure the material liability of the personnel, and the competence and qualification of the management contributes to the efficient use of the property.

The next aspect of the state's activity is the creation of conditions for the successful implementation by the enterprise of its activities. Thus, the state is forced to intervene in market mechanisms, regulating them in such a way that the interests of all interested parties (both owners and the population) are in balance. It is also important for owners that social stability is observed, and for the population, the ability to satisfy their needs is important. The growth in meeting the needs of the population should also lead to an increase in the incomes of owners.

There are several points of view on the economic security of the enterprise, including the owner, the state, personnel who consider the enterprise as a source of income, and buyers of products that satisfy their needs. Currently, the prevailing point of view on the economic security of the enterprise is: in ensuring the safety of property, even from the owner; in eliminating the uncertainties of conducting financial and economic activities in order to maximize tax revenues.

This is clearly not enough to satisfy not only the appetites of the owner, but also reflect the interests of buyers (customers), staff, partners and the state in the activities of the enterprise. The emphasis should be on property management, on those management decisions that ensure the effectiveness of its use. The existing point of view emphasizes continuously emerging threats, the leveling of which is constantly being done by managers (Karzaeva, 2017). But most of the threats, if not all, are a consequence of management decisions previously made by the same managers. Moreover, all management decisions are to one

degree or another risky (Granaturov, 2000; Gilad). Therefore, the inevitable occurrence of negative consequences of accepted and implemented management decisions.

Considering only threats, the role of enterprise managers is completely ignored, by their actions generating these threats, sometimes even fatal for the enterprise. Therefore, when considering the economic security of the enterprise, it is necessary to give priority attention to the activities of the enterprise management, its ability to make such management decisions that minimize the negative consequences of their implementation.

Considering management decisions management, should highlight: strategic, which allow you to implement effective and safe activities of the enterprise in the future; tactical, which are called upon to implement strategic settings in accordance with the current economic situation.

Strategic management decisions relate to the necessary change in the ownership structure, i.e., the architecture of the enterprise, based on the forced transformation of the product line according to the forecast. Adequate solutions for the transformation of enterprise architecture and their timely implementation are designed to ensure the economic security of the enterprise.

Tactical decisions are focused on the full use of enterprise resources and the opportunities provided by these resources.

As the main criterion for assessing economic security, we take the income received by the owner from the activities of the enterprise. For this, an economic-mathematical model is proposed that allows one to estimate the income of the owner.

To do this, we make several assumptions:

1. Enterprises are capable of producing several types of products.
 2. The implementation of each type of product is independent of other types of products of the enterprise.
 3. The change in the volume of output does not affect its self-value and price.
 4. All products are in demand, that is, they can be sold on the market in the volumes that the enterprise can produce.
 5. For each type of product there is a risk of sale.
 6. The total volume of output is limited by the value of fixed and working capital.
- Thus, an enterprise can produce many types of products I . As an independent variable, we consider the volume of output x_i . Each type of product $\forall i \in I$ is characterized by the vector

$$a_i = (a_{i,j}), j = \overline{1,7}.$$

- $a_{i,1}$ - the value of the owner's income per unit of output i ;
- $a_{i,2}$ selling price of the unit of production i ;
- $a_{i,3}$ the amount of tax payments per unit of output i ;
- $a_{i,4}$ volume of own work (labor input) in cost terms per unit of output i ;
- $a_{i,5}$ - the cost of materials, raw materials, components, energy and other resources coming through the supply chains, in unit price i ;
- $a_{i,6}$ labor costs in the unit of production i ;
- $a_{i,7}$ - deductions from the cost of fixed capital per unit of output i (depreciation).

In addition, for each type of product $i \in I$, the probability of product sales p_i is determined.

On the other hand, enterprise capabilities are characterized by a vector $= (C_j), j = \overline{1,7}$, where

- C_1 - the value of the minimum income satisfying the owner of the enterprise;
- C_2 - the amount of fixed capital of the enterprise;
- C_3 - the amount of working capital of the enterprise;
- C_4 - the value of the wage fund;
- C_5 - the revenue of the company.

Then the task of assessing the economic security of the enterprise can be formulated from the point of view of the amount of income received by the owner, who estimates its sufficiency on the one hand, and on the other, the sufficiency of investments to obtain the necessary income.

