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ASSESSMENT OF CRISIS-FORMING FACTORS AS A MEANS OF MONITORING THREATS TO EFFECTIVE BODY SUPPORT OF NATIONAL GUARD OF UKRAINE MILITARY UNITS

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ОЦІНКА КРИЗОУТВОРЮЮЧИХ ФАКТОРІВ ЯК ЗАСІБ МОНІТОРИНГУ ЗАГРОЗ ЕФЕКТИВНОМУ ТИЛОВОМУ ЗАБЕЗПЕЧЕННЮ ВІЙСЬКОВИХ ПІДРОЗДІЛІВ НАЦІОНАЛЬНОЇ ГВАРДІЇ УКРАЇНИ

This article presents the development of theoretical and methodological provisions for methods of monitoring and assessing the level of impact of crisis-generating threats to the effective logistics of military units of the National Guard of Ukraine. The scientific novelty of the obtained results is the development of theoretical and methodological provisions for assessing the level of influence of crisis-forming factors of threats to the effective logistics of military units of the National Guard of Ukraine. The proposed classification of various factors may cause a crisis in the logistics of military units. An objective relationship between the threat of a crisis and the factors that give rise to it is presented in the form of a linear regression equation of functional relationships. The study proposes a formalized presentation of the system of objectives for assessing the level of impact of crisis-generating threats to the effective logistics of military units of the National Guard of Ukraine. In this article the economic-mathematical modeling of influence of crisis-forming factors of threats to effective logistics of military divisions of National guard of Ukraine in the form of game with opposite interests is carried out. In this regard, the paper proposes to use a certain principle of rational choice of player strategy. In the context of assessing the level of influence of crisis-forming factors of threats to effective logistics, the article considers and formally presents the principle of the most guaranteed result, which is used in case of insufficient awareness of the influence of factors. Similarly, the paper considers the principle of indicator behavior and performs its economic and mathematical representation. A mathematical representation of the optimization problem is proposed, in the arcs of which the volume of agreements of military units with stakeholders and the cost of implemented innovations are determined. The article focuses on the fact that local management of individual factors and groups does not give the maximum possible result due to the high importance of synergistic relationships. The possibility of obtaining a positive result in this work is largely determined by the integrated management of factors in order to effectively adapt to variations and influences of the environment. The practical significance of the obtained results is the formation of appropriate recommendations to the command of military units

regarding the formation of a system of anti-crisis monitoring of the impact of crisis-forming factors of threats to effective logistics.

У даній статті подано розробку теоретико-методичних положень стосовно методики моніторингу та оцінювання рівня впливу кризоутворюючих факторів загроз ефективному тиловому забезпеченню військових підрозділів Національної гвардії України. У якості наукової новизни отриманих результатів виступає розробка теоретико-методичних положень щодо оцінювання рівня впливу кризоутворюючих факторів загроз ефективному тиловому забезпеченню військових підрозділів Національної гвардії України. В роботі запропоновано класифікацію різноманітних факторів може стати причиною кризи тилового забезпечення військових підрозділів. Подано представлення об'єктивної залежності між загрозою кризи і факторами, що її породжують, у вигляді лінійного регресійного рівняння функціональних зв'язків. В дослідженні запропоновано формалізоване подання системи цілей оцінювання рівня впливу кризоутворюючих факторів загроз ефективному тиловому забезпеченню військових підрозділів Національної гвардії України. У даній статті проведено економіко-математичне моделювання впливу кризоутворюючих факторів загроз ефективному тиловому забезпеченню військових підрозділів Національної гвардії України у вигляді гри з протилежними інтересами. У зв'язку із цим в роботі пропонується використовувати певний принцип раціонального вибору стратегії гравця. В статті в контексті оцінювання рівня впливу кризоутворюючих факторів загроз ефективному тиловому забезпеченню розглянуто та формально представлено принцип максимально гарантованого результату, який використовується у випадку недостатньої інформованості про вплив факторів. Аналогічним чином у роботі розглянуто принцип індикаторного поводження та виконано його економіко-математичне подання. Запропоновано математичне представлення оптимізаційної задачі, в арках якої визначається сбіг угод військових підрозділів зі стейкхолдерами і вартість реалізованих інновацій. У статті акцентовано увагу на тій обставині, що локальне управління окремими чинниками і групами не дає максимально можливого результату внаслідок високої значущості синергетичних зв'язків. Можливість отримання позитивного результату значною мірою в даній роботі визначається комплексним управлінні факторами з метою ефективної адаптації до варіацій і впливів зовнішнього середовища. Практичним значенням отриманих результатів є формування відповідних рекомендацій командуванню військових частин стосовно формування системи антикризового моніторингу впливу кризоутворюючих факторів загроз ефективному тиловому забезпеченню.

