

International economic security management within the advanced innovative development paradigm

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3. Assessment of the directions for the state's innovative development
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1. Paradigm of advanced innovative development

The fourth industrial revolution and new technologies stimulate the development of new production technologies and business models that fundamentally transform production. The speed and scale of technological changes, coupled with the emergence of other trends, complicate the task of developing and implementing industrial strategies that promote productivity and inclusive growth. Moreover, recent changes have identified the paradigm of low-cost export competitiveness as a vehicle for growth and development at risk. Awareness of this causes the need to address the issue of strengthening existing market positions and support long-term competitive advantages in its activities of a country in this new production paradigm. Besides, the study of the factors and conditions that have the greatest impact on the transformation of production systems, further evaluating their readiness for the future, will enable appropriate measures to be taken to overcome potential gaps in their readiness for future production, increase their competitiveness in the future and increase the level of international economic security.

Consequently, taking into account all of the above, ensuring international competitiveness of the country^{1,2} is possible provided the continuous and steady implementation of various types of innovations, that is, the fact at the expense of a leading innovative development of the country. In the research³, leading development is defined as a radical, innovative and cyclical process of continuous improvement of the potential of the country, as well as the search for promising directions of its realization, which results in radical changes of the national economy.

It should be noted separately that in view of the fact that Ukraine, like most other countries of the world, has accepted the course on ensuring sustainable development, it is expedient to introduce innovations that at all stages of their life cycle there will not be ecologically destructive impact on the environment or there will be an ecologically constructive impact. Taking into account this, another important characteristic of the advanced innovative development is its compliance with the principles of the Concept of Sustainable Development.

Consequently, advanced innovative development will be considered as a process of introducing innovations that are ahead of scientific and technological development, the formation on this basis of the country's production system, including business portfolio of goods and

¹ Mulatu, A. (2016) On the concept of 'competitiveness' and its usefulness for policy. *Structural Change and Economic Dynamics*, 36, 50-62. DOI: 10.1016/j.strueco.2015.11.001

² Porter, M.E. (2018). On thinking about deregulation and competition. *The Telecommunications Revolution: Past, Present and Future*, 39-44. doi:10.4324/9781351115704

³ Illyashenko, N.S. (2018). *Vyperedzhaiuchy innovatsiyni rozvytok: teoriia, metodyka, praktyka [Advanced innovative development: theory, methodic, practice]*. Trytoria, Sumy. [in Ukrainian]

services, which are at different stages of the life cycle and satisfy not only the existing, but also potential needs that in general will ensure the stability of the country competitive position in the international market and the possibility of their growth, high level of country's international competitiveness, as well as its economic and ecological security. Comprehensive approach to providing ecological security are explored in paper⁴. Issues of enterprise's economic security management at the foreign marketing are considered in the article⁵. Issues of global economic security in terms of the fuzzy concept of worth are examined in the papers^{6,7}.

According to the report⁸, the countries' success in the conditions of the current production changes is determined by the production drivers that are explained as the key factors that position the country to take advantages of the fourth industrial revolution for accelerating the transformation of national production systems.

The main factors that position the state for using new technologies and opportunities in the future are technologies and innovations, human capital, global trade and investments, institutional frameworks, stable resources and demand environment⁹.

Technologies and innovations reflect the level of innovations implementation and commercialization that are potentially used in production, as well as the level of development and infrastructure security to support the new technologies implementation in production.

Human capital is the ability to respond to changes in the labor market caused by the Fourth Industrial Revolution, considering both the current workforce and the long-term ability to develop skills and talent in future workforce.

Global trade and investments is the participation in the international trade for facilitating the exchange of products, knowledge and technologies; the establishment of global connections, the existence of financial resources for development investment related to production, as well as the infrastructure quality for the activity provision connected to production.

Institutional structure is effectiveness of state institutions, rules and regulations in the field of technological development, new enterprises and leading production. Especially it should be delighted the role of institutions in field of environment protection and waste management including hazardous waste (in more detail see Brauweiler H.-Chr., Shkola V.Y. and Markova O.O.¹⁰).

Sustainable resource is the production impact on the environment, including the usage of

⁴ Domashenko, M., Kotenko, O., Shkola, V.Y., Kuchmiyov A. (2017). Innovative marketing strategies to provide ecological safety at regional and global levels. *Marketing and Management of Innovations*, 4, 367-373. DOI: 10.21272/mmi.2017.4-33

⁵ Prokopenko, O., Domashenko, M., Shkola, V. (2014). Management features of economic security of foreign economic activity of Ukrainian machine-building enterprises. *Actual problems of economics*, 10 (160), 188-194

⁶ Orrell, D. (2020). The value of value: A quantum approach to economics, security and international relations. *Security Dialogue*. DOI: 10.1177/0967010620901910

⁷ Der Derian, J; Wendt, A. (2020). 'Quantizing international relations': The case for quantum approaches to international theory and security practice. *Security Dialogue*.

⁸ The Readiness for the Future of Production Report 2018. <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>

⁹ The Readiness for the Future of Production Report 2018. <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>

¹⁰ Brauweiler, H.-Chr., Shkola, V.Y., Markova, O.O. (2017). Economic and legal mechanisms of waste management in Ukraine. *Marketing and Management of Innovations*, 2, 359-368 DOI: <http://doi.org/10.21272/mmi.2017.2-33>

natural resources and alternative energy sources.

