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КЕРІВНІ ПРИНЦИПИ ПРІОРИТИЗАЦІЇ ЗАВДАНЬ РОЗВИТКУ ПІДПРИЄМНИЦЬКОГО СЕКТОРУ ВОДНОГО ТРАНСПОРТУ УКРАЇНИ

Актуальність. Водний транспорт має вирішальне значення для економічного процвітання та національної безпеки України. Більшість галузей економіки залежить від водного транспорту, його інфраструктури, логістичних мереж, суден і персоналу як у мирний час, так і у надзвичайних ситуаціях, а особливо під час війни.

Мета та завдання. Мета роботи полягає у визначенні пріоритетних напрямів розвитку підприємницького сектору водного транспорту України у період післявоєнного відновлення.

Матеріали та методи. Для вирішення поставлених завдань використано такі методи: системно-структурного аналізу та розрахунково-аналітичний – при проведенні аналізу діяльності підприємницького сектору водного транспорту в Україні; абстрактно-логічного аналізу та групування – при розробленні керівних принципів пріоритизації завдань розвитку підприємницького сектору водного транспорту України.

Результати. Підприємництво, як повноправний вид господарської діяльності, використовує виробничі ресурси: природні, трудові, фінансові, інформаційні. Перелічені ресурси споживаються за будь-якого виду підприємництва, що є перетворенням ресурсів на кінцеві продукти бізнесу: товари та послуги. Для підприємництва важливим є питання розміру прибутку. Існують абсолютний та відносний показники прибутку. Відносним показником прибутку є рентабельність. Цей показник демонструє ступінь віддачі виробничих факторів, що застосовуються у виробництві. Тобто рентабельність діяльності підприємця показує ступінь віддачі всього авансованого капіталу, використовуваної інформації та вкладеної праці. Протягом тривалого періоду часу рентабельність діяльності підприємств водного транспорту України перебувала на дуже низькому рівні та не перевищувала 2%. Крім того, до 2015 року вона мала від'ємні значення і тільки у передвоєнні роки рівень рентабельності всієї діяльності підприємств водного транспорту України почав зростати і перевищив 12%. Таким чином, визначення напрямів пріоритизації завдань розвитку підприємницького сектору водного транспорту України необхідно здійснювати в залежності від їхнього впливу на рентабельність таких підприємств відповідно до наведених нижче керівних принципів, які застосовуються до всіх цілей і завдань, післявоєнного відновлення та розвитку водного транспорту України:

1) перевезення вантажів водними шляхами є важливою складовою мультимодальної транспортної системи; 2) сучасний економічно-ефективний та безпечний водний транспорт має важливе значення для економічного процвітання та захисту економічної безпеки України; 3) водний транспорт України має бути гнучким і стійким до потрясінь; 4) водний транспорт дозволяє розвантажити автомобільні та залізничні шляхи, сприяє екологізації вантажних перевезень; 5) покращене фінансове забезпечення реалізації конкурентних стратегій в умовах структурних змін макросередовища секторів водного транспорту України; 6) співпраця держави та підприємницького сектору водного транспорту має вирішальне значення для економічного процвітання та захисту економічної безпеки України; 7) інновації як основа післявоєнного відновлення та розвитку водного транспорту України.

Висновки. Результати проведеного нами дослідження дозволили зробити висновок про те, що водний транспорт інтегрує економіку України у величезну глобальну систему, яка переміщує понад 90% світової торгівлі за тоннажем, включаючи споживчі товари, сільськогосподарську продукцію, енергію та сировину. Підприємницький сектор водного транспорту України, судна, інфраструктура та персонал, який забезпечує їх функціонування, відіграють вирішальну роль у економічному процвітанні та захисті національної економічної безпеки. Таким чином, в рамках проведеного дослідження нами було визначено чотири основних напрями пріоритизації завдань розвитку підприємницького сектору водного транспорту України.

Ключові слова: морський транспорт, внутрішній водний транспорт, потенціал, стратегія, конкурентоспроможність, післявоєнне відновлення.

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GUIDING PRINCIPLES OF PRIORITIZING TASKS FOR DEVELOPING UKRAINE'S WATER TRANSPORT

Topicality. Water transport is of crucial importance for the economic prosperity and national security of Ukraine. Most sectors of the economy depend on water transport and its infrastructure, logistics networks, ships, and personnel in peacetime and emergencies, especially in times of war.

Aim and tasks. The purpose of the work is to determine the priority directions for the development of the water transport business sector of Ukraine during the post-war recovery period.

Materials and Methods. We used the following methods to solve the set tasks: system-structural, computational, and analytical – when analyzing the business sector of water transport in Ukraine; abstract-logical analysis and grouping – in developing guiding principles for prioritization of tasks for the post-war development of Ukrainian water transport.

Research results. Entrepreneurship, as a full-fledged type of economic activity, uses production resources: natural, labor, financial, and informational. The listed resources are consumed by any entrepreneurship, which is the transformation of resources into final business products: goods and services. For entrepreneurship, the issue of profit is the most important. There are absolute and relative indicators of profit. Profitability is a relative indicator of profit. This indicator shows the degree of return of production factors used in production. The profitability of an entrepreneur's activity shows the degree of return on all advanced capital, used information, and invested labor. For an extended period, Ukrainian water transport enterprises' profitability was deficient and was at most 2%. In addition, until 2015, it had negative values, and only in the pre-war years did the level of profitability of all activities of water transport enterprises of Ukraine begin to grow and exceed 12%. Thus, determining the directions of prioritization of tasks for the development of the business sector of water transport in Ukraine must be carried out depending on their impact on the profitability of such enterprises by the following guiding principles, which apply to all goals and tasks of the post-war reconstruction and development of water transport of Ukraine: 1) transportation of goods by waterways is an essential component of the multimodal transport system; 2) modern, cost-effective and safe water transport is vital for economic prosperity and protection of the economic security of Ukraine; 3) water transport in Ukraine should be flexible and resistant to shocks; 4) water transport allows the unloading of road and railway routes and contributes to the environmentalization of freight transport; 5) improved financial support for the implementation of competitive strategies in the conditions of structural changes in the macro-environment of the water transport sectors of Ukraine; 6) cooperation between the state and the business sector of water transport is of crucial importance for the economic prosperity and protection of the economic security of Ukraine; 7) innovations as the basis of the post-war recovery and development of water transport in Ukraine.

Conclusion. The results of our research allowed us to conclude that water transport integrates Ukraine's economy into a powerful global system that moves more than 90% of world trade by tonnage, including consumer goods, agricultural products, energy, and raw materials. Ukraine's water transport business sector, vessels, infrastructure, and personnel that ensure their operation plays a crucial role in economic prosperity and protection of national economic security. Thus, within the research framework, we identified four primary areas of prioritization of tasks for developing the entrepreneurial sector of water transport in Ukraine.

Keywords: maritime transport, inland water transport, potential, strategy, competitiveness, post-war recovery

Problem statement and its connection with important scientific and practical tasks. The relevance of the research is because water transport is of crucial importance for the economic prosperity and national security of Ukraine. Most sectors of the economy depend on water transport and its infrastructure, logistics networks, ships, and personnel in peacetime and emergencies, especially in times of war. According to the Ministry of Infrastructure of Ukraine (Ministry of Infrastructure of Ukraine, 2022), water transport has one of the most powerful potentials among the world's leading countries. It includes 38 state-owned enterprises with a turnover of about UAH 10 billion per year, more than 5,000 business entities, and 76,442 sailors who are citizens of Ukraine. In the pre-war period, the port system of Ukraine included 18 seaports, 13 of which were located on the continental territory of Ukraine, and five ports - on the temporarily occupied territory of the Crimean Autonomous Republic. The total capacity of continental ports and terminals was about 313.3 million tons. On average, the capacity utilization of Ukrainian ports is only 43% to 51%. Ukraine has three navigable rivers, two of which are among the TOP-5 largest rivers in Europe.

Also, Ukraine has 16 river ports and terminals with a total capacity of 60 million tons of cargo per year. The total length of navigable rivers in Ukraine is more than 4 thousand km - Dnipro, Danube, and Southern Bug. The Danube is the second and the Dnipro the fourth longest river in Europe. All navigable rivers in Ukraine have access to the Black Sea. The operating length of public inland waterways has decreased by 60% over the past 30 years, from 3,915,000 km in 1991 to almost 1,569,400 km. Thus, one workplace in the field of water transport stimulates the creation of 4-5 workplaces in related sectors of the national economy of Ukraine.

Analysis of recent publications on the problem. Through studies we analyzed the scientific results presented in the works of domestic and foreign scientists devoted to issues of sustainable economic development (B. Burkynskyi, O. Laiko & V. Talpa (Burkynskyi, B., et.al., 2020), N. Andryeyeva, O. Nikishyna, B. Burkynskyi, N. Khumarova, O. Laiko, & H. Tiutiunnyk (Andryeyeva, N., et.al., 2021), T. Shevchenko, & Yu. Danko (Shevchenko T. & Danko Y., 2022)), entrepreneurial development (O. Laiko, S. Kovalenko, & O. Bilousov (Laiko,

O., et.al., 2020), O. Laiko, T. Umanets, & N. Shlafman (Laiko, O., et.al., 2021)), transport economics (O. Kotlubai (Kotlubai, O., et.al., 2011), V. Kukharchyk (Kotlubai, O. & Kukharchyk, V. et.al., 2009), S. Onyshchenko (Onyshchenko, S., 2009), N. Prymachev (Prymachev, N., et.al., 2009), S. Ilchenko (Ilchenko, S., 2017), N. Khumarova, N. Maslii, M. Demianchuk, V. Skribans (Ilchenko, S., et.al., 2021), S. Kotenko, N. Maslii, V. Kasianova, M. Bezpartochnyi & I. Nadochii (Kotenko, S., et.al., 2021), V. Gryshchenko, I. Gryshchenko (Gryshchenko, V. & Gryshchenko, I., 2021)) in the system of ecological and economic security (B. Burkynskyi, V. Stepanov (Burkynskyi, B. & Stepanov, V., 2009)).

Allocation of previously unsolved parts of the general problem. At the same time, issues related to prioritizing tasks for developing the water transport business sector of Ukraine and their economic justification require further research. Successful functioning and development of maritime transport, in this context, requires an appropriate approach to the use of its competitive potential, which, in turn, requires the development of the concept of maritime transport competitive potential using in the system of economic security of the country. Insufficient development and scientific methodological significance of these issues led to the choice of topic and purpose of the study.

Formulation of research objectives (problem statement). The purpose of the work is to determine the priority directions for the development of the water transport business sector of Ukraine during the post-war recovery period. By the set goal, the following tasks containing elements of scientific novelty were defined: 1) analyze the business sector of water transport in Ukraine; 2) develop guiding principles for prioritizing tasks for developing the water transport business sector of Ukraine.

Materials and Methods. The theoretical and methodological basis of the study was the fundamental scientific principles of general economic theory and transport economics, the work of domestic and foreign scientists. The information base of the study consists of: collected, processed, and summarized personally by the authors of primary materials of economic research, official statistics, monographs, and scientific and analytical articles of domestic and foreign authors. We used the following methods to solve the set tasks: system-structural, computational, and analytical – when analyzing the business sector of water transport in Ukraine; abstract-logical

analysis and grouping – in developing guiding principles for prioritization of tasks for the post-war development of Ukrainian water transport.

An outline of the main results and their justification. According to Art. 42 of the Economic Code of Ukraine, "Entrepreneurship is an independent, initiative, systematic, at one's own risk economic activity, carried out by business entities (entrepreneurs) to achieve economic and social results and obtain profit" (Verkhovna Rada of Ukraine, 2003). Entrepreneurship, as a full-fledged type of economic activity, uses production resources: natural, labor, financial, and informational. The listed resources are consumed by any entrepreneurship, which is the transformation of resources into final business products: goods and services. At the same time, the resources involved in entrepreneurship become its factors, which essentially do not differ from known production factors: land, labor, and material or monetary capital. Entrepreneurship is work, a lot of work. Labor action on natural resources with the help of fixed assets allows an entrepreneur to create necessary products and services for consumers who are ready to pay money for them. Funds are necessary for entrepreneurship: land plots, buildings, premises, machines, and equipment. They are needed for production, storage, transportation, sale of products, and business management. Today it is impossible to conduct serious business without office premises equipped with means of communication, office equipment, and computers. Running a business also requires working capital and material resources: raw materials, materials, and energy. They are mostly needed by entrepreneurs - producers of goods from these resources. However, no business can do without electricity, paper, or heating the premises. A business also needs cash capital, and not just initial capital. Moreover, money for entrepreneurial purposes is not needed in itself; physical capital is required: fixed and working capital. Factors of entrepreneurship should also include information resources, without which effective business is impossible. The concept of "informational resources", or scientific and informational resources, includes knowledge about the subject and ways of conducting business, data about analog products, projects, and technologies, i.e., information of a different nature, without which the company is simply unrealized. For entrepreneurship, the issue of profit is essential. There are absolute and relative indicators of profit. The absolute amount of profit should always be compared with the annual turnover of the business entity or the amount of its capital and

expenses. In this regard, the indicator of profit dynamics is also essential, comparing its value this year with the corresponding value of previous years. Profitability is a relative indicator of profit. This indicator shows the degree of return of production factors used in production. The profitability of an entrepreneur's activity shows the degree of return on all advanced capital, used information, and invested labor.