Keywords: *crisis-forming factors; logistics; command; military units; efficiency; management decisions.*

Ключові слова: *кризоутворюючі фактори; тилове забезпечення; командування; військові підрозділи; ефективність; управлінські рішення.*

Formulation of the problem. In order to effectively manage the logistics of military units in a crisis, it is necessary to investigate the causes of crises and the factors that stimulate their development, in order to prevent and timely neutralize. A crisis can suddenly appear during the stable development of logistics, but there are always reasons for it. Factors whose negative consequences can lead to destabilization of the state of logistics and cause a crisis can be defined as crisis-forming. That is why the scientific and practical issues of assessing the level of influence of crisis-forming factors of threats to the effective logistics of military units of the National Guard of Ukraine become relevant..

Analysis of recent research and publications. Scientific articles [1-4] contain theoretical and methodological principles on threats to the effective logistics of military units of the National Guard of Ukraine. Consideration of the general specifics of the management of logistics of military units is reflected in studies [5-7]. The considered specific features of logistics management can be a logistical component of the system for assessing the level of impact of crisis-forming factors. In works [8-11] the basic methodological bases of regulation of influence of crisis-forming factors and a choice of the corresponding materials and the equipment are systematized.

At the same time, today in the specialized literature there is no methodological approach to the assessment of crisis-forming factors as a means of monitoring threats to the effective logistics of military units of the National Guard of Ukraine.

Formulation of the goals of the article (task statement). The purpose of the article is to develop a methodology for monitoring and assessing the level of impact of crisis-generating threats to the effective logistics of military units of the National Guard of Ukraine.

Presenting main material. A large number of different factors can cause a crisis in the logistics of military units. According to the author, they should be divided into internal, which take place in a particular military unit, related to errors and shortcomings of the command, and external, which occur outside the military unit and are outside the sphere of influence of the command. Using the principles of econometrics for the analysis of real statistical information (in this case, the factors of the crisis and the dynamics of their development), conducting constant monitoring of the external and internal environment of the military unit, you can identify potential threats at an early stage and prevent them. The objective relationship between the threat of a crisis and the factors that give rise to it can be represented as a linear regression equation of functional relationships, which has the following form:

$$Y = \beta_1 \cdot \chi_1 + \beta_2 \cdot \chi_2 + U,$$

where Y is the indicator of crisis threats; β_1 - regression coefficient of external crisis-forming factors; χ_1 - intensity of influence of external crisis-forming factors; β_2 - regression coefficient of internal crisis-forming factors; χ_2 - intensity of influence of internal crisis-forming factors; U - perturbations of the environment, which characterize the deviation from the functional connection.

In the author's opinion, the classification of factors adapted to the methods of anti-crisis management should be the basis for the classification of crisis-forming factors in the logistics of a military unit. The logistics of a military unit, on the one hand, functions as an element of a higher-level system - the economy of the region or the state as a whole, and on the other - as a separate integrated system. Therefore, according to the sources of origin, crisis-forming factors can be classified as external and internal. External factors are heterogeneous in sources of origin, as they are formed due to the functioning of systems of different levels. Internal factors characterize the conditions of the internal environment of the military unit and the ability to effectively adapt to environmental conditions.

External and internal crisis-forming factors should be divided according to the way they affect the logistics of the military unit: some factors are the result of economic transformation - induce, and others to some extent are their reflection, mediated by their impact and act as activators of crisis processes - produce. External factors must also be classified depending on their environment, which generates them (politics, economics, science and technology, social environment).

Political factors determine the dependence of the economy on political influence and ideology, as well as the relationship of political factors with economic effects; characterize the political preconditions for economic reform, the impact of the alignment of political forces on the sequence of political and economic decisions, the formation of economic policy conditions and the degree of external influence on the economy.

Economic factors reflect the state and causes of economic reform, method, prospects and priorities of its development, the degree of planning and centralization, the peculiarities of the market, the level of balance of commodity and money supply, the dependence of the systemic crisis on local crises.

Scientific and technical factors reflect the state and dynamics of scientific and technological progress, the level of equipment and technology, the degree of innovative development of the industry, the stages of implementation of global reorganization projects.

Social factors characterize the state and trends of the social environment, the specifics of the mentality of society, the level of welfare and legal culture of the population.

Internal factors should be classified depending on the functional scope (finance, management, technology, marketing, organizational structure, information support).

The influence of financial factors affects the efficiency of use of financial and investment potential, the economic characteristics of the logistics of the military unit, cash flows, turnover, payment discipline and balance sheet structure.

We will present the system of goals for assessing the level of influence of crisis-forming factors of threats to the effective logistics of military units of the National Guard of Ukraine in the form of a tuple:

$$S = \langle T, KR, W, KI \rangle, \quad (1)$$

where T is the level of efficiency of the logistics of military units;

KR - the estimated cost of contracts with stakeholders;

W - the volume of transactions with stakeholders;

KI - the cost of implemented innovations.