The demand environment is access to external and local demand for production, the complexity of the consumer base, as it can lead to diverse activities of industry and new products. It is agriculture and the food industry that are the most sensitive branches of economy to this group of factors, as it has been exposed due to the challenge, the modern society has faced – the corona virus outbreak, and its effect on food security^{11,12,13,14}.

Besides above mentioned factors, on authors thought, the crucial driver of innovative development is competition. As it is explored in paper¹⁵, competition has a positive effect on long-term economic growth. In conditions of growing competition those economies which follow the strategy of leading innovative development are in a stronger market position.

Advanced development involves the production transformation to meet the consumers' needs and demands at the international markets in the conditions of global competition, which will ensure its economic security.

Model of production transformation from the study phase of the economies' flexibility for changing, which is determined on the basis of the archetype matrix, till the implementation of the changes in the country, presented by the author in Fig. 1, shows the role of the management system in ensuring its development, and consequently the growth of its ecological and economic efficiency.

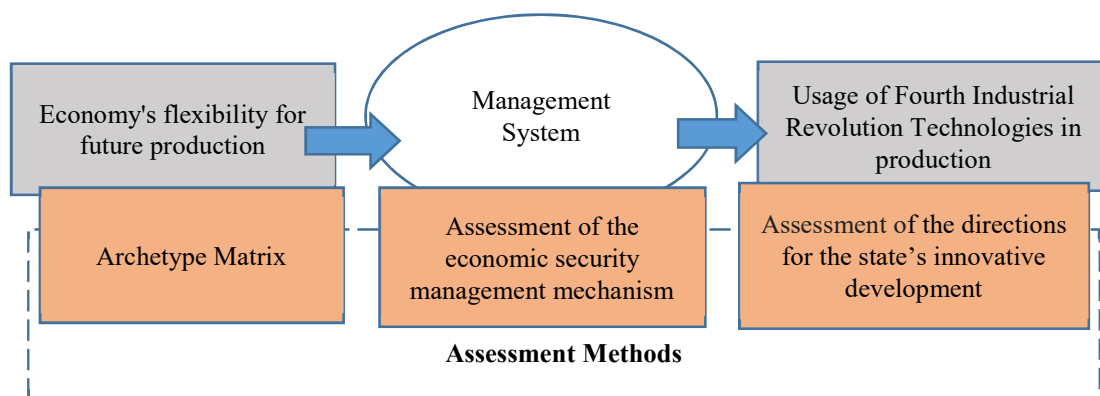


Figure 1. Model of production transformation (developed by the authors)

¹¹ Deaton, B. James, Deaton, Brady J. (2020). Food security and Canada's agricultural system challenged by COVID-19. *Canadian Journal of Agricultural Economics-revue Canadienne d'Agroeconomie*. DOI: 10.1111/cjag.12227

¹² Glauber, J.; Laborde, D.; Martin, W. (2020). COVID-19: Trade restrictions are worst possible response to safeguard food security. *IFPRI Blog: Issue Post*, March 27. Retrieved from <https://www.ifpri.org/blog/covid-19-trade-restrictions-are-worst-possible-response-safeguard-food-security>

¹³ Sachs, Goldman (2020). Goldman Sachs Economics Research. *US Daily: A sudden stop for the US economy*, March 20. Retrieved from <https://www.goldmansachs.com/insights/pages/gs-research/us-daily-20-mar-2020/report.pdf>

¹⁴ Tarasuk, V.; Fafard St-Germain, A.-A.; Loopstra, R. (2019). The relationship between food banks and food security: Insights from Canada. *Voluntas*. Retrieved from <https://doi.org/10.1007/s11266-019-00092-w>

¹⁵ Charles, V., Zegarra, L.F. (2014). Measuring regional competitiveness through Data Envelopment Analysis: A Peruvian case. *Expert Systems with Applications*, Volume 41, Issue 11, 5371-5381 DOI: 10.1016/j.eswa.2014.03.003

In the given model, the management system is the key link between the production system and the market, and therefore it is considered to be the ability of the country to ensure its constant competitiveness on the basis of: quality management and production organization and marketing as a whole; effective usage of human capital; application of the latest marketing tools; rational usage of available financial and material resources.

The management system, which has the task to ensure the international competitiveness in the future under the current conditions, is represented by the factor of "*Human Capital*".

A detailed Ukrainian profile¹⁶, which allows identifying concrete opportunities and challenges for countries, as they are oriented towards the production future, was allowed to conclude that human resources and human capital are a strong position of Ukraine. At the same time, the possibility of using other growth factors depends on the efficiency of the management system of the economic system and its marketing potential. Taking into account the fact that the enterprise is the basic unit of the national production system, in our opinion, it is appropriate to study the key factors of the enterprise efficiency growth.