According to the State Statistics Service of Ukraine (State Statistics Service of Ukraine, 2020; State Statistics Service of Ukraine, 2021), 2020 saw one of the lowest percentages of water transport enterprises that received revenue - 56.5% against 60.3%, 62.4%, and 66.7% in 2015, 2017 and 2019, respectively. In 2020, about 43.5% of water transport enterprises were unprofitable and

did not have funds to cover depreciation deductions (Table 1; Fig. 1).

For an extended period, Ukrainian water transport enterprises' profitability was deficient and did not exceed 2%. In addition, until 2015, it had negative values, and only in the pre-war years did the level of profitability of all activities of water transport enterprises of Ukraine begin to grow and exceed 12% (Table 2; Fig. 3).

Thus, determining the directions of prioritization of tasks for the development of the business sector of water transport in Ukraine must be carried out depending on their impact on the profitability of such enterprises by the following guiding principles, which apply to all goals and tasks of the post-war reconstruction and development of water transport of Ukraine.

Table 1

Financial results before taxation of water transport enterprises of Ukraine

Years	Total				
	financial result (balance) before taxation, a thousand UAH	Businesses that made a profit		Enterprises that received a loss	
		in % to the total number of enterprises	financial result, a thousand UAH	in % to the total number of enterprises	financial result, a thousand UAH
2010	-90335,3	51,3	77896,3	48,7	168231,6
2011	-83707,0	52,2	50071,5	47,8	133778,5
2012	-85105,8	55,3	139968,3	44,7	225074,1
2013	-132445,8	57,0	65179,2	43,0	197625,0
2014	-139302,6	61,9	38565,3	38,1	177867,9
2015	-61456,2	60,3	163925,4	39,7	225381,6
2016	31681,9	57,9	108492,5	42,1	76810,6
2017	87803,4	62,4	137693,4	37,6	49890,0
2018	73191,4	53,6	241267,9	46,4	168076,5
2019	255496,1	66,7	303951,4	33,3	48455,3
2020	152275,4	56,5	376522,4	43,5	224247,0

Source: built by the authors based on data from the State Statistics Service of Ukraine.

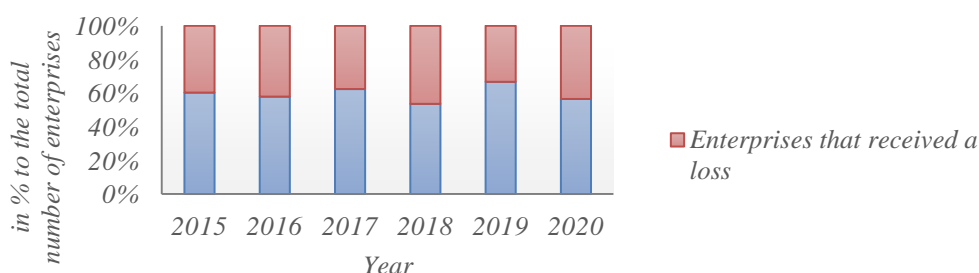


Fig. 1. Water transport enterprises in Ukraine that made a profit

Source: built by the authors based on data from the State Statistics Service of Ukraine

In recent years, there has been a tendency to increase the net profit of Ukrainian water transport enterprises. Thus, during 2016-2019, the net profit

of water transport enterprises increased more than nine times from 22.7 to 213.4 million UAH. But in 2020, an almost 60% drop was observed (Fig. 2).

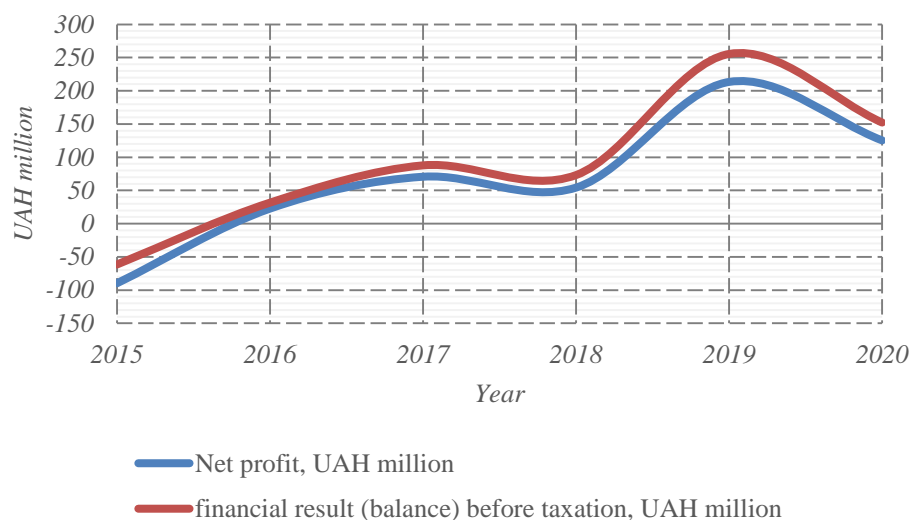


Fig. 2. Net profit of water transport enterprises in Ukraine

Source: built by the authors based on data from the State Statistics Service of Ukraine

For an extended period, Ukrainian water transport enterprises' profitability was deficient and did not exceed 2%. In addition, until 2015, it had negative values, and only in the pre-war years did the level of profitability of all activities of water transport enterprises of Ukraine begin to grow and exceed 12% (Table 2; Fig. 3).

Thus, determining the directions of prioritization of tasks for the development of the business sector of water transport in Ukraine must be carried out depending on their impact on the profitability of such enterprises by the following guiding principles, which apply to all goals and tasks of the post-war reconstruction and development of water transport of Ukraine.

1. Transportation of goods by waterways is an essential component of the multimodal transport system. Therefore, the business sector of water transport of Ukraine, in coordination with other modes of transportation, needs to use an integrated

multimodal approach to the functioning of the transport system to optimize the contribution of water transport to the economically efficient, reliable, safe, and environmentally responsible movement of goods.

2. Modern, cost-effective and safe water transport is essential for the economic prosperity and protection of the economic security of Ukraine. Well-planned investments in the development of water transport contribute to increasing the volume of global and domestic trade in Ukraine, increasing economic competitiveness, creating new jobs, and increasing the level of economic security and environmental protection.

3. Water transport in Ukraine must be flexible and resistant to shocks. Acts of war, artificial accidents, natural disasters, adverse weather conditions, cyber-attacks, and unauthorized use of technology can significantly negatively affect mobility and security.

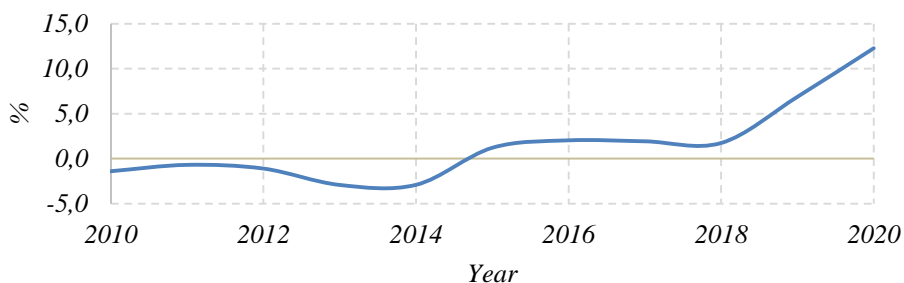


Fig. 3. Level of profitability of water transport enterprises in Ukraine

Source: built by the authors based on data from the State Statistics Service of Ukraine

Table 2

The level of profitability (unprofitability) of all activities of water transport enterprises in Ukraine

Year	Total	including			
		large enterprises	medium enterprises	small businesses	among them micro enterprises
2010	-1,4	c	c	9,2	24,3
2011	-0,7	c	c	2,4	18,7
2012	-1,1	c	c	-1,9	1,9
2013	-2,9	c	c	-9,8	-18,1
2014	-2,9	c	c	-29,8	-65,0
2015	1,2	c	c	-5,1	-28,3
2016	2,0	-	2,3	0,7	-20,6
2017	1,9	-	3,1	-4,4	-7,1
2018	1,7	-	7,6	-23,4	-56,9
2019	6,9	-	7,0	6,0	22,3
2020	12,3	-	14,2	-1,8	-12,4

c – confidential information

Source: built by the authors based on data from the State Statistics Service of Ukraine

4. Water transport allows the unloading of road and railway routes and contributes to the greening of freight transport. The post-war development and inclusion of water transport in Ukraine in the multimodal transportation system will reduce harmful emissions into the atmosphere and energy costs. Furthermore, the development of water transport will contribute to the introduction of ecologically clean, cost-effective, and socially friendly technologies and practices of cargo transportation. The use of water transport allows you to transport large-sized cargo while reducing the cost of repairing roads and railways. Transporting goods between the industrial centers of Ukraine and seaports by "river-sea" vessels without additional overloading of roads and railways frees them from a significant part of unprofitable freight transportation, thus contributing to their reformation. In addition, modern water transport, in comparison with rail and road types, is more ecological, which significantly increases its competitiveness given the latest trends of the EU regarding the greening of freight transport and the implementation of relevant standards.

5. Improved financial support for implementing competitive strategies in the conditions of structural changes in the macro-environment of the water transport sectors of Ukraine. Financial support, in this context, means the provision of funds in the required amount and at the time needed for the implementation of competitive water transport strategies to meet the needs of businesses and society in the provision of transport services for the transportation of goods by waterways. Thus, financing is the fundamental basis for ensuring the implementation of

competitive water transport strategies and the functioning of transport infrastructure. Ensuring the implementation of competitive water transport strategies requires a significant increase in funding to develop water transport and its infrastructure. During the period of post-war recovery of the economy of Ukraine, to finance the development of water transport and its infrastructure, funds from various sources can be used, in particular: funds from the state budget, own funds of economic entities working in the field of water transport (profit, depreciation deductions), credit resources of commercial banks and international financial organizations, funds received from the issue of shares, bonds, and other securities, etc. External sources of financing for the implementation of competitive water transport strategies play a significant role in this process, primarily bank loans from commercial banks, loans from international financial organizations, and funds obtained from the issuance of bonds, shares, and other securities. The effectiveness of the provision of transport services for the transportation of goods by waterways and the operation of its infrastructure, as well as the level of competitiveness of water transport, depends on how correct and justified the financing of the implementation of competitive water transport strategies is.

6. Cooperation between the state and the business sector of water transport is crucial for the economic prosperity and protection of the financial security of Ukraine. Therefore, the Ministry of Infrastructure of Ukraine must strive to align state interests with the interests of the business sector of water transport at the state, regional and local levels, including with consignors, consignees,

carriers, port operators, and the public.

7. Innovations as the basis of the post-war recovery and development of water transport in Ukraine. Innovation is the main strength of the water transport of the world's leading countries and their competitive advantage. Such countries have considerable experience in applying innovative approaches in the field of water transport, including the development of containerization and modern intermodal concepts. The governments of the economically developed countries of the world, their academic partners, and representatives of the business sector in the field of water transport support the research of new methods and technologies and also promote the use of proven advanced technologies in the construction, operation, and maintenance of vessels and water transport infrastructure.

Conclusions and perspectives of further research. The results of our research allowed us to conclude that water transport integrates Ukraine's economy into a powerful global system that moves more than 90% of world trade by tonnage, including consumer goods, agricultural products, energy, and raw materials. Ukraine's water transport business sector, vessels, infrastructure, and personnel that ensure their operation plays a crucial role in economic prosperity and protection of national economic security. Thus, within the research framework, we identified four primary areas of prioritization of tasks for developing the entrepreneurial sector of water transport in Ukraine. Which, in our opinion, can include the

following: 1) to increase the number of modern, highly efficient vessels of the merchant fleet sailing under the flag of Ukraine, which is a necessary condition for increasing the competitive potential of water transport, economic growth, and ensuring the national security of Ukraine in the post-war period; 2) increase the number of sailors who work for Ukrainian shipping companies, fully provide the need for human resources for the transportation of goods by waterways and fly under the flag of Ukraine; 3) post-war restoration and construction of a new state-of-the-art port infrastructure based on the principle of "better than it was" to increase the competitiveness of Ukrainian water transport on the market of international and cabotage transportation; 4) implementing innovations in automation, informatization, navigation safety, and reducing the impact on the environment and other areas in water transport activities.