Then the task is formulated as follows: to determine the structure and volume of output from a given set I , delivering the maximum income of the owner, i.e.

$$y = \sum_{i \in I} p_i a_{i,1} x_i \rightarrow \max$$

subject to the following restrictions:

- The output of all types of products is limited by the value of fixed capital (if necessary, the value of fixed capital can be represented by a vector characterizing its structure), the value of α is determined based on the planned or ongoing depreciation policy, $0 \leq \alpha \leq 1$.
 - $\sum_{i \in I} a_{i,7} x_i \leq \alpha C_2$
- Labor costs are limited by the size of the wage fund
 - $\sum_{i \in I} a_{i,6} x_i \leq C_4$
- The volume of accounts payable should be limited to a fixed share of revenue coming from the sale of the enterprise's products, where the value β fixes the share of revenue going to pay off accounts payable, $0 \leq \beta \leq 1$
 - $\sum_{i \in I} a_{i,5} x_i \leq \beta C_5$

- The amount of receivables is limited by the available value of working capital, taking into account tax payments and work in progress, defined as the volume of own work (labor intensity) in value terms per unit of production i ;

$$\sum_{i \in I} (a_{i,3} + a_{i,4} + a_{i,5})x_i \leq C_3$$

Results

The model under consideration is parametric; the components in this case are the components of the vector C . When varying, its components figure out the adequacy of investments and income, depreciation policy, the adequacy of fixed and working capital for the efficient operation of the enterprise.

As a result of solving the problem, the maximum possible income of the owner is estimated, which is compared with the income on which he expects. If the received income y significantly exceeds the minimum income that the owner expects C_1 , i.e. $y \gg C_1$, then you can count on the fulfillment of mutual obligations of the owner and his company. The income of the owner is estimated taking into account the tax burden of the enterprise and is closely related to the range of products. In addition, as a result of solving the problem, not only the mission is revealed, as the main goal of the enterprise, justifying its existence, but also the outlines of the vision of the enterprise, its architecture is determined.

In addition, the model allows us to evaluate the feasibility and effectiveness of innovation and investment policies, their attractiveness and effectiveness.

You can also define the economic security of the enterprise as a relation

$$SP = \frac{\sum_{i \in I} p_i a_{i,1} x_i}{\sum_{i \in I} a_{i,1} x_i}$$

This indicator is relative and can be used to compare with other options for the production program, the amount of capital provided, etc.

To clarify the assessment of economic security, it is necessary to solve problems that make it possible to concretize the results obtained from the point of view of marketing, capacity utilization, substantiation of the value of working capital, the impact of capital intensity, material intensity and labor intensity of the products on the results of the enterprise.

Discussion

The proposed mathematical model implies that the company is focused on mass production. Mass production refers to standardized products manufactured by an enterprise without prior ordering based on projected demand. As accumulation of finished products in the warehouse, it is sold to wholesalers. This is a very important point, which should fix the period for which calculations are performed according to this model. Typically, mass production has a short production cycle, which ranges from one or several days to a month. Therefore, the use of the model is appropriate for several periods: the period of full filling of the finished goods warehouse (for footwear and tobacco products two weeks); the duration of the production cycle of production; the period determined by the timing of the preparation of financial statements.

There are other options for choosing a period for which the proposed problem is being solved. In this case, it is necessary to take into account the breadth of the nomenclature and range of products, the scale of production, the profitability of products and production, the specific gravity of each type of product in the volume of output. The last parameter allows you to evaluate the economic security of the enterprise from the point of view of management.

Theoretical and Practical Implications

The analysis of the definitions of economic security proposed in modern literature, presented by Vishnyakov Ya.D. and Lozinskiy S.V. (1998), Guskov N.S., Zenyakin V.E. and Krukov V.V. (2000), Kleiner G.B., Tambovtsev V.L. and Kachalov R.M. (1997), Kuzmin I.I., Makhutov V.L. and Hetagurov S.V. (1997) *Muravyh A.I. (1997)*, Oleinikov E.A. (1997), Shlykov V.V. (2009), Fleisher C.S. and Bensoussan B. (2002) allows us to conclude that - in the most general sense, it is "a condition in which danger is not in danger, there is protection from danger". The concept of "enterprise security" implies the efficient use of resources, ensuring stable operation of the enterprise in the present and sustainable development in the future (Shpilevskaya, 2013). It is assumed that the enterprise represents an open system operating in an unstable hostile environment (Vishnyakov & Lozinskiy, 1998). In the theoretical consideration of the security problem, the following conceptual apparatus are usually used:

- Hostility - environmental impact directed at the enterprise and being the response of the environment to the actions of the enterprise; characterized by a combination of threats to the stable functioning of the enterprise (Vishnyakov & Lozinskiy, 1998);
- Threat - these are changes in the external or internal environment of the subject, which lead to undesirable changes in the subject of security;

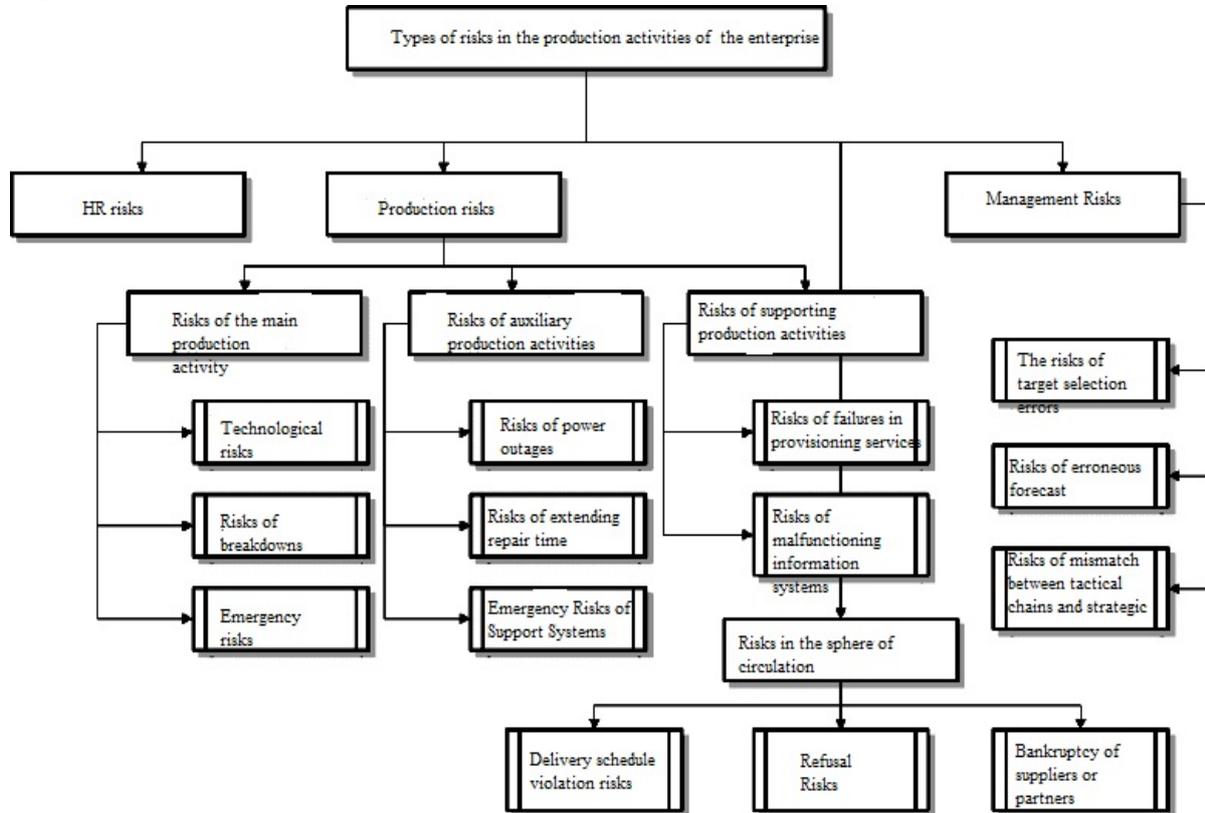
- Risk - the probability of occurrence of the above-mentioned undesirable changes;
- Damage - this is the most undesirable qualitative change in the subject of security, a decrease in its value to the subject or its complete loss;
- Security strategy - a set of the most significant decisions aimed at ensuring an acceptable level of security for the functioning of the enterprise (Shpilevskaya, 2013);
- Negative event is any unplanned event that results in material damage or moral damage to the enterprise, and entailing losses, additional expenses of the enterprise. An example of a negative event is an accident, catastrophe, accident, a failed transaction, bankruptcy of an enterprise, etc.;
- Pre-expenditures (preventive costs) - the costs of the development and implementation of measures to prevent negative events;
- Post-costs - these are the costs of eliminating the consequences of realized negative events;
- Total costs - these are the costs of ensuring the safety of the enterprise, representing the amount of pre-expenditures and post-expenditures;
- Profits resulting from the implementation of security measures.