We suggest implementation of the assessment of the economic security management mechanism based on the marketing principles by means of correlating changes in the environmental safety level (as a result of this mechanism functioning) with the costs of forming, the operation maintenance, as well as the mechanism development. Target function and restrictions that correspond to the above-described description concerning mechanism assessment of the economic security management, are presented as a system:

$$\begin{cases} \sum_{j=1}^m \frac{R_j}{C_{1j}+C_{2j}+C_{3j}} \rightarrow \max, \\ R_j = f(\Delta K_{nj}, UC_j, \Delta K_s), \\ 0 \leq \Delta K_{nj} \leq 1 \end{cases} \quad (1)$$

where R_j – the result of the economic security management mechanism according to the j-type activity (j=1,...,m), currency unit; C_{1j} , C_{2j} , C_{3j} – the mechanism action costs (respectively: functioning, operation maintenance, development) according to the j-type activity (j=1,...,m), currency unit; ΔK_{nj} – change indicator of the economic security level according to j-type activity; UC_j – unit costs caused by changes of the economic security level to the elementary measurement unit on the scale $0 \leq \Delta K_{nj} \leq 1$, currency unit / production unit; ΔK_s – change indicator of the economic security level caused by the synergetic effect of this mechanism.

Mechanism of international economic security management

Regarding international economic security as the ability of state to protect and develop its economy, as well as defend its citizens against the crises by means of cooperation of countries¹⁷, managing of international economic security includes the structure of the organizational and economic mechanism of management, functions, management decisions, which all together lead

¹⁶ The Readiness for the Future of Production Report 2018. <http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>

¹⁷ Silvers, Roger (2020). Cross-border cooperation between securities regulators. *Journal of Accounting and Economics*, Volume 69, Issue 2-3, UNSP 101301. Retrieved from <https://www.sciencedirect.com/science/article/pii/S0165410120300033?via%3Dihub>

to the fulfillment of the main task - an efficient and uninterrupted governing.

Under the mechanism, that ensures economic security is proposed to consider a component of the state management system. It is based on the purpose, selected by authorities in order to support and enhance the level of economic security by using the existing capacity of the country. The component of management system ensures the implementation of the purpose and results in a stable and efficient operation of the country.

The scheme of formation of organizational and economic mechanism of international economic security is shown in Figure 2.

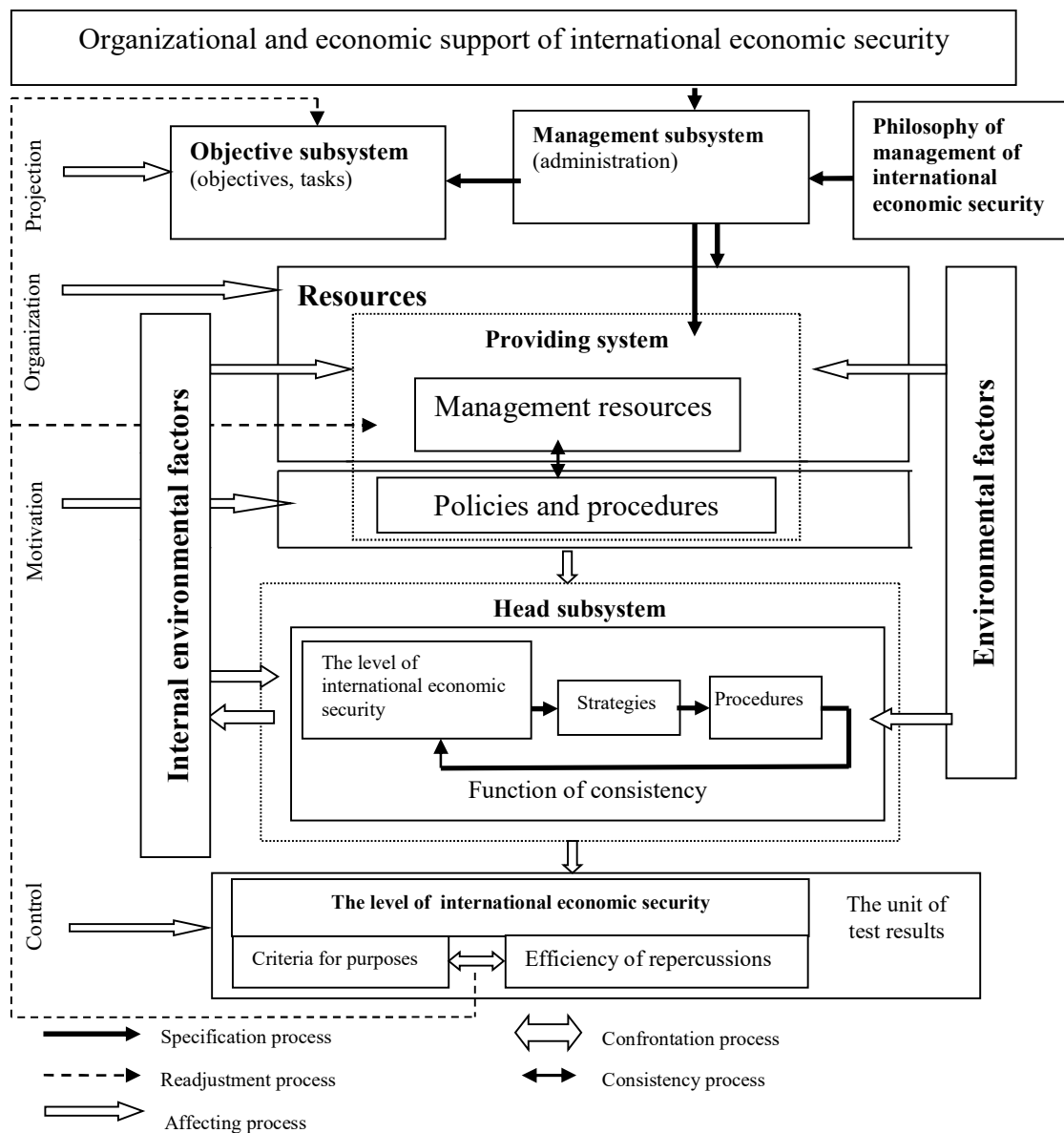


Figure 2. The structure of the organizational and economic mechanism of international economic security management¹⁸