Further research will make it possible to conduct an economic justification of directions for prioritization of tasks for the development of the entrepreneurial sector of water transport of Ukraine and to forecast the profitability of the activities of water transport enterprises of Ukraine for the short-term perspective.

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СТРАТЕГІЯ ДИВЕРСИФІКАЦІЇ ЯК НАПРЯМ ПІДВИЩЕННЯ КОНКУРЕНТОСПРОМОЖНОСТІ ТРАНСПОРТНО-ЕКСПЕДИТОРСЬКОЇ КОМПАНІЇ

Актуальність. Потреба впровадження нових стратегій та послуг до діяльності транспортно-експедиторських компаній для підвищення власної конкурентоспроможності та втримання позицій на ринку, оскільки через зростаючу кількість постачальників логістичних послуг, таких як NVOCC (Non-Vessel Operating Common Carrier), послуги традиційних експедиторів та їх функціональна відмінність стає незрозумілою.

Мета та завдання. Систематизація різновидів диверсифікації діяльності транспортно-експедиторських компаній як стратегічного напрямку підвищення конкурентоспроможності на ринку відповідних послуг, визначення різновидів стратегії диверсифікації та відповідних напрямків діяльності ТЕК, розробка алгоритму впровадження стратегії диверсифікації діяльності ТЕК, формування переліку управлінських рішень, що повинні супроводжувати процес диверсифікації діяльності ТЕК.

Матеріали та методи. Дане наукове дослідження проводилося відповідно до логіки і методології системного аналізу, теорії транспортних процесів і систем, а також із застосуванням методів дослідження операцій. Теоретичною основою дослідження послужили праці провідних фахівців зі стратегічного менеджменту, диверсифікації діяльності підприємств та роботи транспортно-експедиторських компаній. Для обґрунтування напрямків розвитку транспортно-експедиторського обслуговування використовувався морфологічний метод. Для структуризації процесу розвитку транспортно-експедиторського обслуговування та структуризації процесу розвитку транспортно-експедиторської компанії використовувалися методи аналізу і синтезу.

Результати. В сучасних умовах транспортно-експедиторські компанії є перш за все інтеграторами різних транспортних послуг, які формують певні системи доставок як для одиничних транспортувань, так і для довгострокового транспортного обслуговування регулярних поставок, тому виникає потреба у впровадженні стратегії диверсифікації у діяльність підприємств, щоб інтеграційні процеси пройшли у повній мірі задовольняючим чином. Оскільки експедиторські компанії на сьогоднішній день не просто надають додаткові до процесу транспортування послуги, а є організаторами і координаторами доставки вантажів, основне завдання експедитора – звільнити вантажовласника від вирішення питань, пов'язаних з транспортуванням вантажів. Саме тому виникає залежність між асортиментом послуг, які можуть запропонувати ТЕК та проблемами клієнта, які ці послуги можуть вирішити. Клієнту, звичайно, зручніше та вигідніше передати всі види робіт, пов'язаних з вантажем, на одну компанію, яка повністю візьме на себе організацію та реалізацію процесу без залучення третіх компаній. Аби впроваджена стратегія диверсифікації приносила транспортно-експедиторській компанії лише конкурентні переваги та позитивні наслідки, при розробці стратегії та плануванні нових напрямків діяльності необхідно вивчати та аналізувати ринок, поведінку конкурентів, споживачів і постачальників. Не менш важливо розрізняти напрямки та спрямування стратегії диверсифікації, щоб ліпше розуміти, до яких цілей і яким чином варто прямувати. Тільки при правильному

аналізі, розробці необхідних цілей та планів, розуміючи тенденції ринку і урахуванню можливих ризиків можна прийти до належних та бажаних результатів впровадження стратегії диверсифікації ТЕК.

Висновки. Через те, що транспортно-експедиторські компанії сьогодні є організаторами та координаторами вантажних перевезень, виникає потреба в диверсифікації діяльності та номенклатури послуг для повного задоволення потреб споживача, які полягають у придбанні повного пакету послуг, які б могли звільнити вантажовласника від вирішення будь-якого роду питань, пов'язаних з транспортуванням вантажів. Аби впроваджена стратегія диверсифікації приносила транспортно-експедиторській компанії лише конкурентні переваги та позитивні наслідки, при розробці стратегії та плануванні нових напрямків діяльності необхідно вивчати та аналізувати ринок, поведінку конкурентів, споживачів і постачальників.

Ключові слова: диверсифікація, транспортно-експедиторська компанія, стратегія, алгоритм впровадження, стратегічний розвиток, конкурентоспроможність

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DIVERSIFICATION STRATEGY AS A WAY TO INCREASE THE COMPETITIVENESS OF A FREIGHT FORWARDING COMPANY

Topicality. The need of introducing new strategies and services to the activities of freight forwarding companies in order to increase their own competitiveness and maintain their positions in the market in due to the growing number of logistics service providers such as NVOCC (Non-Vessel Operating Common Carrier) the services of traditional freight forwarders and their functional differences become unclear.

Aim and tasks. The systematization of diversification's types of the activities made by freight forwarding companies as a strategic direction of increasing competitiveness in the market of relevant services, determination of diversification strategy's types and relevant areas of activity made by freight forwarding companies, development of an algorithm for implementing the diversification's strategy of freight forwarding companies, formation of a management decisions' list that should accompany the process of diversification freight forwarding companies.

Materials and Methods. This scientific research was conducted in accordance with the logic and methodology of system analysis, the theory of transport processes and systems, as well as with the application of operations research methods. The theoretical basis of the study was the works of leading experts in strategic management, diversification of the activities of enterprises and the work of freight forwarding companies. The morphological method was used to substantiate the development directions of transport and forwarding services. Methods of analysis and synthesis were used to structure the process of development of freight forwarding services and to structure the process of development of a transport and forwarding company.

Research results. Today freight forwarding companies are the first among all integrators of various transport services, which form certain delivery systems both for single shipments and for long-term transport services of regular deliveries, therefore the need of implementing a diversification strategy in the activities of enterprises is increasing so that the integration processes pass in a fully satisfactory manner. Since freight forwarding companies simply do not provide additional services to the transportation process, but are organizers and coordinators of cargo delivery, the main task of the freight forwarder is to free the cargo owner from solving issues related to cargo transportation. That is why there is a dependency between the range of services that freight forwarding companies can offer and the client's problems that these services can cause. Of course, it is more convenient and profitable for the client to transfer all types of cargo-related work to one company, which will completely take over the organization and implementation of the

process without the involvement of third companies. In order for the implemented diversification strategy to bring only competitive advantages and positive consequences to the freight forwarding company, it is necessary to study and analyze the market, the behaviour of competitors, consumers and suppliers when developing a strategy and planning new areas of activity. It is no less important to distinguish the directions the diversification strategy in order for better understanding what goals should be aimed. Only with proper analysis, development of the goals and plans, understanding trends and taking into account possible risks, it is possible to accept the proper and desired results of the implementation of the diversification strategy of freight forwarding companies.

Conclusion. Due to the fact that freight forwarding companies today are organizers and coordinators of freight transportation, they need to diversify their activities and range of services to fully satisfy the needs of consumers, which consist in acquiring a complete package of services that could free the cargo owner from solving any kind of issues, related to the transportation of goods. In order for the implemented diversification strategy to bring only competitive advantages and positive consequences to the freight forwarding company, it is necessary to study and analyze the market, the behaviour of competitors, consumers and suppliers when developing a strategy and planning new areas of activity.

Keywords: diversification, freight forwarding company, strategy, implementation algorithm, strategic development, competitiveness

Problem statement and its connection with important scientific and practical tasks. In today's environment where information technology has completely changed the way of life and business strategies, international freight forwarding company like every modern business are evolving to adapt to a fast-changing and competitive business environment. A significant share among all types of adaptive development is diversification, which includes changes in business strategies, expanding the range of services provided, improving technologies, entering new supplier markets and new sales markets.

Analysis of recent publications on the problem. At the current stage there is no doubt that scientists are interested in the study of the diversification of enterprise activities as a kind of strategy. Fundamental studies of this issue belong to such western scientists as: I. Ansoff, J. Barney, F. Kotler, H. Mintzberg, M. Porter, A. Thompson, A. Stickland and others, who primarily considered the nature and origin diversification, it is necessary to introduce it at the micro-levels of the enterprise. Diversification of activity is the object of research by representatives of scientific opinion in the countries of the post-soviet space such as, H. Sokoliuk, M. Korinko, O. Tsohla, O. Zhurska, K. Zalutska, who mostly analyzed the improvement of the industry structure at the national level. Among the Ukrainian scientists who considered the activities and ways of increasing the efficiency of the functioning of freight forwarding companies, it is worth highlighting such scientists as H. Makhurenko, Yu. Koskyna, S. Onyshchenko, V. Gladkovska, V. Stadnik.

Allocation of previously unsolved parts of the general problem. Despite a significant number of research papers on this issue, they lack an analysis of the current level of development of freight forwarding companies, directions for their diversification in order to increase

competitiveness.

Formulation of research objectives (problem statement). The purpose of the study is the systematization of diversification's types of the activities made by freight forwarding companies as a strategic direction of increasing competitiveness in the market of relevant services. The main objectives of the study are: determination of diversification strategy's types and relevant areas of activity made by freight forwarding companies; development of an algorithm for implementing the diversification's strategy of freight forwarding companies; formation of a management decisions' list that should accompany the process of diversification freight forwarding companies.

Materials and Methods. This scientific research was conducted in accordance with the logic and methodology of system analysis, the theory of transport processes and systems, as well as with the application of operations research methods. The theoretical basis of the study was the works of leading experts. The morphological method was used to substantiate the development directions of freight forwarding services. Methods of analysis and synthesis were used to structure the process of development of freight forwarding services and to structure the process of development of a freight forwarding company.

An outline of the main results and their justification. Diversification is one of the four main growth strategies identified by Igor Ansoff (Figure 1).

Diversification is a term applied to the process of redistribution of resources that exist at a given enterprise to other areas of activity that are significantly different from the previous ones (Ansoff, H.I., 2011).

Ansoff noted that the diversification strategy stands apart from the other three strategies.

While the first three strategies are usually pursued with the same technical, financial, and

merchandising resources used for the original product line, diversification typically requires the company to acquire new skills and knowledge in product development, as well as new insights into market behavior.

This requires not only the acquisition of new

skills and knowledge, but also requires the company to acquire new resources, including new technologies and new tools, which expose the organization to higher levels of risk (Thompson, A.A., et.al., 2010).

		<u>PRODUCTS</u>	
		Present	New
<u>MARKETS</u>	Present	Market penetration	Product development
	New	Market development	Diversification

Fig. 1. Ansoff's matrix of strategies

Source: Ansoff, H.I. (2011) Strategic management.

Since the economic situation in which freight forwarding companies operate today is characterized by uncertainty and instability, in order to ensure the enterprise's sustainable development and the possibility of maintaining and gaining new competitive advantages, it is necessary to implement systems of forecasting and adaptation to the conditions of the external environment (Gladkovska, V., 2017).

Namely, diversification is an effective means of

ensuring the sustainable development of freight forwarding companies and the opportunity to maintain and expand its competitive position on the market.

For a more complete study of the peculiarities of the diversification of the activities of freight forwarding companies, we suggest considering the varieties of its strategies on specific examples, which are schematically depicted in Figure 2.

