УПРАВЛІННЯ ПІДПРИЄМСТВОМ

UDC 330.131.7:656.6

I. M. Averichev, Candidate of Economic Sciences, Associate Professor

METHODOLOGICAL APPROACHES TO ECONOMIC SECURITY EVALUATION OF WATER TRANSPORT COMPANIES OF UKRAINE

Urgency of the research. *The urgency of research related to the problems of organization of the economic security system at water transport enterprises is conditioned by the fact that it is directly related to the life and health of people.*

Target setting. *In the conditions of instability, there is a need to ensure the economic security of water transport enterprises for their economic stabilization and prevention of bankruptcy.*

Actual scientific researches and issues analysis. *The problems of the essence, factors and components of economic security are sufficiently investigated.*

Uninvestigated parts of general matters defining. *Further research is needed on the practical issues of the formation of the internal organizational mechanism of economic security, taking into account the specificity of water transport.*

The research objective. *The purpose of the article is to develop a mechanism of providing economic security based on the use of methods of diagnosing threats and methods of economic evaluation of the profile and level of economic security, and a justification of creation of an adaptive model of economic security.*

The statement of basic materials. *The development of economic security profiles for three Ukrainian ports was carried out, the analysis was conducted, on the basis of which a model of economic security of Mykolaiv Sea Commercial Port was developed and practical recommendations for improving its economic security were developed.*

Conclusions. *The presented method of studying the economic security profile creates the practical possibility of forming a mechanism, methods and tools of providing the proper level of economic security of water transport companies in the range from critical to absolute.*

Keywords: *economic safety; water transport; model of economic security; economic security mechanism.*

УДК 330.131.7:656.6

І. М. Аверічев, к. е. н, доцент

МЕТОДИЧНІ ПІДХОДИ ДО ОЦІНЮВАННЯ ЕКОНОМІЧНОЇ БЕЗПЕКИ КОМПАНІЙ ВОДНОГО ТРАНСПОРТУ УКРАЇНИ

Актуальність теми дослідження *проблем організації системи економічної безпеки на підприємствах водного транспорту обумовлюється тим, що вона безпосередньо пов'язана зі впливом на життям та здоров'я людей.*

Постановка проблеми. *В умовах нестабільності виникає необхідність забезпечення економічної безпеки підприємств водного транспорту для їх економічної стабілізації та попередження банкрутства.*

Аналіз останніх досліджень і публікацій. *Достатньо дослідженими є проблеми сутності, чинників та складових економічної безпеки.*

Виділення недосліджених частин загальної проблеми. *Потребують додаткового дослідження практичні питання формування внутрішньо організаційного механізму економічної безпеки з урахуванням специфіки водного транспорту.*

Постановка завдання. *Мета статті полягає у розробці механізму забезпечення економічної безпеки на основі використання методів діагностування загроз та прийомів економічного оцінювання профілю і рівня економічної безпеки та обґрунтування створення адаптаційної моделі економічної безпеки.*

Виклад основного матеріалу. *Здійснено побудову профілів економічної безпеки для трьох українських портів, проведено аналіз, на основі якого розроблено модель економічної безпеки Миколаївського морського торгівельного порту та розроблено практичні рекомендації щодо підвищення рівня його економічної безпеки.*

Висновки. *Представлена методика дослідження профілю економічної безпеки створює практичну можливість формування механізму, методів та інструментів забезпечення належного рівня економічної безпеки компаній водного транспорту в інтервалі від критичного до абсолютного.*

Ключові слова: *економічна безпека; водний транспорт; модель безпеки підприємства; механізм економічної безпеки.*

DOI: *10.25140/2410-9576-2018-2-1(13)-47-53*

Urgency of the research. The organization of the security system at water transport enterprises is one of the most important problems that need immediate resolution, because it is directly related to the life and health of people. The success and quality of transport services provided by water transport enterprises is determined by the availability of a complex of effective measures to neutralize the threats and risks associated with the peculiarities of the implementation of economic processes, which in their aggregate represent the system of economic security of companies.