¹⁸ Prokopenko O., Domashenko M., Shkola V. (2014). Management features of economic security of foreign economic activity of Ukrainian machine-building enterprises. *Actual problems of economics*, № 10 (160), 188-194

The basic principles of management, which are priority rules for country's foreign economic activity, make it possible to identify the main objectives of the activity and the tasks of their achievements, requesting the government to perform one of its administrative functions, such as planning. The primary task of the planning function is to determine the current economic situation of the country, to establish potential and desired results and to identify ways to achieve them.

Based on the notion of economic security as aspect of the most effective usage of its resources for sustainable operation and development of the international market and the ability to withstand the influence of hazardous factors in the external and internal environment to ensure effective relationship between the undertakings on the territory of Ukraine, and beyond it, management of economic security is supposed to be based on the most efficient usage of resources of the country. That is why, setting objectives and tasks, the government analyzes available resources and distributes them so as to achieve these objectives.

On basis of the analysis of resources, the government distributes them in such a way as to unlock its potential at best. As a result of these actions, another management function, namely – organizational one, are implemented. This is why, its effectiveness depends on the proper organization of economic activity. Taking into account resources availability, the most appropriate management methods are selected and implemented by using management resources.

The sequence of ensuring economic security is shown in the figure 3.

Stages in the management process of international economic security, represented in the diagram, are divided into two main components – analysis of the economic security and measures for its enhancement and support.

Analysis of international economic security involves the collection and processing of data on the major aspects of economic security, the quantitative and qualitative analysis.

Measures, aimed at enhancement and maintenance of international economic security, provide choice and justification of the maximum allowable level of international economic security, selection of tools for improving and maintaining its level, forming management decisions.

Stage 1. The first stage in the management process of international economic security is the collection and processing of the data of all aspects of international economic security as it involves acquisition, processing, transmission and practical use of various kinds of information.

Obtained at this stage, the information should be accurate, complete and well-timed. The list of such information may include data on financial stability and solvency of partners, customers, competitors, data on the political and economic situation of the country, which it is planned to work with, in the direction of foreign economic activity; probability of various risks, market conditions, marketing conditions.

Data from the previous experience, various analytical reviews, expert opinion, and data of specialized companies (such as Berry Company or other rating agencies) may be the sources of such information.

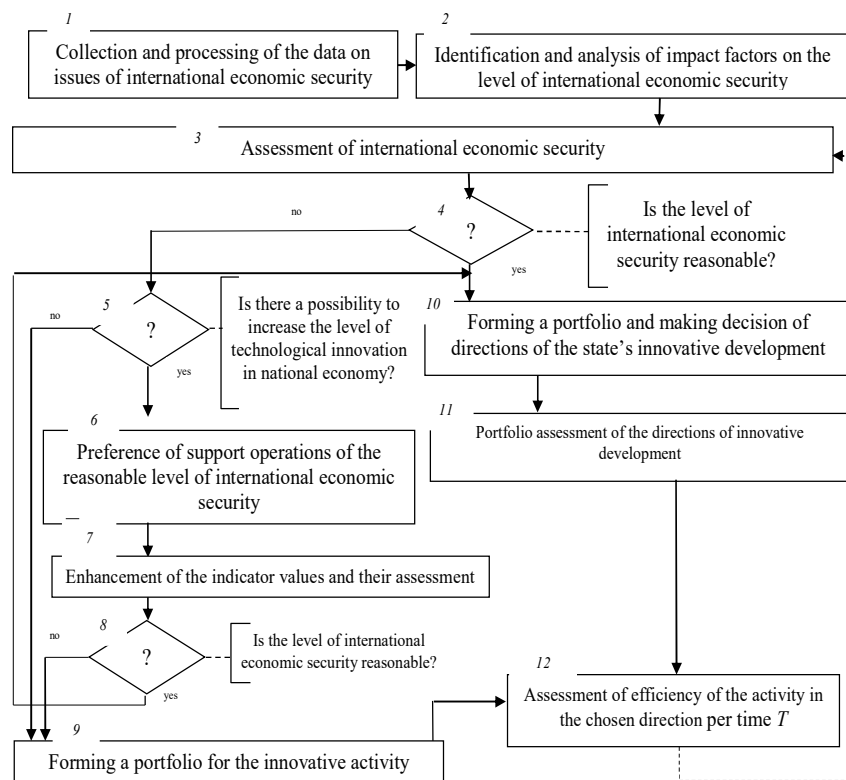


Figure 3. Escalated flowchart of the management process of international economic security¹⁹

Stage 2. Information in the process of qualitative analysis of impact factors on the level of international economic security is especially important. Qualitative analysis involves identifying the sources of the violation of international economic security. In the process of qualitative analysis, it is important not only to establish the source of the violation of economic security, but also to identify possible loss of resources upon the occurrence of hazardous events. During the qualitative analysis large group of factors that have a negative impact on international economic security can be isolated. These may be as organizational and economic factors, as political ones and factors of force majeure, which are not always possible to predict and prevent. The results of the qualitative analysis are required for quantitative assessment.