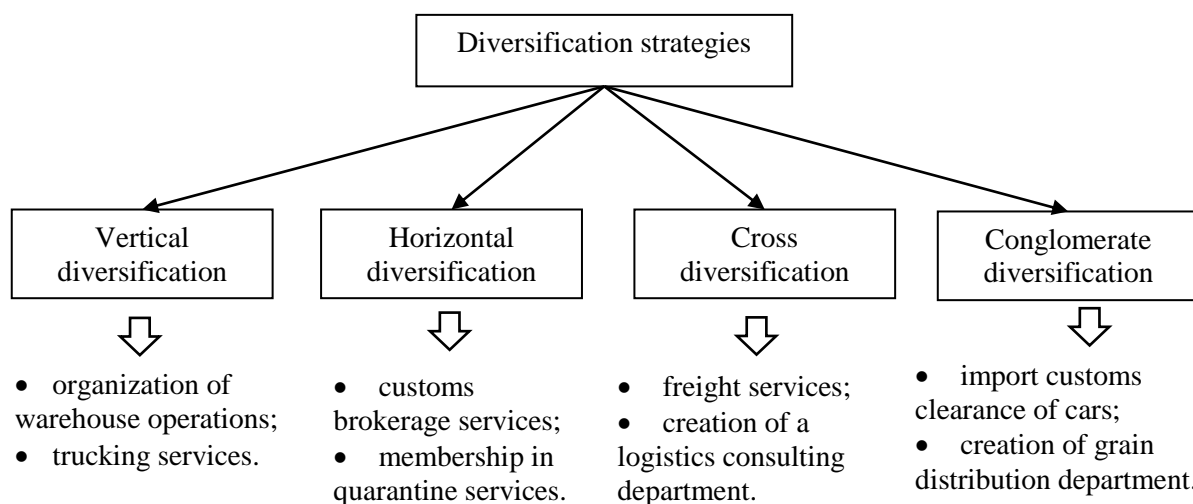


Fig. 2. The main types of diversification strategy on the example of freight forwarding companies

Source: compiled by the authors

The strategy of vertical integration is based on the search and use of additional opportunities for the production of new products and the provision of new services (Mintzberg, H. & Global, S., 1994) and is reflected in freight forwarding companies activities through the addition to the main range of services of such novelties as the organization of

warehouse operations and the provision of trucking services.

In essence, the services of warehousing and transportation of goods are in the same circle of needs for customers, together with the usual services for the organization of transportation provided to them by the forwarder.

For the company's customers, the addition of these services to the range is a comfort of communication due to the absence of third parties in the chain, a decrease in the added value of services.

Since the cost of providing the service should be much lower than the cost of its purchase from another company (Makhurenko, H.S., 2013, Onyshchenko, S., 2014).

Using trucks from its own fleet and acting as a direct carrier for the client, the freight forwarder can be "more flexible" in terms of rates and the schedule of submitting trucks for loading.

The organization of warehouse operations will help to more deeply control the process of transshipment, packaging and storage of cargo.

As a rule, customers feel more relaxed if they understand that one company with which they are already familiar handles the organization, delivery and transshipment of their cargo (Stadnik, V.H., 2015).

The strategy of horizontal diversification involves the search for growth opportunities in the existing market at the expense of new products, which requires a new technology, different from the one used (Kotler, Ph. & Armstrong, G.M., 2010).

In this case, the new product should be aimed at the consumer of the main product, but in terms of its qualities, it should be related to the products that are already being produced.

On the example of freight forwarding companies, the addition of such types of services as customs brokerage services and services for the organization and implementation of phyto-sanitary and veterinary certificates for cargo would correspond to this strategy (Koskyna, Yu.A., 2007).

Acting as a broker and receiving the appropriate license, freight forwarders have the opportunity to save the client's money, processing the cargo quickly and immediately as it enters the territory of Ukraine, thereby preventing downtime and the occurrence of detention or demurrage (Gomeniuk, M., 2020).

In addition, according to the report of the Ministry of Economy of Ukraine on the general results of the export of goods of Ukraine in 2021, the products of the agro-industrial complex and the food industry take the first place among all other types of export goods and make up 36.1% of the total volume (Ministry of Economy of Ukraine, 2021).

That is, in terms of freight forwarding companies export activity, the transportation of grain occupies a leading position.

For customs clearance of grain products and their further transportation, there is a need to issue a phyto-sanitary certificate, which confirms the fact of grain processing and their suitability for consumption.

Therefore, traditional freight forwarders should contact the relevant services that issue these certificates.

However, due to the fact that today the registration procedure has become somewhat simpler and more accessible, freight forwarding companies have the opportunity to attract relevant specialists to their staff to carry out selections analyzes and issue certificates on their own.

In this case, first of all, the periodicity of issuing certificates and their cost for the forwarder is reduced.

For the client, the introduction of this service is an indicator of the company's rating (which has a positive effect on the company's reputation and competitiveness) and an opportunity not to turn to third-party companies, which can become a factor in slowing down the process (Gladkovska, V., 2017).

Cross-diversification is carried out at the enterprise through a combination of horizontal and vertical diversification, that is, in essence.

It is the introduction and addition to the existing nomenclature of the company's services of novelties that are in the same market as the existing services of the enterprise and carry the novelty of the implementation technology for the client (Barney, et.al., 2013).

On the example of freight forwarding companies, cross-diversification is reflected in the addition of such modernizations to the existing range of services as the creation of a logistics-consulting department and the introduction of freight services.

The logistics consulting department, by the opinion of the authors, is considered necessary in cases where the exporter or importer of goods is a small company or an individual entrepreneur who does not yet have relevant experience in foreign economic activity.

In addition, these companies do not pretty understand cause-and-effect relationships in the transportation process cargo, but in turn does not have opportunities to create its own logistics department to attract the necessary specialists (Gomeniuk, M., 2020).

In this case, the freight forwarder can provide the services of a consultant, reporting and providing the client with the necessary information to organize the transportation process in such a way as to avoid additional costs.

For a freight forwarding company, this industry is studied and understood from both the theoretical and practical sides, therefore consulting clients will be carried out at a highly qualified level for an appropriate fee.

The services of a freight broker in this case mean mediation between ship owners (or owners of feeders, barges) and cargo owners.

It is more convenient for the client to leave the documents and cargo "in the hands" of professionals who will deliver, clear customs and send the cargo by river transport, without involving third parties to the deal.

Conglomerate diversification and its manifestation consists in the fact that the firm expands due to the production of technologically unrelated goods that are sold in new markets (Korinko, M.D., 2007).

On the example of freight forwarding companies, conglomerate diversification is manifested in the addition of such updates to the existing list of services as the provision of services for customs clearance and vehicle registration and the creation of a grain distribution department.

The creation of a grain distribution department assumes the role of a trader-intermediary between seller companies and buyer companies that cannot find each other on the market.

The main idea is to buy raw materials and then resell them to non-residents. Having a base of its regular and potential customers, the freight forwarder can find sales markets and sources of supply in companies to which it previously sold its own services.

Importing and customs clearance of cars from European or Asian countries is also an option of conglomerate diversification for the forwarding company, since the procedure for the customs clearance of cars is somewhat different from the procedure for the customs clearance of ordinary cargo.

By changing the concept of development of one of the departments, giving preference to B2C (Business to Customer) market players and individual to individuals (Kotler, Ph. & Armstrong, G.M., 2010), the forwarding company can start mastering a new industry and new accompanying documentation.

To start implementing diversification strategies in the activities of a transport forwarding company, it is necessary to determine the direction of diversified activity first (Sokoliuk, H.O., 2012).

For example, if we are talking about the diversification of traditional transport and forwarding services, then there are obviously two ways to solve this problem:

1. Development in the direction of coverage of services that are directly related to the implementation of the delivery process.

2. Expansion of the range of services that are not directly related to the implementation of the delivery process, but are related to transport and forwarding services.

Next, we form potential solutions in a more concrete and reasoned form:

- a) provision of any warehousing services, transportation, storage and consolidation of cargo for a direction that is directly related to the implementation of the delivery process;

- b) provision of customs and freight broker services, the ability to carry out phyto- and veto selections for the issuance of phyto- and veto certificates for the direction that is directly related to the provision of transport and forwarding services.

After the formation of specific solutions, we form functional options for development and suggest that the development of functional options for development be carried out using the Ansoff matrix (Ansoff, H.I., 2011):

- 1) a new direction – gaining a significant share of the market;

- 2) the existing direction – increasing the volume of services or entering new market segments from the point of view of the type of cargo and the geography of the location of potential customers.

The fourth stage of the implementation of diversification strategies is the formation of potential solution options at the content level. Example:

1. Gaining a 30 % market share among container LCL shipments (Less Container Loaded) and a 40 % market share among FCL shipments (Full Container Loaded) on the Ukrainian forwarders market.

2. Increasing the transportation of party goods on a permanent basis, such as oil, grain, metal products, meal, etc.

When making a decision regarding the diversification of the activities of freight forwarding enterprises, it is necessary to substantiate the optimal set of types of activities of the enterprise, taking into account the available opportunities and the level of risk from the development of a new type of activity.

For this, a certain methodology is needed for the formation of a strategy for the diversification of the activities of a transport forwarding company.

We have proposed a methodical approach to the formation of a strategy for the diversification of the freight forwarding company's activities. The

algorithm for implementing the diversification strategy in the activities of a freight forwarding company is presented in Figure 3.

It consists in the implementation of a number of consecutive analytical procedures, starting from the realization of the need for diversification of the enterprise's activities and the decision-making regarding the choice of types of activities and the implementation and control of the chosen diversification strategy.

The formation of a diversification strategy, like any other strategy of an enterprise, must begin with a strategic analysis, which in the strategic management system is the initial stage of the strategy development process and involves a comprehensive study of the enterprise's internal and external environment (Porter, M.E., 2008).

In the process of forming a strategy for diversifying the activities of a freight forwarding company, such aspects as the state and trends of the enterprise, which are determined by analyzing

financial and economic indicators.

Require special attention during the assessment of the internal environment; availability, level and efficiency of use of resource potential; place and role of the enterprise in the market, its competitiveness (Tsohla, O.O., 2011).

In this case, the study of the external environment should be concentrated in the area of analysis of the sectors of the transport and forwarding market; assessment of the state and trends of market development (at the same time, it is necessary to identify its conjuncture, satisfied and unsatisfied demand, etc.), the level of competition on it (Markides, V. & Holweg, M., 2006).

Based on the results of the strategic analysis, decisions are made regarding the need to diversify the activities of the freight forwarding company.

In the case of a positive decision, the goals and objectives of diversification are formulated.

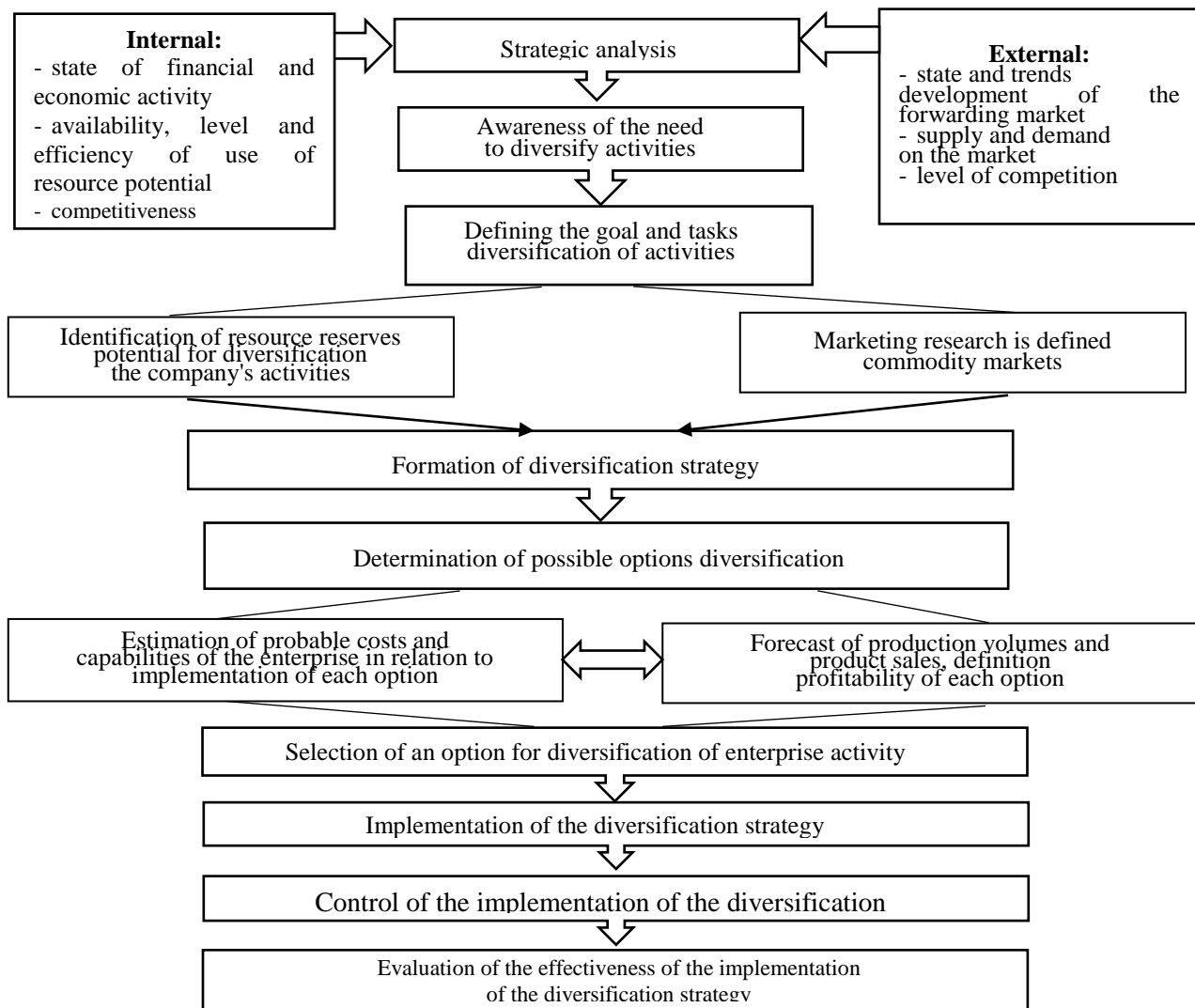


Fig. 3. Algorithm for implementation of diversification strategy

Source: compiled by the authors

After choosing the option of diversification of the enterprise, the stage of implementation and implementation of this strategy begins directly in the company's activities.