Target setting. Economic security of companies is also a significant factor in the formation of demand for transportation and the provision of a positive economic result of the economic activity of enterprises of sea and river transport. However, the lack of a mechanism of providing sufficient level of economic security does not allow timely diagnosis of its state and complicates the implementation of

the necessary response measures.

Actual scientific researches and issues analysis. The analysis of recent studies and publications has shown that the problems of economic security of water transport enterprises are poorly researched. Existing approaches consider economic security without taking into account the specifics of the economic activity of water transport, factors and threats associated with its production processes. The system and mechanism of providing economic security of enterprises are rather accurately represented in the scientific works of such researchers as: O. Aref'ieva [1], V. Heiets [2], N. Hryshko [3], Kozachenko [4], O. Kravchuk [5], M. Shelukhin [6], B. Gilad [7], D. Scott [8] and others.

Uninvestigated parts of general matters defining. An overview of previous scientific achievements by domestic and foreign authors showed that the essence and constituent elements of the mechanism of providing economic security of water transport enterprises, the conditions and tools of its functioning, and the methods of evaluation of its effectiveness, need further research.

The research objective. The purpose of the article is to develop methodological provisions defining the functionality of the mechanism of providing economic security on the basis of the use of methods of diagnosing threats and methods of economic evaluation of the level and profile of economic security, as well as the justification of creation of an adaptive model of economic security of water transport enterprises.

The statement of basic materials. The study of approaches to evaluating the level of economic security of water transport enterprises begins with the identification of threats and risks that are detected on the basis of analysis of large amounts of information from different sources. It should be noted that in addition to traditional sources, the evaluation of economic security of water transport should take into account the likelihood of a number of specific events and their possible consequences, in particular: risks of physical malfunctions of ships and other equipment that may result from malicious harm, terrorist, military or criminal acts; threats and risks of human errors occurring in the security management process; natural phenomena (storms, floods, etc.) that can lead to reduced security and total or partial loss of equipment; it is also worth considering the factors that are not controlled by the organization, because they are in the area of coordination and control of service companies; the risks of installing poor-quality security equipment and a low level of its maintenance, etc.

Evaluating the level of economic security in water transport companies should be carried out with a certain sequence of stages, the most important of which is the stage of building the profile and assessing the effectiveness of the system of economic security for a particular economic entity. It is carried out using graphical and matrix analysis methods. In addition, in order to assess the actual level of economic security of water transport enterprises and to analyse the level of its sufficiency, it is expedient to use a functional and parametric method that takes into account the functional distribution of components and the assessment of parameters for achieving the planned level of the economic security profile.

In the presented study, the formation of the economic security profile was carried out on the basis of constructing a histogram of the influence of components with an assessment of the scale of their impact. The economic security profile of the economic entity was based on the evaluation of the components' parameters. Their level is determined by the ratio of the individual components of economic security of the company under investigation to their benchmark values and taking into account their importance. According to this method, the level of economic security is reflected in the form of a histogram, the elements of which are separate functional components of the economic security of water transport.

For the reference level, we have adopted industry average or normative values of the indicators, which are determined by the industry average trends and normative acts. However, in some cases, industry average indicators such as the cost of capital, the volume of income and profit are not appropriate to use, as there is a large divergence in the scale of work in water transport companies. In this case, it is more expedient to use the company targets as the benchmark values. The calculation of the length of the components was carried out according to the formula:

$$B_к = \left(\sum_{i=1}^{n} \frac{П_i}{П_{ie}} \cdot q_i \right) \cdot 100 \qquad (1)$$

where $П_i$ is a value of the indicator in the investigated company; $П_{ie}$ is a value of the indicator at the reference / normative level of security; $к$ is a number of groups of indicators; q_i is a weight of the indicator; n is a number of indicators in the group. The indicators of the level of economic security can be grouped by functional components. Provided that the indicators that are stimulators are analysed, the calculation is carried out according to the generally accepted methodology. If the indicator is a destimulator (the parameter is better, the smaller its value), its calculation is carried out according to the inverse formula.