Stage 3. Quantitative assessment of the level of international economic security provides numerous definitions of current and future condition of economic security. At this stage the quantitative assessment of the economic security and its adequate level is estimated and set depending on the situation. Methods of assessing the level of economic security are considered below.

Stage 4. Development of foreign economic activity, based on technological innovation, in Ukraine is vital. However, the high level of risk concerning innovations could impair the overall level of international economic security. Hence, it is required to carefully determine the feasibility of the directions of innovative development.

Stage 5. As it is indicated in the figure 3, initially the country analyzes its activities for data. The last twelvemonths are proposed to consider, as the period of the report, because during this

¹⁹ Prokopenko O., Domashenko M., Shkola V. (2014). Management features of economic security of foreign economic activity of Ukrainian machine-building enterprises. *Actual problems of economics*, № 10 (160), 188-194

period the country does its own cycle of activity that enables to make well-founded conclusions. It is reasonable to choose twelvemonths as an examination period of the effectiveness of the activity in the chosen direction – time T.

It should be noted that analysis of the activity should be based on the determination of the actual values of net income and comparing the obtained values with those of previous years. It is necessary to take appropriate management decisions to regulate the methods of achieving this goal on the basis of the obtained values.

However, before making the decision of changing the direction of innovative activity it is suggested to consider the opportunity of enhancement of the assessed values by using tools to ensure an adequate level of international economic security, the selection of which is shown below. The current direction of the innovative activity is possible after elimination of negative factors.

3. Assessment of the directions for the state's innovative development

An important criterion for selecting areas, and within them, for innovation development options is the efficiency level during the ecological and economic cycle of innovation that covers the life cycle of innovation (LCI) and customization cycle of innovation (CCI), which is proposed to be determined by the indicators of expected environmental and economic efficiency for enterprises, consumers and society as a whole, as well as the expected commercial efficiency of the innovation development direction.

The expected environmental and economic efficiency should be determined in the assessment of the directions, reflecting the results of innovation activities for the manufacturer, consumers and society as a whole, and the expected commercial efficiency given the market optimality, taking into account the interests and economic benefits of the innovative enterprise.

The authors propose to consider the ecological and economic efficiency E as a indicators system which reflects the general results and costs for the implementation of the chosen innovation development direction for innovative enterprises, consumers and society in general, including both direct results and costs, and external effects in related sectors of the economy, including environmental and social eco-innovations during the ecological and economic cycle. The following formula is proposed for its calculation:

$$E = \frac{\sum_{t=1}^T (R_{Et} \cdot g_t - E_{Et} \cdot k_t) \cdot s_t^m \cdot (1+r)^{-t}}{\sum_{t=1}^T E_{Et} \cdot k_t \cdot (1+r)^{-t}}, \quad (2)$$

where R_{Et} – the expected direct (variant) ecological and economic result of the innovative activity in the t-period, currency unit; E_{Et} – expected expenses of the t-period for realization of measures in the direction (variant) under consideration, currency unit; r – discount rate, relative unit; k_t – correction coefficient taking into account the level of expenses change for measures implementation within the innovation development direction depending on the type of implemented innovation, the corresponding stage of its evolutionary development and the priority ecologization concept of the innovation activity; g_t – coefficient of society's flexibility for the innovation acceptance; s_t^m – coefficient that takes into account the synergy of social, economic and environmental effects and the synergy of adding the ecological and economic effect in each t-period to the previous ones (with the intensifying nature of action m takes on a meaning +1, with the decreasing one goes to -1); T – the ecological and economic cycle duration, years. The value

of the s_t , k_t , g_t coefficients and m index are established on the basis of empirical analysis of the output data. It was developed the table of values for the k_t , g_t coefficient, the application of which allows to increase the accuracy of predictive calculations taking into account exo- and endogenous factors.

The expected commercial efficiency of the innovation development direction (variant) is determined by the criterion of the market optimality and by the indicators of net present value NPV, internal rate of return IRR, profitability index PI and payback period PP taking into account risk in three forecast variants (pessimistic, most probable and optimistic).

The NPV calculation taking into account the R_t risk is proposed to be carried out according to the formula:

$$NPV = \sum_{t=1}^T \left(\frac{E_t}{(1+r)^t} - \sum_{j=1}^d \frac{RV_{tj}}{(1+r)^t} \right), \quad (3)$$

where E_t – the expected effect from the direction (variant) realization in the t-period, currency unit; RV_{tj} – the expected absolute value of the loss from the j risk type in the period t, $j \in [1; d]$, currency unit; r – discount rate, relative unit; t – the realization period of the direction taking into account the eco-economic innovation cycle (T), the year. The methodology for risk assessment of innovation activity is presented in works^{20, 21}. The calculation of IRR, PI, PP is carried out according to the procedure outlined in works^{22, 23}.

The market optimality of the variant is based on the comparison of the evolutionary development stages of innovation (S_1), enterprise (S_2) and market (S_3) (see in more detail work²⁴).

The matrix for combination of the innovation, enterprise and market development stages (table 1) has been developed to determine the market optimality of the innovation development variant.