In the process of implementing the strategy and after its completion, it is worth starting control so that all languages are respected and the actual results correspond to the planned ones.

The final stage of the implementation of the diversification strategy in the activities of the transport forwarding company is the evaluation of the effectiveness of the implementation of this strategy.

If the dynamics of the indicators show that they are approaching the norm, then the chosen strategy can be considered satisfactory. In the opposite case, the expediency of strategy development and implementation will be determined by non-economic criteria (and by the fact of achieving goals) (Zhurska, O., 2018).

The preparation and adoption of management decisions at the enterprise, related to the diversification of fuel and energy, mainly covers the following areas (Zalutska, K.Y., 2020):

1. Carrying out activities related to increasing the company's diversification potential. The increase in diversification potential is associated with an increase in the company's ability to

provide new services demanded by the market, which requires appropriate resources and qualified employees. In practice, such measures may include staff training through various trainings and courses, acquisition of new programs that could facilitate the work of each individual employee of the company. Management decision-making in this case is reduced to the analysis of various alternatives with limited capabilities of the enterprise and the selection of those whose effectiveness, from the point of view of increasing the diversification potential of the enterprise, will be maximum.

2. Planning and implementation of freight forwarding companies diversification. This direction includes various aspects of diversification planning (determining the time to start developing new types of services, assessing the need for resources and ensuring their availability, coordinating various sales schemes) and implementing diversification (direct introduction of new services to the market).

The general scheme of making managerial decisions related to the diversification of freight forwarding companies, depending on the degree of relevance of threats to decrease the demand for works and services provided, is presented in Figure 4.

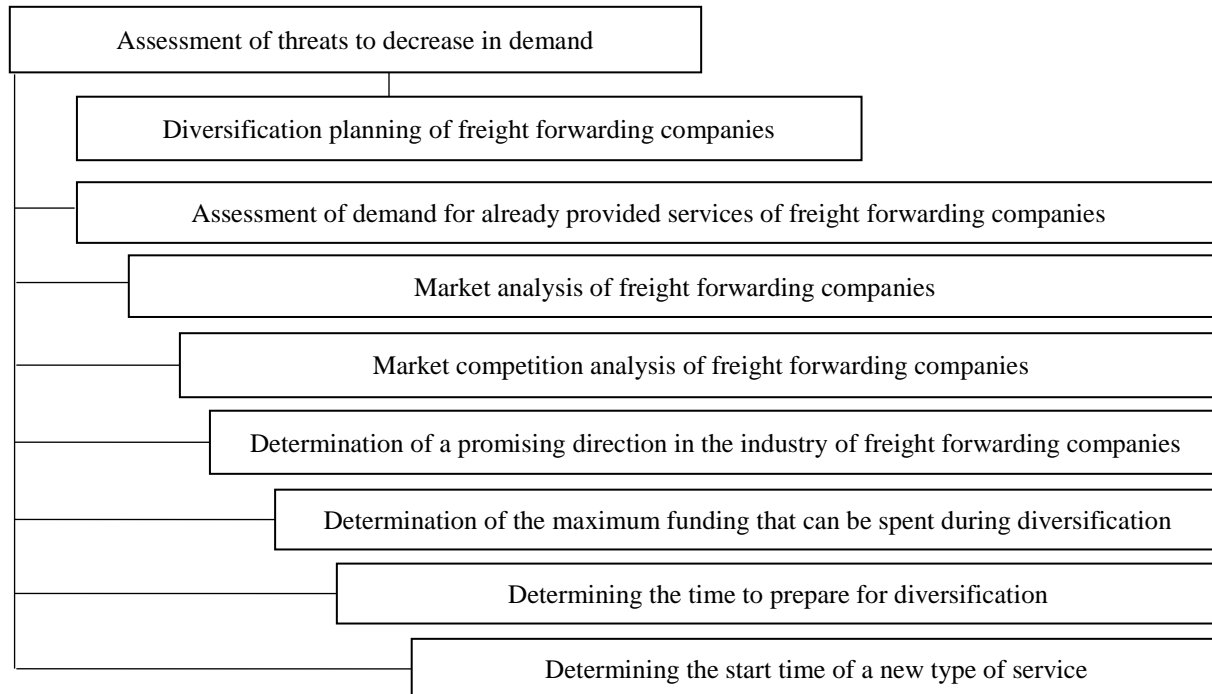


Fig. 4. List of management decisions accompanying the process of freight forwarding companies diversification

Source: compiled by the authors

The current economic situation in Ukraine necessitates the development of production and

conducting business in an unfavorable business environment, which is characterized by high risks

and increased competition with narrowed solvent demand, making the diversification of the types of activities of the transport forwarding company quite relevant. It is worth noting the importance of the quality of the provision of transport and forwarding services and the achievement of a high level of development of the market of transport and forwarding services not only for direct consumers of services, but also for Ukraine as a whole (Zhurska, O., 2018).

This is explained by the fact that the current stage of the development of market relations is characterized by the intensification of international relations and the growth of cargo flows. Ukraine's course towards integration into the world economy causes increased attention to it as a transit state. One of the factors affecting the increase in the flow of transit cargo is, among other things, the level of development of the national market of transport and forwarding services.

Conclusions and perspectives of further research. In modern conditions, freight forwarding companies are, first of all, integrators of various transport services that form certain delivery systems both for single transportations and for long-term transport services of regular deliveries, therefore there is a need to introduce diversification strategies into the activities of enterprises in order for the integration processes to pass in a fully satisfactory manner.

Since today's freight forwarding companies do

not just provide additional services to the transportation process, but are organizers and coordinators of cargo delivery, the main task of the freight forwarder is to free the cargo owner from solving issues related to cargo transportation. That is why there is a dependence between the range of services that freight forwarding companies can offer and the client's problems that these services can solve. Of course, it is more convenient and profitable for the client to transfer all types of work related to the cargo to one company, which will completely take over the organization and implementation of the process without the involvement of third companies.

In order for the implemented diversification strategy to bring only competitive advantages and positive consequences to the freight forwarding company, it is necessary to study and analyze the market, the behavior of competitors, consumers and suppliers when developing a strategy and planning new areas of activity. It is no less important to distinguish the directions and directions of the diversification strategy in order for better understanding which goals and how to go. Only with proper analysis, development of the necessary goals and plans, understanding market trends and taking into account possible risks, it is possible to arrive at the proper and desired results of the implementation of the freight forwarding companies diversification strategy.

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РОЛЬ ЦИФРОВИХ ПЛАТЕЖІВ ТА ВИВЧЕННЯ ПОТОЧНОЇ СИТУАЦІЇ У ЗМІЦНЕННІ ФІНАНСОВИХ РЕСУРСІВ БАНКІВ АЗЕРБАЙДЖАНУ

Актуальність. За останні десятиліття в інституційній архітектурі центральних банків у світі відбулися радикальні зміни, і сучасні центральні банки стали важливим інститутом макроекономічної стабільності. Найважливішим якорем макроекономічної стабільності є стабільність цін. Той факт, що ціни є низькими та менш волатильними, дозволяє бізнесу правильніше планувати інвестиційні рішення, оптимізувати заощадження та споживчі витрати населення. Важливим соціальним показником є також цінова стабільність. Зміна цін безпосередньо впливає на бюджет 2,1 мільйона сімей, які проживають в Азербайджані. В даний час з розвитком системи електронних платежів спостерігається висока активність кредитних організацій в напрямку скорочення паперових технологій.

Цей процес характерний: для цього процесу характерно збільшення емісії пластикових карток, зростання оборотів і залишків на карткових рахунках, розширення послуг з використанням банківських карток. В ході розвитку ринку пластику створюються різні види пластикових карток, які відрізняються за своїм призначенням і технічними характеристиками. Операції з банківськими пластиковими картками відкривають нові перспективи фінансового обслуговування клієнтів місцевих банків.

Мета і завдання. У зв'язку з розширенням цифрових платежів в Азербайджані, необхідно дослідити особливості фінансового менеджменту в банках і вивчити поточний і перспективний вплив цифрових платежів на формування фінансових ресурсів банків.

Результати досліджень. Під час дослідження вивчалися типи, характеристики та вплив системи цифрових платежів на економічні процеси.

Матеріал і методи. У дослідженні використано статистичні розрахунки, вибіркове спостереження, синтез, регресійний аналіз. Регресійний аналіз складається з таких етапів, як вибір типу моделі, обчислення параметрів, побудова моделі та оцінка її придатності та точності. Рівень точності моделі характеризує ступінь відхилення фактичних значень залежної змінної від значень, отриманих на регресійних моделях. Для оцінки рівня точності використовуються такі оцінки, як середня відносна похибка, середня абсолютна похибка, стандартна похибка.

Висновок. Важливо покращувати та розвивати інфраструктуру банків, щоб представити додатки банків у сфері цифрового банкінгу широкій громадськості.

Ключові слова: безготівковий розрахунок, банк, менеджмент

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THE ROLE OF DIGITAL PAYMENTS AND STUDYING THE CURRENT SITUATION IN STRENGTHENING THE FINANCIAL RESOURCES BANK OF BANKS IN AZERBAIJAN

Topicality. In recent decades, radical changes have taken place in the institutional architecture of central banking in the world, and modern central banks have become an important institution of macroeconomic stability. The most important anchor of macroeconomic stability is price stability. The fact that prices are low and less volatile allows business to plan investment decisions more correctly, and to optimize the savings and consumption costs of the population. Price stability is also an important social indicator. Price changes directly affect the budget of 2.1 million families living in Azerbaijan. Currently, with the development of the electronic payment system, high activity of credit organizations in the direction of reducing paper technologies is observed. This process is typical: an increase in the issuance of plastic cards, an increase in the turnover and balance in card accounts, and the expansion of services using bank cards are characteristic of this process. During the development of the plastic market, different types of plastic

cards are created, which differ in their purpose and technical characteristics. Transactions with bank plastic cards open up new perspectives for financial services to clients of local banks.

Aim and tasks. In connection with the expansion of digital payments in Azerbaijan, it is to investigate the features of financial management in banks and to study the current and prospective effects of digital payments in the formation of financial resources of banks.

Research results. During the study, the types, characteristics, and effects of the digital payment system on economic processes were studied.

Material and methods. Statistical calculations, sample observation, synthesis, regression analysis were used in the study. Regression analysis consists of steps such as selecting the model type, calculating the parameters, constructing the model, and assessing its suitability and accuracy. The level of accuracy of the model characterizes the degree of deviation of the actual values of the dependent variable from the values obtained on regression models. Estimates such as average relative error, average absolute error, standard error are used to estimate the level of accuracy.

Conclusion. It is important to improve and develop the infrastructure of banks in order to present the applications of banks in the field of digital banking to the wider public.

Keywords: non-cash payment, bank, management

Introduction

Electronic payments are widespread with the development of e-commerce and Internet banking. Plastic cards have traditionally been the main means of payment in e-commerce. The latest payment instruments, in addition to ensuring customer satisfaction, have strengthened security measures against possible intrusions by online fraudsters. The urgency of the research topic is to objectively determine the level of development of information technology in the conduct of payment procedures in the banking sector in the current situation and the emergence of new methods and mechanisms. Currently, with the development of electronic payment systems, there is a high activity of credit institutions to reduce paper technology. This process is typical: an increase in the issuance of plastic cards, an increase in turnover and balance in card accounts, The expansion of services using bank cards is typical for this process. During the development of the plastic market, various types of plastic cards are being created, which differ in their purpose and technical characteristics. Transactions with bank plastic cards open new prospects for financial services to customers of local banks. Various payment systems are being developed and accelerated in the country, and more and more citizens are participating in the cashless payment system based on the use of bank cards.