The criterion for the effectiveness of the choice of rational parameters is as follows:

$$f(S) = \frac{W}{T} + \frac{KI}{IM} + KR \cdot \gamma,$$

where IM - investments of external partners to create effective logistics of military units;

γ is the size of the safe rate.

Currently, there is no single concept of optimal choice of strategies in the game with conflicting interests due to high uncertainty, which is introduced as a result of the variety of possible actions of crisis factors threatening the effective logistics of military units of the National Guard of Ukraine. In this regard, it is proposed to use a certain principle of rational choice of player strategy, which is that he reduces the criterion of effectiveness f to the criterion f*,

which depends on the known parameters and own strategy. Rule P of the transition from f to f^* $f(x_1, x_2, \dots, x_n) \xrightarrow{\Pi} f^*(x, \beta(x))$ is the rule of uncertainty, where $\beta(x)$ - known actions of crisis-forming factors.

In the theory of active systems the following rules of a choice of rational strategies of active elements are developed - the principle of the most guaranteed result and the principle of indicator behavior.

In the context of assessing the level of impact of crisis-generating threats to effective logistics, the principle of the most guaranteed result is used in case of insufficient awareness of the impact of factors and is formally recorded as follows:

$$f(x_1, x_2, \dots, x_n) \xrightarrow{\Pi} \min_c f(x_1, x_2, \dots, x_n) \rightarrow \max_c .$$

The principle of indicator behavior is used when the player becomes aware of some subsets (so-called aggregates) from the competitive strategies of other players: $\alpha(x) = (\alpha_1(x), \alpha_2(x), \dots, \alpha_m(x)) \dots$. In the task of assessing the level of impact of crisis-generating threats to effective logistics, this principle can be used if the command is aware of the impact of factors. Any equilibrium situation according to Nash x^* is a stable solution of the game with indicator behavior:

$$f(x_1^*, x_2^*, \dots, x_n^*) \rightarrow \max_c f(x_1^*, \dots, x_{i-1}^*, x_i, x_{i+1}^*, \dots, x_n^*) .$$

The parameters of the tuple (1) are determined as follows.

The level of efficiency of logistics of military units (in UAH) is calculated by the formula:

$$T = \frac{ST}{P} ,$$

where ST - the cost of the technological platform of logistics;

P is the number of partners and stakeholders.

The estimated share price is determined by the formula:

$$KR = \frac{OV}{kola} ,$$

where OV - the amount of investment capital investment (in UAH);

$kola$ - the number of issued shares.

The volume of transactions with stakeholders (W) and the cost of implemented innovations (KI) are calculated as a result of solving the optimization problem:

$$z = \sum_{j=1}^N \mu_j W_j + \sum_{r=1}^M \nu_r KI_r \rightarrow \max_{W_j, KI_r}$$

with the following restrictions:

$$\left\{ \begin{array}{l} \sum_{j=1}^N W_j \leq \sum_{j=1}^N U_j , \\ \sum_{r=1}^M KI_r \leq T , \\ KI_r, W_j \geq 0 , \end{array} \right.$$

where r is the index of the target segment of stakeholders;

M is the total number of segments.

Coefficient ν characterizes the effectiveness of innovation, which should be determined by the formula:

$$\nu = \frac{VC}{VK} ,$$

where VC - the amount of goods and services provided by partners of military units; VK - sales of goods and services based on the use of alternative innovations.

Target function z reflects the command's desire to maximize the cost of goods and services provided by military partners, which provide a possible reduction in the impact of crisis-generating threats to effective logistics.

Local management of individual factors and groups does not give the maximum possible result due to the high importance of synergistic relationships. The possibility of obtaining a positive result is largely determined not only by

the opportunities that arise when managing a specific crisis factor of the internal environment separately, but also in their integrated management in order to effectively adapt to variations and influences of the external environment.

Conclusions and suggestions. Thus, the developed classification of crisis-forming factors is a methodological basis for analyzing the mechanism of their impact on the logistics of military units of the National Guard of Ukraine. Factors of the external environment determine the conditions to which the enterprise must adapt, and internal crisis-forming factors characterize the set of levers of influence on the logistics of the military unit in order to effectively adapt to these conditions.

The scientific novelty of the obtained results is the development of theoretical and methodological provisions for assessing the level of influence of crisis-generating factors of threats to the effective logistics of military units of the National Guard of Ukraine.

The practical significance of the obtained results lies in the formation of appropriate recommendations to the command of military units regarding the formation of a system of anti-crisis monitoring of the impact of crisis-forming factors of threats to effective logistics.

The direction of further research may be the construction of economic and mathematical models for forecasting the impact of crisis-generating factors of threats to the effective logistics of military units of the National Guard of Ukraine.

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