It allows determining the realizing country possibility of the investigated variant and the expediency of investing investment resources taking into account possible refinement and approximation to the existing market situation and possible scenarios of its development based on forecasting changes in the marketing environment and market conditions.

Establishment of absolute market optimality (segment A of Table 1) allows you to go directly to the assessment of the commercial effectiveness of the option, taking into account the risks identified in accordance with the specificity of the analyzed version and implemented innovation. When the combination of the "innovation-enterprise-market" system is unacceptable (segment E of Table 1), it is necessary to determine which of the components makes it impossible

²⁰ Ilyashenko, S.M. (2004). *Ekonomichnyi ryzyk [Economic Risk]*. Kyiv: Center for Educational Literature. [in Ukrainian]

²¹ Ilyashenko, S.M. (2010). *Innovatsiyni menedzhment [Innovative management]*. Sumy: Publishing Company "University Book" [in Ukrainian]

²² Kozmenko, S. (2005). *Investitsionnye resheniya i upravlenie NTP [Investment decisions and management of scientific and technical progress]*. Sumy: Publishing Company University Book, LLC "Consulting Publishing Company "Business Perspectives". [in Russian]

²³ Lipsits, I.V., Kosov, V.V. (1996). *Investitsionnyy proekt: metody podgotovki i analiza [Investment project: preparation and analysis methods]*. Moscow: Publisher BEK. [in Russian]

²⁴ Kasyanenko, T. V. (2012). *Ekonomichne obgruntuvannia ekolohichno spriamovanoho innovatsiynoho rozvytku [Economic justification of ecologically oriented innovative development]*. *Candidate's thesis*. Donetsk: Donetsk State University of Management [in Ukrainian]

to implement the investigated variant and determine the possibility of its adjustment. The presence of certain opportunities for the enterprise to implement the research variant (segments B, C, D of Table 1) necessitates an additional analysis based on the specific risks of the analyzed variant and the implemented innovations.

Table 1. The matrix for combination of “the innovation, enterprise and market system”
(developed by the authors)

S (S ₁ , S ₂ , S ₃)		The development stage of innovation, S ₁											
		I			II			III			IV		
		The development stage of enterprise, S ₂											
		I	II	III	I	II	III	I	II	III	I	II	III
The development stage of market, S ₃	0	A	A	C	E	E	E	E	E	E	E	E	E
	I	C	C	C	C	B	C	C	B	C	E	E	E
	II	E	E	E	D	B	B	D	B	B	D	B	B
	III	E	E	E	D	D	D	D	C	A	D	C	A
	IV	E	E	E	E	E	E	D	B	A	C	A	A

Legend: A – the combination is absolutely market-optimal; B – the combination is market-optimal provided compliance with additional recommendations; C – the combination may be optimal under certain conditions and provided compliance with certain recommendations; D – the combination is acceptable under certain conditions; E – combination is unacceptable.

4. Estimation of economic security

For the complex consideration of internal and external factors influencing the international economic security when entering the international market, a three-component indicator of the level of international economic security K_{nj} is proposed:

$$K_{nj} = f(I, P_n, D_j),$$

$$I, P_n, D_j = \begin{cases} 1, & \text{if } I, P_n, D_j \geq I_{suf}, P_{suf}, D_{suf}, \\ 0, & \text{if } I, P_n, D_j < I_{suf}, P_{suf}, D_{suf}, \end{cases} \quad (4)$$

where I – value of estimating the potential of national economy; P_n – country's risk level for a country n ; D_j – indicator of the level of market opportunities of the country for the implementation of j type of activity; $I_{suf}, P_{suf}, D_{suf}$ – sufficient value of indicators I, P_n, D_j (see Table 2 where area of the sufficient indicators is highlighted by the eclipse).

Table 2. Values of indicators for assessing the level of international economic security
(developed by the authors)

The level of potential, I		Country risk level, P_n		Level of market opportunities, D_j	
Value	Characteristic	Value	Characteristic	Value	Characteristic
$0,95 \leq I \leq 1$	Absolutely safe	$75 < P_n \leq 100$	Low	$0,75 \leq D_j \leq 1$	High
$0,75 \leq I < 0,95$	Acceptable	$30 < P_n \leq 75$	Middle	$0,5 \leq D_j < 0,75$	Middle
$0,5 \leq I < 0,75$	Unstable				

$0,25 \leq I < 0,5$	Low	$0 \leq P_n \leq 30$	High	$0 \leq D_j < 0,5$	Low
$0 \leq I < 0,25$	Inadmissible				

The value of the indicator I is proposed to be determined by the formula:

$$I = \sum_{i=1}^n B_i \cdot \frac{F_i}{G_i}, \quad (5)$$

where B_i – the ponderability coefficient of the i security component; F_i – actual value of the i security component; G_i – sufficient value of the i security component; n – the number of security components.

The main components of potential I: financial (characterizes the financial sustainability); industrial-technical (characterizes the efficiency of using the main production assets); intellectually-cadre (shows the efficiency of the labor resource usage); marketing (reflects the stability of the country in the sectoral market); legal (characterizes the degree of the country interests and its workers protection); interface (characterizes the reliability of interaction with contractors); innovative-technological (defines the technological potential of the country); raw materials and energy (reflects the supply of raw materials and energy resources); ecological (characterizes the ability of the national economy to carry out production activities in accordance with environmental standards).