The proposed methodological approach to evaluating the level of economic security allows, by analysing the range of histogram bars, to determine the level of economic security. It is considered that the level of absolute security, in which the system automatically monitors and minimizes threats, is provided with a vector length of 100 to 80; threats are timely detected and eliminated through the use of special measures, provided that the indicator is in the range of 79 to 60 (satisfactory security); the company fulfils the conditions and norms of providing safe conditions for work and functioning, but does not have an effective system of economic security management, when the indicator is in the range of 59 to 40 (acceptable security); the company is not able to continuously monitor threats and cannot predict them when the indicator is in range of 39 to 20 (unsatisfactory security); the conditions in which the company is endangered correspond to the indicator in the range of less than 19 (critical security). The outline of the profile outlines the company's ability to achieve a potential level of economic security. The retrospective and current level makes it possible to follow the dynamics of vectors change in order to concentrate management efforts on the most problematic areas.

As a rule, the drop in the level of security occurs in cases of over expenditure of resources, which is caused by the lack of modernization and innovation development, the loss of competitive positions in the market. Consequently, the use of the economic security profile allows identifying problematic functional components and determining directions for improving the system of economic security management.

Using the methodological approach described above, the economic security profile for the studied water ports of Ukraine was constructed (Fig. 1).

By the method of distribution on the basis of Fig. 1, the average level of economic security by economic entities was determined (Tab. 1). As we see from Tab. 1, most of the elements of the analysis of economic security of Mykolaiv Sea Commercial Port SE are at the acceptable level (54,5%), some on satisfactory (27,3%) and unsatisfactory (18,2%).

Table 1

Distribution of components according to the levels of the economic security profile

Level of economic security	Range of vector length	Compliance of components with the level of economic security		
		Mykolaiv Sea Commercial Port SE	Chernihiv River Port PJSC	Kyiv River Port PJSC
Absolute	100-80	-	-	
Satisfactory	79-60	2, 8, 10	6, 7	1
Acceptable	59-40	3, 4, 5, 6, 9, 11	4, 5	3, 5, 6, 8, 10, 11
Unsatisfactory	39-20	1, 7	8, 9, 10	2,4,7
Critical	less than 19	-	1, 2, 3, 11	

Source: calculated by the author

The analysis shows that the economic security management system of Mykolaiv Sea Commercial Port is at the acceptable level and has reserves for improvement. The level of economic security at Chernihiv river port PJSC is at the critical level (36,36%), while the company has reserves in information and legal security (18,18% at the acceptable security level), physical and technological security (18,18% at the satisfactory security level), but the environmental, personnel and intellectual components of economic security in their development are at the unsatisfactory level (27,3%). Kyiv River Port PJSC is also at the level of acceptable economic security, since most of the components belong to this group (54,6%).