Problem statement and its connection with important scientific and practical tasks. Setting the problem and its relationship with important scientific and practical tasks importance from determining the existence of conditions for the active development of digitization in the country and as a result of its application in the future, both micro and macro of the country actions that will increase the impact of digitalization on economic growth at the level consists of the development of the complex. Results obtained during the study, proposed methods and practical recommendations

on the speed of information technology in Azerbaijan state aimed at improving the quality of economic growth aimed at improving the development of the policy. Research separately the results of competitiveness by companies and banks in new conditions can be used to develop a growth strategy.

Theoretical part of the research

Ensuring system integration in the digital economy is one of the main goals of the digital transformation process. System integration can be expressed as structural changes in the organization and management of physical objects and their interaction with information systems. System integration, consisting of horizontal and vertical integrations, analyzes the flow of the production system as a whole. Vertical integration is the support of the transformation of the underlying system by factors arising from the internal structure of the firm. The development and implementation of the company's activities, which include key elements such as the organizational structure of the company, the human factor, departmental relations, technology and management level, means vertical integration. Horizontal integration supplier and customer network integration,

Thanks to the recent revolutionary development in digital technology, big data has become a fundamental concept that is gaining importance in terms of economies. In the digital economy, big data has become the oil of the traditional era. One of the most important concepts in the digital age, big data is considered to be a collection of data that is too large to be processed by existing systems and difficult to maintain and analyze. Big data is high-volume data expressed in units such as petabytes, exabytes, and zettabytes. For example, one petabyte is equal to the text of about 20 million file folders, and an exabyte is equal to 1000 times that amount (McAfee, Brynjolfsson 2012, p.64).

There are mainly the following types of digital

payments:

- Payment cards
- Electronic money (E-cash)
- Electronic wallet (E-wallet)
- Smart cards
- Pay by finger
- Voice Pay
- Bitcoin
- Pay Pal

Analysis of recent publications on the problem.

Digital banking, also known as branchless banking, is considered to be a type of banking that is able to provide all types of banking services to customers without the need for branches and employees. Eliminating branch and staff costs, reducing operating costs and being easy to use are among the main advantages of digital banking (Zhao 2009, p.2). Digital banking means providing banking services to customers through a computer or television. Users can easily perform all banking operations at home, in the office or anywhere with internet access.

One of the alternative distribution channels developed to diversify financial services as a result of increasing competition is the electronic or online banking system (Daniel and Storey 2009: p.72). Electronic banking is used as a generic name for individual and small value banking operations carried out using electronic devices (Kurnia, 2010, p.1).

Digital banking is the provision of financial services by a bank to customers using a website without any time or space constraints. Thus, customers can use the website to carry out traditional banking operations using their bank account information, as well as the bank's mobile applications. Mobile banking means being able to conduct traditional banking operations without going to bank branches (Tapscott, 2008).

In a study by Pickens et al. (2009) of creating branchless banking scenarios, the following decisions were made regarding the real state of branchless banking services (Demiral 2017, p. 25-35):

- The financial system is growing and developing in many countries. However, this growth is provided by more branches and automatic ATMs.
- Growing using bricks and mortar (creating a physical branch) naturally requires a certain cost. This cost does not exist in branchless banking. It is a fact that in most countries, customers prefer to go to branches. However, the pandemic proved that banks are working to provide customers with many services at home. Some banks have provided

online card issuance and delivery services to customers. Rabitabank was the first to provide this service in Azerbaijan.

- The success of non-branch banking services depends on raising awareness of the material needs of the middle and low-income population. Because those who take loans from banks for personal use and starting a business are mainly middle and low-income groups.

The first digital banking application was introduced in 1981 in the US state of New York as "home banking" services (Osho, 2008). Home banking is the provision of a line connected to the banking system that allows bank customers to operate directly with their bank accounts. This line can be connected to TVs and computers used in homes and workplaces. Thanks to these lines, it is possible for customers to obtain information about their bank accounts and issue payment orders to the bank for money transfers between accounts. In home banking applications, customers connect to the bank's main computers using their personal computers and a modem device via telephone lines. At the same time, customers benefit from all the services offered by the bank. In this case, customers are not required to come to the bank to make payments, the user is required to have only components such as a personal computer, modem and software in working order (Horvitz, 2006). At present, banks provide customers with all the operations they are allowed to perform over the Internet. After completing online membership transactions, customers can open an account using special passwords, pay invoices, contact customer representatives, apply for a loan, make transfers between accounts and create their own portfolio (Karakas, 2009, p.459). Only 1.5 years after the opening of the first digital bank.

Allocation of previously unsolved parts of the general problem.

The main purpose of the study is to investigate the features of the expansion of digital payments in Azerbaijan and to study the current and prospective effects of digital payments in the formation of financial resources of banks.

Material and methods. Statistical calculations, sample observation, synthesis, regression analysis were used in the study. Regression analysis consists of steps such as selecting the model type, calculating the parameters, constructing the model, and assessing its suitability and accuracy. The level of accuracy of the model characterizes the degree of deviation of the actual values of the dependent variable from the values obtained on regression models. Estimates such as average relative error, average absolute error, standard error are used to

estimate the level of accuracy.

Formulation of research objectives (problem statement)

According to the Law of the Republic of Azerbaijan on the Central Bank, the Central Bank is entrusted with organizing, coordinating, regulating and supervising the activities of interbank centralized and other unlicensed payment systems.

It should be noted that in 1997, the Central Bank launched a qualitatively new direction in the formation of the National Payment System (NPS) based on best international practices within the framework of IMF technical assistance.

On February 16, 2001, the Central Bank introduced the SWIFT-based Real-Time National Interbank Settlement System (AZIPS) payment system within the framework of the World Bank's Technical Assistance to Institutional Building (OGPT) Project, focusing on the development of the EITI. Along with the use of the system, a regulatory center has been established to facilitate its management and a Reserve Center with the most modern technical equipment.

In 2002, as a continuation of the development of the CES, the Small Payments Settlement-Clearing System (CCPS) based on new technologies that meet international standards was established and banks were provided with the use of this system.

Then, in 2008, the Centralized Information

System for Mass Payments (KOMIS) was launched. This system was of great importance for the reforms in the utilities sector to be more effective. As a result of the commissioning of this system, which is based on the latest software and technology, subscribers have the opportunity to receive full information about utility debts at any payment service point and make payments through payment mechanisms.

In 2012, the Government Payment Platform (GPP) was formed as part of the KOMIS platform. The purpose of creating this platform is to make more efficient use of the infrastructure of KOMIS, to expand the process of cashless payments between the population and economic entities and to provide access to financial services in the regions. Thus, the portal provides a centralized process of collecting taxes, duties, rent and other budget payments, as well as payments for utilities, communications and other public services.

As a continuation of the reforms aimed at the development of the EITI, the Interbank Card Center (ICC) was launched in 2016 to increase the efficiency of transactions with payment cards issued by resident banks (<https://www.cbar.az/>). In general, there have been significant increases in the payment card infrastructure over the past 5 years. As of March 1, 2021, the number of payment cards issued by banks was 9.579 million. (Population by age group, 2021)

Table 1

Number of ATMs and POS terminals per 1,000 people of working age (2010-2020).

Indicator	Age of working age (thousand people)	Total number of payment cards, thousand, (end of period)	Number of payment cards per 1,000 able-bodied people
2015	6,616.4	5659	855,2989541
2016	6,677.8	5334	798,7660607
2017	6,705.5	5800	864,9615987
2018	6,771.6	6511	961,5157422
2019	6,842.5	7266	1061,892583
2020	6,894.5	9230	1338,748278

Source: Compiled by the author on the basis of information from the State Statistics Committee of the Republic of Azerbaijan and the Central Bank. (Population by age group, 2021).

By the end of 2020, there will be 1,338.7 payment cards per 1,000 people in the country. Pensions, pensions and social benefits, salaries of employees of budget organizations are paid by payment cards. Work on the payment of salaries to employees of private companies by card is nearing completion. As we can see from the table, the

population that can be a cardholder after 2019, in theory, all of them have a payment card.

The process of making payments in the digital banking system has become possible due to technological improvements. Digital transactions currently carried out in Azerbaijan are mainly carried out through ATMs and POS-terminals.

Table 2

ATMs and POS-terminals (at the end of the period)

History	ATMs	including:		POS terminals	including POS terminals in retail, catering and other service enterprises:		Total POS terminals	
		in Baku	In the regions		Total	including in Baku	in Baku	In the regions
2006	1080	655	425	2070	1576	1436	1719	351
2007	1317	820	497	5309	4653	4470	4871	438
2008	1515	867	648	8124	7367	6968	7397	727
2009	1694	959	735	8657	7854	7429	7871	786
2010	1892	1053	839	7872	6978	6554	7069	803
2011	2132	1179	953	13220	11714	11169	12153	1067
2012	2260	1263	997	36860	35035	32386	33629	3231
2013	2422	1366	1056	33285	31859	28090	28940	4345
2014	2608	1471	1137	73013	71553	49187	50050	22963
2015	2694	1502	1192	80301	78762	47985	48944	31357
2016	2454	1322	1132	71806	70913	39654	40518	31288
2017	2431	1308	1123	65471	64224	36414	37068	28403
2018	2502	1329	1173	66110	64715	38202	38962	27148
2019	2647	1421	1226	67468	65971	40095	40898	26570
2020	2715	1429	1286	57120	55796	36901	37627	19493

Compiled by the author: Central Bank of the Republic of Azerbaijan, (<https://www.cbar.az/>, 2021)

Looking at the table, we see that the number of ATMs in Baku in 2020 increased compared to 2018 and 2019, and in POS terminals decreased in 2020 compared to 2018 and 2019. In the table, the decrease in the total number of POS terminals and ATMs in 2016-2017 is due to the revocation of the licenses of some banks (Texnika Bank, Azerbaijan Credit Bank, Deka Bank, Qafqaz Inkishab Bank, Zamin Bank, Bank Standard, Bank of Azerbaijan, Atrabank, Kredo Bank, Demirbank and Parabank).

The increase in the number of ATMs by 68 in 2020 shows the importance of the banking system to digital banking.

The study included a regression analysis. Table 2 shows the number of banks whose licenses were revoked in 2015-2020, ATMs and POS terminals in the country as a whole, and Table 3 predicts the consequences of the reduction of ATMs and POS terminals of banks whose licenses were revoked.

Table 3

Number of banks whose licenses have been revoked by years and changes in the number of ATMs and POS terminals

Years	Number of liquidated banks	Number of ATMs	Number of POS terminals
2015	2	2694	80301
2016	8	2454	71806
2017	1	2431	65471
2018	0	2502	66110
2019	0	2647	67468
2020	4	2715	57120

Compiled by the author based on the indicators of the Deposit Insurance Fund and the Central Bank.

<https://www.cbar.az/page-45/payment-system-indicators>, 2021. <https://www.adif.az/page/elan-v-bildirislrl>, 2021.

During the regression relationship, we encounter two conditions. If $F(x, y) = 0$, there is no relationship between the quantities x and y . However, if $f(x, y) = 1$, it is said that there is a linear functional dependence between the

quantities and that they are related. Regression analysis allows us to determine the relationship between banks whose licenses have been revoked and the factors affected by this process. The main variable was the number of banks whose licenses

were revoked, and the dependent variables were the number of ATMs and POS terminals.

The values of the regression equation are presented in the table 4.

Table 4

Regression analysis results

Regressi on Statistics								
Multiple R	0.846068							
R Square	0.715832							
Adjusted R Square	0.526386							
Standard Error	2.121162							
Observations	6							
Dispersion								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	2	34,00201	17,001	3,778563	0.151483			
Residual	3	13,49799	4,49933					
Total	5	47.5						
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 98.0%	Upper 98.0%
Intercept	-2,59568	1,022284	-2,5391	0.084746	-5,84905	0.657682	-5,84905	0.657682
ATMs	0.016616	0.008352	1,989496	0.140753	-0.00996	0.043196	-0.00996	0.043196
POS terminals	7,57E-05	0.000168	0.450459	0.682943	-0,00046	0.000611	-0,00046	0.000611

In this case, the ratio $R^2 = 0.715832$ is an indicator of the above-average impact of bank closures. The analysis shows that 71.58% of the changes are due to the influence of the main variable.