The country risk level P_n is determined on the basis of the BERI index, which is calculated four times per year using the expert judgement estimation method. The structure of the analyzed parts of the indicator includes: efficiency of the economy; level of political risk; level of indebtedness; availability of bank loans; availability of short-term financing; availability of long-term loan capital; likelihood of the occurrence of force majeure circumstances; the level of creditworthiness of the country; the amount of outstanding debt repayment obligations²⁵.

There are a number of methodological approaches, the most common of which are: SWOT-analysis^{26,27}, M. Porter's strategies model^{28,29,30,31}, Peter T. FitzRoy's competitive advantage

²⁵ Dolzhansky, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. *Upravlinnya rozvytkom – Development Management*, 8, 20-22 [in Ukrainian]

²⁶ Dolzhansky, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. *Upravlinnya rozvytkom – Development Management*, 8, 20-22 [in Ukrainian]

²⁷ Illyashenko, S. (2005). *Upravlinnia innovatsiinym rozvytkom [Management of innovative development]*. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

²⁸ Illyashenko, S. (2005). *Upravlinnia innovatsiinym rozvytkom [Management of innovative development]*. Sumy: Publishing Company “University Book”, Kyiv: Publishing Company “Princess Olga” [in Ukrainian]

²⁹ Porter, M.E.: Competitive Advantage of Nations. *Competitive Intelligence Review*, Volume 1, Issue 1, 14-14 (1990) DOI: 10.1002/cir.3880010112

³⁰ Porter, M.E. (2008). *The five competitive forces that shape strategy*. Harvard Business Review, Volume 86, Issue 1, 79-93.

³¹ Illyashenko, S., Olefirenko, O. (2008). *Management of a portfolio of orders of the research-and-production enterprise [Upravlinnia portfelem zamovlen naukovo-vyrobnychoho pidpriemstva]*. Sumy: Publishing Company “University Book” [in Ukrainian]

matrix, Boston Consulting Group (BCG) matrix^{32,33}, the GE-McKinsey matrix^{34,35}, the Gap-analysis^{36,37}, the Shell-DPM matrix³⁸, the matrix of R. Cooper³⁹. The analysis of their advantages and disadvantages has allowed to reveal insufficiently complete objectivity of the results obtained on their basis, since all of them are based on qualitative or quantitative estimates of individual components of the competitiveness of the country itself and its closest competitors. In order to solve this problem, the authors offered a methodology for assessing the market opportunities, based on the comprehensive study of the system "product - market - consumer" (see fig. 2).

Characteristics of the levels of the market opportunities, allocated using the corresponding matrix (see Fig. 4), is presented in Table. 3

Theoretically possible there are 8 values of the three-component index K_{nj} corresponding to the four zones of international economic security (Table 3). For each of the selected zones of economic security, competitive strategies are proposed. Their characteristics are given in Table. 4. The groups of activities that has relevance to the Book Index are formed within the framework of each strategy (Table 5). The implementation of these groups can be complex or prioritized, based on the country financial capabilities. It should be noted that the country can apply different strategies at different markets and for different activities simultaneously.

³² Dolzhansky, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. *Upravlinnya rozvy`tkom – Development Management*, 8, 20-22 [in Ukrainian]

³³ Illyashenko, S. (2005). *Upravlinnia innovatsiinym rozvytkom [Management of innovative development]*. Sumy: Publishing Company "University Book", Kyiv: Publishing Company "Princess Olga" [in Ukrainian]

³⁴ Illyashenko, S. (2005). *Upravlinnia innovatsiinym rozvytkom [Management of innovative development]*. Sumy: Publishing Company "University Book", Kyiv: Publishing Company "Princess Olga" [in Ukrainian]

³⁵ Osnovy menedjmenta

³⁶ Dolzhansky, I., Tkachuk S. (2007) Investitsionnyy risk kak ugroza ekonomicheskoy bezopasnosti [Investment risk as threats of economic security]. *Upravlinnya rozvy`tkom – Development Management*, 8, 20-22 [in Ukrainian]

³⁷ Illyashenko, S. (2005). *Upravlinnia innovatsiinym rozvytkom [Management of innovative development]*. Sumy: Publishing Company "University Book", Kyiv: Publishing Company "Princess Olga" [in Ukrainian]

³⁸ Illyashenko, S. (2005). *Upravlinnia innovatsiinym rozvytkom [Management of innovative development]*. Sumy: Publishing Company "University Book", Kyiv: Publishing Company "Princess Olga" [in Ukrainian]

³⁹ Illyashenko, S. (2005). *Upravlinnia innovatsiinym rozvytkom [Management of innovative development]*. Sumy: Publishing Company "University Book", Kyiv: Publishing Company "Princess Olga" [in Ukrainian]

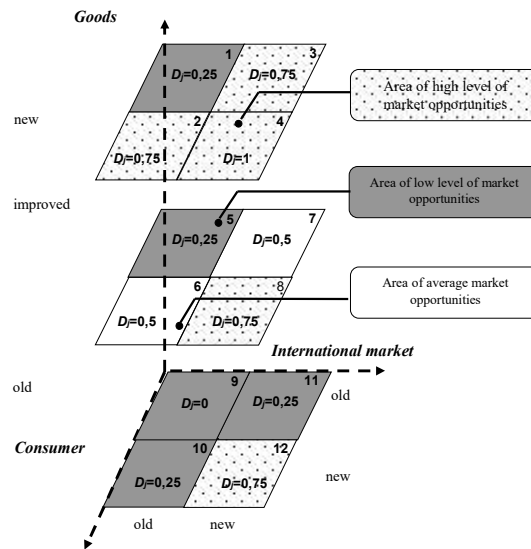


Figure 4. The matrix of levels of market opportunities (developed by the authors)