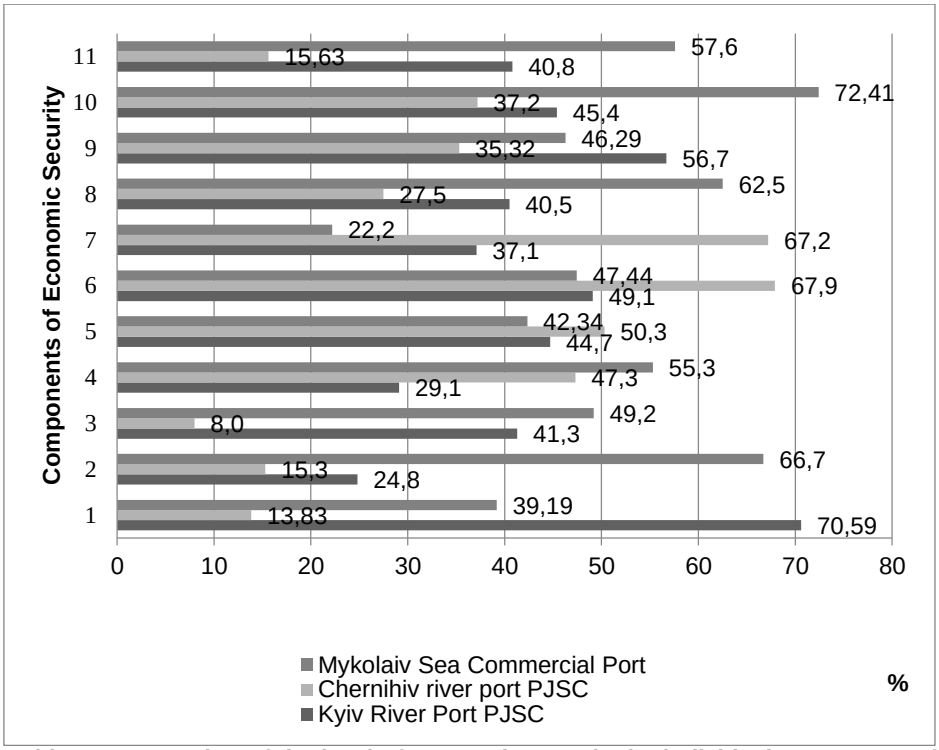

Fig. 1. Graphic representation of the level of economic security by individual components for Ukrainian ports

Note: Components of economic security: 1 – economic, 2 – financial, 3 – innovation and investment, 4 – information, 5 – legal, 6 – physical, 7 – technical and technological, 8 – environmental, 9 – intellectual, 10 – personnel, 11 – organizational

Source: calculated by the author

Thus, the analysis showed that the author's methodological approach to evaluating the level of economic security has practical value and can be used at

enterprises of water transport, because it is oriented on the specifics of their activities and allows to analyse threats in the structure of economic security management. The system of indicators developed in the process of formalization of the method of evaluating the profile level allows us to determine the general level of economic security:

ES=0,19X_1+0,17X_2+0,149X_3+0,043X_4+0,064X_5+0,043X_6+0,085X_7+0,043X_8+0,064X_9+0,106X_{10}+0,043X_{11}, where variables are components of economic security: X_1 – economic, X_2 – financial, X_3 – innovation and investment, X_4 – information, X_5 – legal, X_6 – physical, X_7 – technical and technological, X_8 – environmental, X_9 – intellectual, X_{10} – personnel, X_{11} – organizational. 0,19; 0,17; 0,149; 0,043; 0,106; 0,085 are coefficients of importance of the evaluation parameters, which were obtained expertly. Using this model, the resource intensity of the assets of the economic security system for Mykolaiv Sea Commercial Port for 2016 was calculated. The sequence of calculations in the process of evaluating the level of economic security of Mykolaiv Sea Commercial Port is given in Tab. 2.

The calculations show that for each hryvnia of the effect received from the system of economic security of the acceptable level at Mykolaiv Sea Commercial Port it is necessary to spend 1,03 hryvnias at the expense of loss reduction. This proves the necessity of increasing the level of economic security under conditions of the investigated company of water transport.

In order to substantiate directions of improvement of the economic security system and enhancement of the security profile at Mykolaiv Sea Commercial Port, a factor analysis was conducted, which concluded that the key factors that have the greatest impact on the security profile of the ports are: revenues from the provision of transport services; value of the assets of the enterprise; profit of the enterprise.