The concept of enterprise security is inextricably linked to concepts such as sustainability, development, vulnerability, and manageability.

In general, two approaches of the authors to the definition of security can be distinguished. The first approach is based on the use of threat perception. The second approach, avoiding the use of the concept of threat in the definition of security, is based on economic concepts of achieving the goal, the functioning of the enterprise.

But an enterprise is primarily an object of economic relations, and it is important for its owner (owner, shareholder) to achieve his goal, which, as a rule, is of an economic nature. Will there be any threats in the process of achieving his goal, will there be a struggle with them at all, how will it weigh? The owner most likely does not care. The fight against threats as such is most often not the goal of creating and owning an enterprise by the owner, or conducting economic activity by him. Therefore, the existing approach to the economic security of an enterprise reflects, first of all, the interests of management, which moved from the concept of risk when making management decisions to the category of threats (Fig. 1) (Rausand, 2013).

Figure 1. The classification scheme of the risks of production activities of the enterprise.



At the same time, management does not achieve the efficient use of property, but directs all its efforts to combat constantly emerging threats, including property safety. Such a substitution allows management to translate all the negative consequences of managerial decisions into the category of threats (in the call policy) and build all its activities on the struggle with the results of their managerial decisions. There is no quantitative assessment of the results of the fight against threats, and it cannot be formalized, which makes it impossible to evaluate management activities. Thus, the existing approach contradicts the interests of the owner, who, being interested in economic results, is forced to be content with the fight against threats.

Therefore, the proposed definition of economic security of an enterprise is directly related to the economic interests of all persons interested in its activities. As a result, it becomes possible to evaluate the performance of the enterprise from the point of view of each of the directly involved parties, and, above all, the owner, for whom a mathematical model is proposed that, allows one to evaluate both his income and the sufficiency for his investment.



Conclusion

This article attempts to determine the economic security of the enterprise from the point of view of the interests of the owner, while not ignoring the interest of such parties as customers (buyers), personnel, partners, and the state. To achieve this goal, an analysis is made of the mechanism of influence on the efficiency of the enterprise, which characterizes the degree of its economic security, and a mathematical model is proposed, the purpose of which is to assess the appropriateness of the actions of the owner of the enterprise.



REFERENCES

- Vishnyakov, Ya.D. & Lozinskiy, S.V. (1998). Business and the environment: the degree of environmental hostility to business development. *Menedzhment v Rossii i za rubezhom*, no 3. 43-53.
- Granaturov, V. M. (2000). Economic risk: essence, measurement methods, ways to reduce. Moscow: *Delo i Servis*.
- Guskov, N.S., Zenyakin, V.E. & Krukov, V.V. (2000). Economic security of Russian regions. Moscow: *Algoritm*.
- Karzaeva, N.N. (2017). Fundamentals of Economic Security. Moscow: *INFRA-M*.
- Kleiner, G.B., Tambovtsev, V.L. & Kachalov, R.M. (1997). An enterprise in an unstable economic environment: risks, strategies, security. Moscow: *Economika*.
- Kuzmin, I.I., Makhutov, V.L. & Hetagurov, S.V. (1997). Safety and risk: environmental and economic aspects. St. Petersburg: *Izd-vo SPGU*.
- Muravyh, A.I. (1997). Philosophy of environmental safety (experience of a systems approach). Moscow.
- Oleinikov, E.A. (1997). Fundamentals of economic security. (State, region, enterprise, person). Moscow: ZAO "Biznes shkola Intel-Sintez".
- Shlykov, V.V. (2009). Integrated ensuring economic security of the enterprise. St. Petersburg: *Aleteya*.
- Chomaa, B., Hanocha, Y., Gummeruma, M. & Hodsonb, G. (2003). Relations between risk perceptions and socio-political ideology are domain-and ideology-dependent. *Personality and Individual Differences*, vol. 54 (1). 29–34. doi: 10.1016/j.paid.2012.07.028
- Du Toit, A.S.A. (2013). Comparative Study of Competitive Intelligence Practices between Two Retail Banks in Brazil and South Africa. *Journal of Intelligence Studies in Business*, vol. 2. 30–39.
- Fehringer, D., Hohhof, B. & Johnson, T. (2007). State of the art competitive intelligence, San Antonio, TX: *Competitive Intelligence Foundation*.
- Fleisher, C.S. & Bensoussan, B. (2002). Strategic and competitive analysis: Methods and techniques for analyzing business, Upper Saddle River, NJ: *Prentice Hall*.