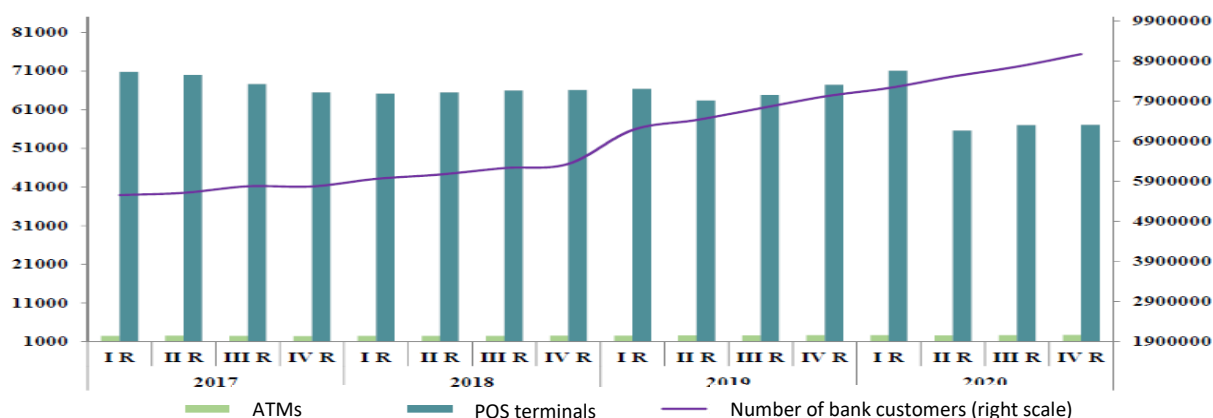


Fig. 1 ATMs and POS-terminals

Compiled by the author: Central Bank of the Republic of Azerbaijan <https://www.cbar.az/>

As we can see from the analysis of the diagram, although the number of bank customers increased in 2019 and 2020, the number of POS terminals

decreased. This is due to the fact that banks prefer the electronic banking system and all operations are carried out electronically.

Table 5

Debit and credit card transactions

Year, month	Total number of payment cards, thousand, (end of period)	From the total number of payment cards in circulation:				Debit and credit card transactions		Debit card transactions		Credit card transactions	
		Debit cards			Credit cards	Number, thousand operations	Volume, million manat				
		Social cards	Salary cards	other				Number, thousand operations	Volume, million manat	Number, thousand operations	Volume, million manat
2010	4231	2427	1260	410	134	46502	6056	44218	5430	2286	626
2011	4580	2522	1330	547	181	50954	7230	48129	6457	2824	773
2012	5008	2560	1361	679	408	57169	8827	52976	7760	4193	1067
2013	5673	2505	1437	788	942	67810	10297	57326	8565	10484	1732
2014	5965	2426	1444	794	1302	79228	11870	62011	9524	17217	2347
2015	5659	2451	1467	732	1010	85218	12472	67739	10185	17479	2287
2016	5334	2552	1521	630	631	83383	12781	72713	11028	10670	1752
2017	5800	2535	1827	815	623	96770	14729	87182	13262	9588	1467
2018	6511	2522	2040	1089	860	117644	17773	103931	15835	13703	1940
2019	7266	2383	2316	1769	797	162285	23241	143440	21641	18846	1600
2020	9230	3443	2501	2193	1093	226455	28951	194726	27098	31730	1852
01	7713	2707	2355	1822	829	15523	1887	13182	1727	2341	160
02	7832	2723	2347	1872	890	16028	2216	13842	2069	2185	147
03	7855	2754	2334	1837	930	18537	2673	16134	2512	2403	161
04	8069	3024	2333	1835	877	15668	1939	13697	1832	1971	107
05	8471	3430	2324	1805	912	18177	2325	15790	2192	2387	133
06	8664	3505	2397	1813	949	18565	2309	15906	2169	2659	140
07	8793	3501	2427	1880	985	19274	2682	16848	2553	2426	129
08	8761	3379	2432	1932	1018	20650	2484	17902	2325	2749	159
09	8967	3408	2473	2029	1057	20549	2425	17441	2246	3109	179
10	9126	3424	2480	2156	1066	19097	2379	16263	2222	2834	156
11	9140	3425	2496	2146	1073	20436	2474	17290	2295	3146	179
12	9230	3443	2501	2193	1093	23951	3158	20431	2956	3520	202

Compiled by the author: Central Bank of the Republic of Azerbaijan <https://www.cbar.az/>

We can clearly see from the table that the total number of payment cards in 2012 was 7266, while in the last month of 2020 it was 9230. The increase in the number of cards has naturally affected electronic payments, as well as debit and credit card transactions. Thus, if in 2019 there were a total of 162,285 card transactions, in 2020 this figure increased significantly to 226,455.

As we know, during the pandemic in 2020, the number of electronic payments increased. People made their needs such as food, clothing, etc. through electronic orders and payments. However,

the increase in the number of digital payments has not increased their volume. One of the reasons for the non-increase in payments is the fact that citizens will be able to make payments electronically through POS terminals in 2020, the economic downturn due to the pandemic, the decline in wages in 2020 (or temporary job losses) will reduce people's spending. The decline in wages was mainly due to the pandemic in tourism, entertainment and a number of other service sectors. However, as a result of targeted measures, the number of labor contracts in the private sector

as of January 1, 2021 has not only decreased, but also increased by 24.0% or 154,000 compared to the beginning of 2020, and 794,000 labor contracts were registered. Another main reason for non-increase of payments is when examining the types of cards. A number of pandemic-related jobs have

been closed or suspended. Here, the issue of state support comes to mind. Thus, the increase in the number of social cards by 1,060,000 in 2020 compared to 2019 is mainly due to social payments made by citizens to the government during the pandemic.

Table 6:

Year, month	Fast money transfers					
	Fast money transfer systems					
	Bank entries			Transfers outside the bank		
	Number, thousand units	Amount, mln. Manat	Amount of one payment, manat	Number, thousand units	Amount, mln. Manat	Amount of one payment, manat
2009	1295.3	722.2	557.5	326.9	149.1	456.0
2010	1627.9	876.9	538.7	447.9	306.6	684.6
2011	1834.7	1046.2	570.2	464.8	416.4	895.9
2012	2082.3	1245.8	598.3	695.6	542.5	779.9
2013	2526.1	1565.5	619.7	985.9	779.6	790.8
2014	2626.8	1634.2	622.1	1306.9	979.7	749.6
2015	2280.2	1251.2	548.7	1278.4	800.8	626.4
2016	2284.8	1455.1	636.9	974.8	618.4	634.4
2017	2568.7	1812.3	705.5	982.0	627.7	639.2
2018	2918.9	1952.6	669.0	1068.5	662.5	620.0
2019	3251.9	2092.1	643.4	1320.9	927.7	702.3
2020	2223.7	1636.6	736.0	981.6	803.7	818.8
01	229.4	154.7	674.5	122.3	70.4	575.7
02	220.4	157.3	713.7	100.5	87.6	872.1
03	185.6	112.7	607.1	86.7	67.9	783.8
04	101.4	73.7	726.9	53.6	46.4	864.6
05	124.1	94.0	757.6	61.3	51.4	839.0
06	190.4	155.8	818.5	79.3	66.4	837.2
07	197.4	154.4	782.3	78.8	65.8	835.0
08	198.9	148.1	744.4	82.3	71.0	862.6
09	207.9	154.1	741.0	87.3	74.8	857.5
10	192.0	140.2	730.1	75.4	67.8	899.4
11	178.5	142.5	798.4	73.3	68.3	932.2
12	197.6	149.0	754.0	81.0	66.0	814.4

Source: Central Bank of the Republic of Azerbaijan <https://www.cbar.az/>

As can be seen from Table 6 and Figure 3, we observe the impact of the devaluation of the manat and the problems it creates on the expenditure of the population's income on the number of fast money transfers in banks, both inbound and outbound. Also, the revocation of the licenses of some banks can be seen as an explanation for the decline in the number of POS terminals and ATMs in some years. The number of express money transfers (included in the bank) was 3251.9 in 2019, and 2223.7 in 2020. This decrease was also reflected in the total amount of payments. Thus,

the total amount of transfers in 2019 will be 927.7 million. manat, and in 2020 - 803.7 million. manat. We can note that the reason for this decline is the economic recession that manifested itself in 2020.

One of the main objectives of the Central Bank in the "State Program for the Expansion of Digital Payments in the Republic of Azerbaijan" approved by the Decree of the President of the Republic of Azerbaijan No. 508 dated September 26, 2018 is to create a digital ecosystem that includes innovative payment solutions.

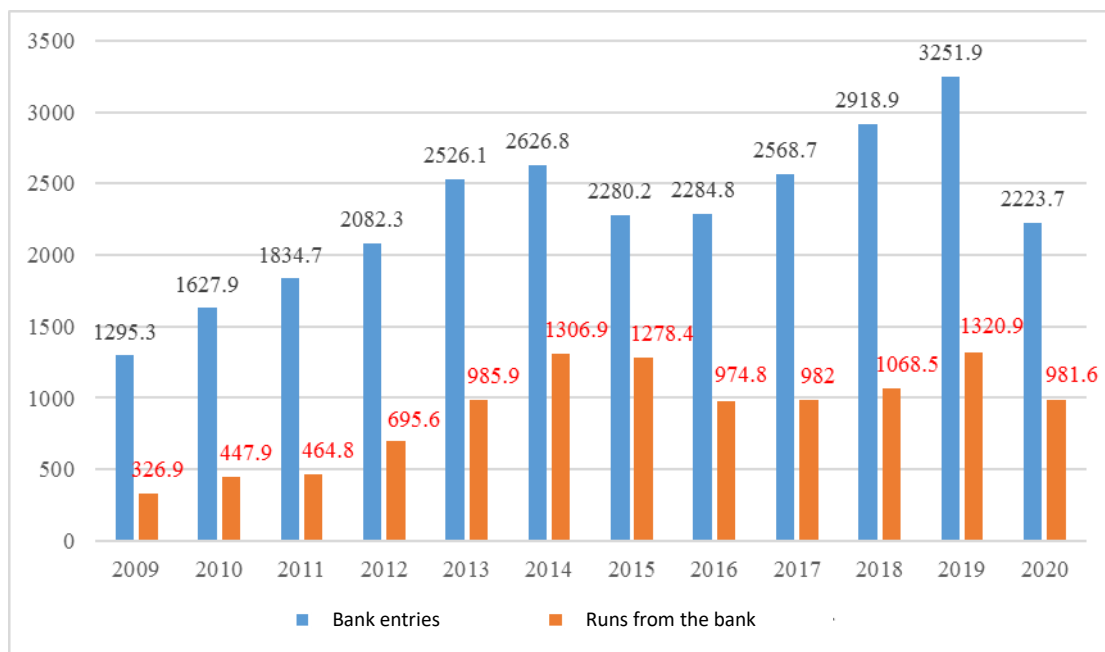


Fig. 2 Number of fast money transfers

Source: Central Bank of the Republic of Azerbaijan <https://www.cbar.az/> compiled by the author on the basis of.

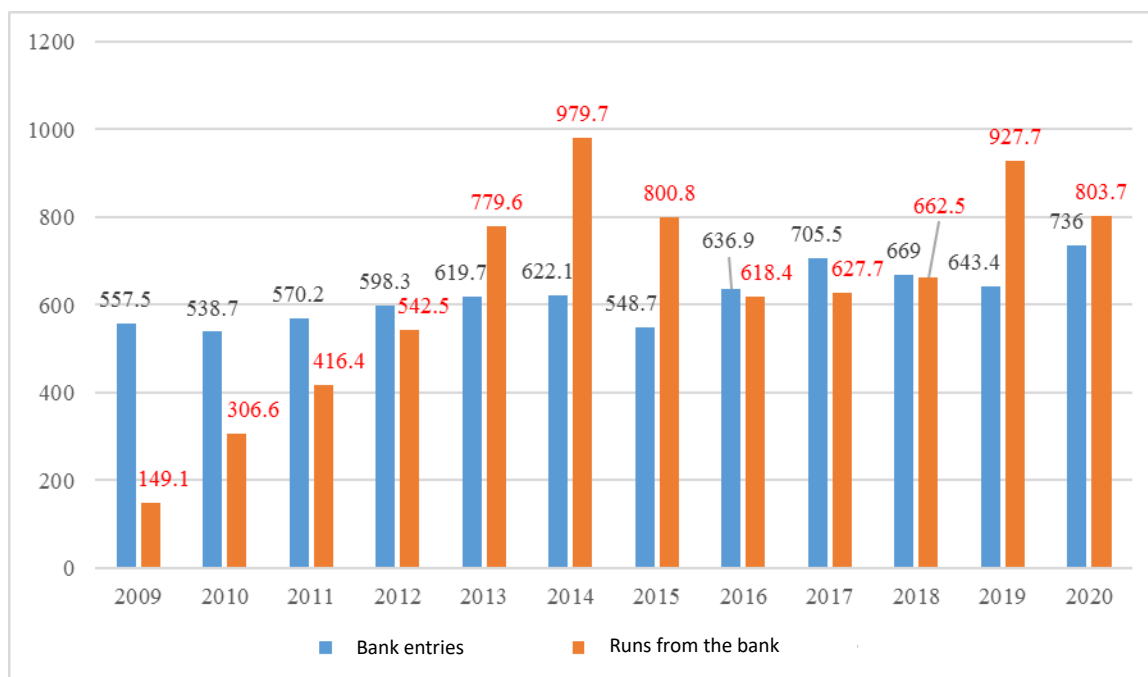


Fig. 3 Amount of instant money transfers

Source: Central Bank of the Republic of Azerbaijan

Conclusions and perspectives of further research. As a result of the work done in recent years to create an ecosystem of digital payments in the country, significant progress has been made in the infrastructure of contactless payments. Thus, in 2020, 26% of payment cards in circulation (2.3 million units) and 53% of POS-terminals (29.5 thousand units) support contactless payments (“The limit of contactless transactions with payment cards has been increased”, 2020). For

comparison, during the same period in 2018, these figures were 7% (409 thousand units) and 32% (21 thousand units), respectively.