Table 2

Evaluation of the level of economic security of ports of Ukraine

Indicator	Name and description	Formulas for calculation	Value
Length of the economic security profile	Functional-parametric method: takes into account the functional distribution of components of the economic security system and the possibilities of evaluating the parameters of providing the planned level of the economic security profile. It is based on the expert method for determining the importance of factors and the functional and parametric description of the components.	Length of the profile: П= 0,19*ЕГ + 0,17*Фін+0,149*ІІ + 0,043*Інф. + 0,064*Пр + 0,043*Фіз +0,085*ТТ + 0,043*Е + 0,064*Інт + 0,106*К + 0,043*Ор where ЕГ is a value of the economic component, Фін is a value of the financial component, ІІ is a value of the innovation and investment component, Інф is a value of the information component, Пр – is a value of the legal component, Фіз is a value of the physical component, ТТ is a value of the technical and technological component, Е is a value of the environmental component, Інт is a value of the intellectual component, К is a value of the personnel component, Ор is a value of the organizational component, 0,19; 0,17; 0,149; 0,043; 0,106; 0,085 are coefficients of importance of the components in the system of evaluation parameters. Values of the components: $$B_к = \left(\sum_{i=1}^{n} \frac{П_i}{П_{ie}} \cdot q_i \right)$$ where *к* is a number of groups of indicators; $П_i$ is a value of the indicator for the investigated enterprise, $П_{ie}$ is a value of the indicator for reference / normative security; q_i is an importance of the indicator; *n* ia a number of indicators in a group	$В_{ЕГ}$ = 0,39, $В_{Фін}$ = 0,67, $В_{ІІ}$ = 0,49,2, $В_{Ін}$=0,55, $В_{Пр}$ = 0,42, $В_{Фіз}$ = 0,47, $В_{ТТ}$ = 0,22, $В_{Е}$ = 0,62, $В_{Інт}$ =0,46, $В_{К}$=72, $В_{Ор}$ =0,57
Efficiency of the system of economic security	Theory of determination of the resource efficiency	$$E = \frac{E_{A_н} + E_{A_п} + K_c}{3}$$ [9] where $E_{Ан}$ is an accumulated efficiency of the asset utilisation, $E_{Ап}$ is a promising efficiency of the attraction of assets, $К_с$ is a coefficient of synergy of the interaction of assets in the system of economic security. The calculation of the indicators of the asset utilisation efficiency for a transport enterprise is presented in the formulas: $$E_{Ан} = \frac{В_{тп}}{В_А} \qquad E_{Ап} = \frac{ВП}{В_А}$$ $$Кс = \frac{ВП}{В_{тп}}$$ where $В_{тп}$ is a cost of provided transport services, $В_А$ is an asset value, ВП is a gross profit.	Coefficient of synergy of interaction: $К_с$ = 0,721425. Accumulated efficiency: $E_{Ан}$ = 0,215. Promising efficiency: $E_{Ап}$ = 0,2983864 Then efficiency: E= 0,4116038.
Resource intensity	Interpreted theory of geometrical optics	$$P = \frac{\frac{1}{E} - \frac{K_c - 1}{П}}{1 - \frac{(1 - K_c)E_{Ан}}{K_c E}}$$ where E is an efficiency of the system of economic security, $E_{Ан}$ is an accumulated efficiency of the asset utilisation, $К_с$ is a coefficient of synergy of the interaction of assets in the system of economic security.	P = 1,03UAH/UAH

Source: calculated by the author

The calculation of the received effects showed that they generally raise the level of the company profile to a value of 0,7048, which corresponds to the satisfactory level of security and 46,83% higher than the current level at Mykolaiv Sea Commercial Port. In general, the implementation of measures to provide economic security under the existing conditions of economic activity at Mykolaiv Sea Com-

mercial Port in 2018 in transition from the acceptable level of economic security to the satisfactory level will allow the prevention of losses in amount of 209 thousand UAH (Tab. 3).

The calculations of planned and forecasted indicators were carried out using the technical and economic method of corporate planning. Based on the methodological approach to determining the general effectiveness of providing economic security, the calculated forecasted indicator for 2018 is 0,27, which exceeds the value of the indicator in 2016 by 0,159.