Table 3. Characteristics of market opportunities (developed by the authors)


Characteristics	Area of market opportunities		
	High	Middle	Low
	Quadrant 2, 3, 4, 8, 12	Quadrant 6, 7	Quadrant 1, 5, 9, 10, 11
Purpose of marketing policy	Optimization of the sales network abroad	Optimization and sales intensification	Sales optimization
Purpose of commodity policy	Extension of the range, basic innovation	Improved modifications, a wide range of models	Elimination of overweight
Purpose of the promotion policy	Consumers' belief in the need to purchase products	Maximum consumer awareness	Maintaining the distinctive advantages of products
Pricing strategy	Establishing a price at the level of compensation of cost and contractual prices	Setting the price at the level of cost, sliding falling and contract prices	Setting of contract prices, flexible prices and preferential prices. Price elasticity


The choice of measures aimed at ensuring an adequate level of international economic security is proposed to be carried out in the following sequence: 1) identification of indicators for assessing the level of economic security (see Table 2); 2) determination of zones of economic security based on the values of the three-component indicator (see Table 4); 3) choice of strategies for ensuring economic security in the world market (see Table 5); 4) selection and implementation of measures to ensure the economic security (see Table 5); 5) assessment of the effectiveness of


measures to ensure the economic security.


Table 4. Zones of international economic security (developed by the authors)

(I, P_n, D_j)		The level of potential, I			
		sufficient		insufficient	
		Country risk level, P_n			
		sufficient	insufficient	sufficient	insufficient
Level of market opportunities, D_j	sufficient	(1;1;1)	(1;1;0)	(1;0;1)	(1;0;0)
	insufficient	(0;1;1)	(0;1;1)	(0;0;1)	(0;0;0)

 – Zone I (absolute security);

 – Zone III (unstable security);

 – Zone II (acceptable security);

 – Zone IV (inadmissible security).

Conclusions.

The developed theoretical and methodological approach to the management of innovative progress allows to take into account: positive results determined by changes in the eco-destructive load on the environment and recipients; the possible cost level for the implementation of the direction (option) depending on the type of innovation, the stage of the ecological and economic cycle of innovation, which increases the level of substantiation of management decisions at the initial stages; market optimality of the direction (option), which allows to reduce investment risks at the early stages and determine its market perspective in the long and short term benefits.

The theoretical and methodological approach suggested by the authors to the formation of strategies, as well as to the system of measures ensuring international economic security, allows to increase the overall level of international economic security, stimulate the government to implement measures aimed at the rational use of the national resources, the choice of optimal market for distribution of their products, as well as the choice of the kind of activity that will fully meet the existing needs of the international market. Further research should be aimed at developing approaches to assessing the effectiveness of the proposed strategies and measures to ensure the international economic security.

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Table 5. Strategies for ensuring international economic security (developed by the authors)

Zone	Strategy	Characteristics of the strategy	K_{nj}	Action groups
Zone I	Support	Maintaining a sufficient level of economic security, preventing the emergence of threats to the economic interests of the country	(1;1;1)	1. Support for core production assets; 2. Effective use of resources; 3. Attraction of investments; 4. Preparation of foreign trade agreements; 5. Supporting a sufficient amount of sales and ensuring its stable growth; 6. R & D support; 7. Improvement of conditions for trade in export goods
		Conduct measures to strengthen one of the indicators of a three-component indicator of international economic security whose value is insufficient	(1;1;0)	1. Analysis of market opportunities; 2. Formation of own sales network abroad; 3. Market monitoring; 4. Improving the quality of goods; 5. Extension of product range; 6. Development of foreign trade ties
Zone II	Strengthening		(1;0;1)	1. Risk Insurance; 2. Search for new sales markets
			(0;1;1)	1. Modernization of production; 2. Motivation of the personnel; 3. Reduced resource costs; 4. Increasing the competitiveness of products; 5. Increase sales; 6. Involvement of new resource providers on more favorable terms
Zone III	Adaptation	Adaptation of the type of activity to a certain market and vice versa, as well as adaptation of the components	(1;0;0)	1. Search for other sales markets; 2. Updating the product range; 3. Improving product quality; 4. Drawing up of new contracts
			(0;0;1)	1. Improvement of results of financial and economic activity; 2. Budget financing; 3. Search for other sales markets; 4. Risk Insurance

		of economic security to the requirements of the environment	(0;0;1)	1. Improvement of the results of financial and economic activity; 2. Adaptation of main productive assets to the type of activity of the country; 3. Promotion of product sales for export; 4. Tax privileges; 5. Budget financing; 6. Increasing the competitiveness of products; 7. Involvement of new suppliers of material resources at more favorable conditions for the country
Zone IV	Change	Conduct changes in the type of activity and the external market	(0;0;0)	1. Formation of a new portfolio of options for Foreign Economic Activity; 2. Search for new sales markets

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