- Excerpt from online foresight guide. (2014). Retrieved from http://forlearn.jrc.ec.europa.eu/guide/9_key-terms/foresight.htm
- Gilad, B. Industry Risk Management: CI's Next Step. *Competitive Intelligence Magazine*, no 4 (3).
- GIA (2013). The State of Market Intelligence in 2013: Global MI Survey findings (GIA White Paper, 2013). *Global Intelligence Alliance*.
- Neu, C. R. & Wolf, C. Jr. (1994). The Economic Dimensions of National Security. *RAND*.
- Rausand, M. (2013). Risk Assessment: Theory, Methods, and Applications. Vol. 115, *John Wiley & Sons*.
- Shpilevskaya, E.V. (2013). Economic Security in Conditions of Intensive Development of Economy. *Molodoy uchenyy*, no 6. 443-445.
- Kasperovich, S.A. & Derbinskaya, E.A. (2016). Economic security of the enterprise: the nature, goals and directions of support. *Works of BGTU*, no 7(189). 278-282.
- Kozivkin, V. V. (2016). Economic security of an enterprise. Retrieved from http://www.bmpravo.ru/show_stat.php?stat=297
- Senchagov, V. K. (2012). Economic security of Russia: basic course. Moscow: *BINOM. Laboratoriya znaniy Publ.*
- Gorbachev, D. V. (2014). A comprehensive approach to the organization of the enterprise economic security system. *Intellekt. Innovatsii. Investitsii*, no. 1, 165-170.
- Volkova, M. N. (2015). Socio-economic sciences and humanitarian research. 165 -170.
- Musataeva, M. O. (2015). Sources, types and factors of economic security risks, the establishment of economic security. Retrieved from <http://e-koncept.ru/2015/95250.htm>
- Economic security of an enterprise. Retrieved from http://mpaantiterror.ru/obespechenie_bezopasnosti.php
- Il'yinyh, A.S. (2016). Economic security of the enterprise. *Mezhdunarodnyy zhurnal gumanitarnykh i yestestvennykh nauk*, no 7(1). 183-186.
- Dvoryakina E.B. & Novikova, N.B. (2010). Economic security. Yekaterinburg.
- Bogomolov, V.A. (2014). Economic security. Moscow.



Oleinikov, E.A. (2005). Economic and national security. Moscow: *Ekzamen*.

Razavi SM, Nasirian M, Afkhami I. Study effectiveness Sleep hygiene training on Staff working on the events work turns or rotating work turns Parvadeh Tabas coal companies in 2013. UCT JOURNAL OF MANAGEMENT AND ACCOUNTING STUDIES. 2019 Oct 10;7(02):69-73.

Maragheh SP, Azar ML, Mollabashi FA. Islamic Iranian Architecture in Various Zones of Iran Dessert Cities From a Social Point. UCT Journal of Social Sciences and Humanities Research. 2019 Oct 10;7(01):6-12.

Fomina SN, Makarov VE, Rostovskaya TK, Knyazkova EA, Bereza NA. Problems of education re-structuring brought up by socially responsible design of policy. Opción. 2018 Dec 28;34(16):111-33.

Salazar FW, Tigre FG, Tubón-Núñez EE, Carrillo S, Buele J. Implementation of the Quality Management System (ISO 9001: 2015) in the Bodywork Industry. Journal of Information Systems Engineering & Management. 2019;4(2).

Luo C, Li M, Peng P, Fan S. How Does Internet Finance Influence the Interest Rate? Evidence from Chinese Financial Markets. Dutch Journal of Finance and Management. 2018;2(1):01.

Sahin N, Gault R, Tapp L, Dixon JK. Pre-Service Teachers Making Sense of Fraction Division with Remainders. International Electronic Journal of Mathematics Education. 2019 Sep 24;15(1):em0552.