Table 3

Effects of implementation of measures to provide economic security at Mykolaiv Sea Commercial Port, thousand UAH

Level of profile	Effect in the form of averted damage from the prevention of negative influences	Effect in the form of net profit growth as a result of the prevention of losses from accumulation of assets to provide economic security	Effect in the form of net profit growth as a result of receiving operating revenues from the implementation of measures to provide economic security	Cumulative effect in the form of annual net profit growth, thousand UAH
Critical level of profile	75	16	24	115
Unsatisfactory level of profile	81	20	33	134
Acceptable level of profile	93	21	48	162
Satisfactory level of profile	106	36	67	209
Absolute level of profile	127	27	85	239

Source: calculated by the author

According to the calculations, Mykolaiv Sea Commercial Port is at the acceptable level of economic security profile. In addition, the analysis of the port's economic security profile indicates the weakness of the economic, technical and technological components, which indicates the existence of threats in the management of providing transport services. In order to increase the efficiency of the key components of economic security of Mykolaiv Sea Commercial Port, identified in the research process, a step-by-step scenario was developed for improving the company's internal and external environment.

The first step is to implement a flexible tariff policy for transhipment, depending on the size or priority status of the cargo owner. Tariffs should depend on (wholesale, globalization) volumes of transhipment, which will lead to an increase in large customers. This will ensure the enlargement of the client base, which will increase the level of economic security in the direction of risk reduction and income growth.

The second step is to increase the level of service for large customers by reducing the time of waiting for loading and unloading, priority service, information support, etc.

The third step: the current danger of illegal takeover at this level should be prevented by limiting open access to information. For this the port requires highly skilled programmers and the latest up-to-date software.

The fourth step is the explanatory work with personnel that have access to information, providing them with moral and material incentives, providing a sustainable psychological climate among employees by strengthening organizational culture.

Activities in the external environment of the company include providing information monitoring, state support for reducing tariffs, social insurance against accidents, intermediation in monitoring changes in the regulatory, legal or legislative framework, providing investment support for renovation of transhipment equipment.

Conclusions. The presented method of studying the profile of economic security creates the practical possibility of forming a mechanism for providing economic security of water transport, which is a complex of interrelated objects and subjects of economic security management, methods and tools for maintaining the proper level of economic security, management functions, that in general allows achieving a certain level of economic security in the range from critical to absolute. The described methodological approach also provides a scientific basis for the development of recommendations for scenarios of economic actions to increase the level of economic security to the appropriate level. The

further research and development of scientific approaches to providing the economic security of water transport companies should be conducted taking into account the economic cluster-type interrelations that arise and develop in the modern economic space and provide the competitiveness of modern companies [10]. The possibility of getting additional synergistic effects by tightly interacting companies creates additional opportunities for increasing the economic security of companies, which creates the need for careful further research in this direction.

References

1. Arefieva, O. V., Kuzenko, T. B. (2009). Ekonomichni osnovy formuvannia finansovoi skladovoi ekonomichnoi bezpeky [Economic basics of formation of the financial component of economic security]. *Aktualni problemy ekonomiky - Actual problems of economics 1(91)*, 98 – 104 [in Ukrainian].

2. Heiets, V. M., Kyzym, M. O., Klebanova, T. S., Cherniak, O. I. (2006). Modeliuvannia ekonomichnoi bezpeky: derzhava, rehion, pidpryiemstvo [Modeling of economic security: state, region, enterprise]. Kharkiv [in Ukrainian].

3. Hryshko, N. Y. (2013) Formuvannia otsinochnykh parametriv skladovykh ekonomichnoi bezpeky mashynobudivnoho pidpryiemstva [Formation of the evaluation parameters of the components of the economic security of a machine-building enterprise]. *Visnyk sotsialno-ekonomichnykh doslidzhen - Bulletin of social and economic research, 1(48)*, 62-69 [in Ukrainian].

4. Kozachenko, H. V., Ponomarov, V. P., Liashenko, O. M. (2003). Ekonomichna bezpeka pidpryiemstva: sutnist ta mekhanizm zabezpechennia [Economic security of an enterprise: the essence and mechanism of provision]. Kyiv: Libra [in Ukrainian].

5. Kravchuk, O. Y., Kravchuk, P. Y. (2008). Diahnostyka ta mekhanizm zabezpechennia korporatyvnoi bezpeky pidpryiemstva [Diagnostics and mechanism of enterprise corporate security]. Lutsk: Nadstyria [in Ukrainian].

6. Shelukhin, M. L. (2011). Zahrozy ekonomichnoi bezpeky v transportnii sferi: vyznachennia ta klasyfikatsiia [Threats to economic security in the transport sector: identification and classification]. *Chasopys Akademii advokatury Ukrainy - Journal of the Academy of Advocacy of Ukraine, 12(3)*, 56-61 [in Ukrainian]. .

7. Gilad, B. (2013). Industry Risk Management: CI's Next Step. *Competitive Intelligence Magazine, 4(3)*, Retrieved from http://www.academyci.com [in English].

8. Scott, D. A. (2009). What's next for innovation? Chief Executive Magazine. *chiefexecutive.net*. Retrieved from www.chiefexecutive.net [in English].

9. Fedonin, O. S., Riepina, I. M., Oleksiuk, O. I. (2004). *Potentsial pidpryiemstva: formuvannia ta otsinka [Potential of the enterprise: formation and evaluation]*. Kyiv: KNEU [in Ukrainian].

10. Palyvoda, O. M., & Plavan, V. P. (2016). Otsiniuvannia synerhetychnoho efektu formuvannia klasternykh orhanizatsiinykh struktur [Evaluation of the synergetic effect of forming cluster organizational structures]. *Ekonomichnyi chasopys - Economic journal, 158, 3-4(2)*, 48-51 [in Ukrainian].

Література

1. Ареф'єва, О. В. Економічні основи формування фінансової складової економічної безпеки / О. В. Ареф'єва, Т. Б. Кузенко // Актуальні проблеми економіки. – 2009. – № 1 (91). – С. 98 – 104.

2. Геєць, В. М. Моделювання економічної безпеки: держава, регіон, підприємство: монографія / В. М. Геєць, М. О. Кизим, Т. С. Клебанова, О. І. Черняк. – Х., 2006. – 240 с.

3. Гришко, Н. Є. Формування оціночних параметрів складових економічної безпеки машинобудівного підприємства Н. Є. Гришко // Вісник соціально-економічних досліджень. – 2013. – Вип.1 (48). – С. 62-69.

4. Козаченко, Г. В. Економічна безпека підприємства: сутність та механізм забезпечення: [монографія] / Г. В. Козаченко, В. П. Пономарьов, О. М. Ляшенко. – К.: Лібра, 2003. – 280 с.

5. Кравчук, О. Я. Діагностика та механізм забезпечення корпоративної безпеки підприємства: монографія / О. Я. Кравчук, П. Я. Кравчук. – Луцьк : Надстир'я, 2008. – 256 с.

6. Шелухін, М. Л. Загрози економічної безпеки в транспортній сфері: визначення та класифікація / М. Л. Шелухін // Часопис Академії адвокатури України. – 2011. – № 3 (12) – С. 11-17.

7. Gilad, Ben. Industry Risk Management: CI's Next Step // Competitive Intelligence Magazine. – 4 (3), May-June. – URL: http://www.academyci.com.

8. Scott, D. Anthony. What's next for innovation? //Chief Executive Magazine, The. – July/August 2009. – URL: www.chiefexecutive.net.

9. Федонін, О. С. Потенціал підприємства: формування та оцінка: навч. посібник / О. С. Федонін, І. М. Рєпіна, О. І. Олексюк. – К. : КНЕУ, 2004. – 316 с.

10. Паливода, О. М. Оцінювання синергетичного ефекту формування кластерних організаційних структур / О. М. Паливода, В. П. Плаван // Економічний часопис-XXI. - 2016. - № 158. - С. 48-52.

Received for publication 25.12.2017

Бібліографічний опис для цитування :

Averichev, I. M. Methodological approaches to economic security evaluation of water transport companies of Ukraine / I. M. Averichev // Науковий вісник Полісся. - 2018. - № 1 (13). Ч. 2. - С. 47-53.