As in all countries, the demand for digitalization, contactless payments, e-commerce, e-banking services in the pandemic has become relevant in Azerbaijan. The spread of the virus by touching the surface during a pandemic has led the population to prefer contactless payments without touching the POS-terminal. In order to increase the

ability of the population to make contactless payments during a pandemic, in many countries around the world have increased the limits for cashless transactions with contactless cards without entering a PIN-code. Using a similar experience, the Central Bank in 2020 increased the limit of contactless payments on cards without entering a PIN-code from 50 (fifty) to 100 (one hundred) manats and expanded the opportunities for consumers to make daily contactless payments more easily, quickly and securely.

In accordance with the strategy of expanding the contactless card infrastructure in the country, the Central Bank is working to ensure support for contactless payments on all bank cards and POS-terminals in the near future. ("The limit of contactless transactions with payment cards has been increased", 2020).

Another key issue in digital banking is the number of age groups in which the population has the right to operate in the bank and their access to ATMs and POS terminals. In order to assess this possibility, it is necessary to determine the number of ATMs and POS terminals per 1,000 people of working age. The result will provide information on the access of this group of people to ATMs and POS terminals.

Traditionally, since the beginning of banking, customer services are provided through physical contact in bank branches. During the active development of remote banking services, telephone banking, terminal banking, internet banking, television banking and mobile banking emerged. As part of these payment services, payments and transfers are made from one person to another

using a smartphone. However, digital banking no longer offers digital communication channels with just one customer, but digital products that meet the needs of customers around the clock. Digital banking is banking without a physical document. Leading actors provide new and improved customer experiences and provide faster and more efficient services (Lipton, 2017).

At present, the development of digital banking and digital payments within it is one of the main indicators of the development of the country's financial system. One of the first steps to determine the direction of development trends in digital payments in Azerbaijan and to choose strategic goals is to pay attention to the experience of developed countries.

The following measures are proposed for the effective operation of digital banking:

1) Based on the information obtained, banks should accelerate their activities to improve the quality of services in this area, with the forecast that the use of Internet banking will increase in the coming years.

2) Banks need to increase their investment in information technology and improve their websites in terms of security and convenience.

3) Banks should inform their customers more about internet banking, help raise awareness and strengthen their work by taking incentive measures.

4) Systematic meetings should be organized where all banks can discuss international experience in digital banking, security systems and legal regulations.

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ІНВЕСТИЦІЙНІ РЕСУРСИ ПІДПРИЄМСТВ ТА ДЖЕРЕЛА ЇХ ФОРМУВАННЯ

Актуальність. Оскільки інвестиційні ресурси є найбільш дефіцитними та, водночас, необхідними ресурсами підприємства, вони визначають головні процеси інноваційного розвитку, конкурентоспроможність продукції та її якість. Тому важливо всебічно дослідити інвестиційні ресурси підприємств та джерела, з яких вони формуються.

Мета та завдання. Метою дослідження є аналіз інвестиційних ресурсів підприємств та оцінка їх впливу на розвиток підприємства. Виходячи з поставленої мети, дослідницькими завданнями є вивчення сутності інвестиційних ресурсів підприємств, визначення найбільш актуальних джерел формування інвестиційних ресурсів та виявлення і вирішення основних проблеми, які виникають при формуванні джерел фінансування інвестиційної діяльності.

Матеріали та методи. Для досягнення поставленої мети використані загальнонаукові методи дослідження, а саме системного аналізу, методи порівняння і логічного узагальнення. Інформаційними джерелами дослідження є наукові праці вітчизняних та зарубіжних вчених з проблем формування базових інвестиційних ресурсів підприємств, статистичні дані й дані з відкритих джерел.

Результати. Дослідження інвестиційної сфери економіки завжди перебувало в центрі уваги науковців та практиків. Це обумовлено тим, що інвестиції є базовим елементом діяльності усіх суб'єктів господарювання, у тому числі й держави. Зазначено, що інвестиційна діяльність перебуває під впливом багатьох факторів, урахування яких під час її оцінки та прийняття обґрунтованих рішень вимагає застосування багатокритеріальних підходів. Вибір конкретних інструментів інвестиційного регулювання залежить від структури господарства, його специфіки та рівня розвитку ринкових інструментів.

Переважає більшість підприємств на сучасному етапі свого існування потребує як короткострокових, так і середньо- і довгострокових ресурсів для задоволення своїх інвестиційних потреб. Таким чином, досліджено як внутрішні джерела, так і залучення банківських кредитів, зарубіжних інвестицій та ін. Розглянуто різні аспекти проблеми інвестиційної діяльності, такі як: фінансування інвестиційних проектів за рахунок коштів фінансових установ, бюджетних та власних коштів суб'єктів економіки.

Систематизовано основні джерела формування інвестиційних ресурсів підприємства, приведено їх сучасну класифікацію. Розглянуто джерела забезпечення інвестиційних ресурсів та особливостей їх використання сучасними підприємствами. Визначено роль інвестиційних ресурсів в системі управління підприємством, а також виокремлено поняття інвестиційної сфери, як сукупності всіх економічних відносин, які забезпечують розширене відтворення галузей господарства, підприємств різних форм власності та інших господарюючих суб'єктів.

Визначено наявність тісного взаємозв'язку між інвестиційними ресурсами та економічним розвитком підприємств. Виокремлено позитивні аспекти залучення прямих іноземних інвестицій. Обґрунтовано, що пріоритетне значення мають фінансово-економічний механізм залучення фінансових та інвестиційних ресурсів і джерел, а важливими інструментами є фондовий ринок, оподаткування, біржова торгівля, кредитування, власні ресурси. Розглянуто важливість дослідження напрямів підвищення конкурентоспроможності підприємств (впровадження інновацій, маркетингових стратегій, системного управління).

Результатами дослідження стали висновки, зроблені на основі дослідження наукової, законодавчої та методичної бази з даної проблематики, а також аналізу інвестиційних ресурсів суб'єктів господарювання та джерел, що їх формують. Констатовано, що необхідною передумовою розвитку економіки є підвищення

інвестиційної активності інвесторів у країні, збільшення інвестиційних ресурсів та ефективне їх використання.

Перспективою подальших досліджень за даним напрямом є методичне забезпечення збільшення кількості видів та якості джерел фінансування та джерел фінансування інвестиційної програми підприємства. Зокрема, необхідним є оцінювання можливостей застосування залучених джерел фінансування інвестиційних програм.

Висновки. Інвестиційна діяльність підприємства є сукупністю різних за масштабом інвестиційних проектів різного призначення. В основі раціоналізації інвестиційної діяльності та ефективного прогнозованого формування і витрачання фінансових ресурсів має бути інвестиційна стратегія підприємства, яка ґрунтується на стратегічному виборі та життєвому циклі. З метою визначення оптимальної структури джерел, зниження рівня інвестиційних ризиків і запобігання загрози банкрутства необхідно при прогнозуванні обсягу інвестиційних ресурсів враховувати стратегічні фінансові цілі розвитку підприємства і рівень інноваційної активності. Фінансово-економічний стан та ефективність функціонування підприємств можна оцінювати багатьма фінансово-економічними показниками. Слід зазначити, що прийняття будь-якого інвестиційного рішення вимагає обґрунтування стратегії формування інвестиційних ресурсів, аналізу інших методів і джерел залучення, детальну розробку схеми фінансування. Тому для більш ефективної розробки стратегії формування інвестиційних ресурсів необхідно ретельно оцінити кожне з використовуваних джерел, враховуючи, що будь-яке з них володіє певними перевагами і недоліками.

Ключові слова: інвестиції, інвестиційні ресурси, інвестиційні джерела, фінансування, стратегія

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INVESTMENT RESOURCES OF ENTERPRISES AND SOURCES OF THEIR FORMATION

Topicality. Since investment resources are the most scarce and, at the same time, necessary resources of the enterprise, they determine the main processes of innovative development, the competitiveness of products and their quality. Therefore, it is important to comprehensively investigate the investment resources of enterprises and the sources from which they are formed.

Aim and tasks. The purpose of the research is to analyze the investment resources of enterprises and assess the impact of investment resources on the development of the enterprise as a whole. Based on the set goal, the research tasks are consideration of investment resources of enterprises, determination of the most relevant sources of investment resources formation, and identification and solution of the main problems that arise in the formation of sources of financing investment activities.

Materials and methods. To achieve the goal, general scientific methods of research were used, namely system analysis, methods of comparison and logical generalization. The information sources of the research are the scientific works of domestic and foreign scientists on the problems of forming basic investment resources of enterprises, statistical data and data from open sources.

Research results. The study of the investment sphere of the economy has always been in the center of attention of scientists and practitioners. This is due to the fact that investments are a basic element of the activity of all business entities, including the state. It should be noted that investment activity is influenced by many factors, the consideration of which during its evaluation and making informed decisions requires the use of multi-criteria approaches. The choice of specific instruments of investment regulation depends on the structure of the economy, its specifics and the level of development of market instruments.

The vast majority of enterprises at the current stage of their existence need both short-term, medium- and long-term resources to meet their investment needs. Thus, both internal sources and the attraction of bank loans, foreign investments, etc., were investigated. Various aspects of the problem of investment activity are considered, such as: financing of investment projects at the expense of funds of financial institutions, budgetary and own funds of economic entities.

The main sources of the formation of investment resources of the enterprise are outlined, their modern classification is given. The sources of providing investment resources and the features of their use by modern enterprises are considered. The role of investment resources in the enterprise management system is determined, as well as the concept of the investment sphere is distinguished as a set of all economic relations that ensure the expanded reproduction of economic sectors, enterprises of various forms of ownership and other economic entities.

The mechanisms of formation of investment resources of enterprises in the economy are disclosed. The presence of a close relationship between investment resources and the economic development of enterprises was determined. The positive aspects of attracting foreign direct investment are singled out. It is substantiated that priority is given to the financial and economic mechanism of attracting financial and investment resources and sources, and important tools are the stock market, taxation, stock trading, lending, and own resources. Considered the importance of research on ways to increase the competitiveness of enterprises (introduction of innovations, marketing strategies, system management).

The results of the research were the conclusions made based on the research of the scientific, legislative and methodical base on this issue, as well as the analysis of the investment resources of business entities and the sources that form them. It was established that a prerequisite for the development of the economy is an increase in the investment activity of investors in the country, an increase in investment resources and their effective use.

Conclusion. *The investment activity of the enterprise is a set of investment projects of various purposes, different in scale. The basis of the rationalization of investment activity and the effective forecasted formation and spending of financial resources should be the investment strategy of the enterprise, which is based on a strategic choice and one or another life cycle. In order to determine the optimal structure of sources, reduce the level of investment risks and prevent the threat of bankruptcy, it is necessary to take into account the strategic financial goals of the enterprise's development and the level of innovative activity when forecasting the amount of investment resources. The financial and economic condition and efficiency of the functioning of enterprises can be evaluated by many financial and economic indicators. As you can see, investments have a decisive influence on the formation of the rate of economic growth of the country's economy. It should be noted that the adoption of any investment decision requires the justification of the strategy for the formation of investment resources, the analysis of other methods and sources of attraction, and the detailed development of the financing scheme. Therefore, in order to more effectively develop a strategy for the formation of investment resources, it is necessary to carefully evaluate each of the used sources, while it should be borne in mind that any of them has certain advantages and disadvantages.*

Keywords: *investment, investment resources, investment sources, financing, strategy.*

Problem statement and its connection with important scientific and practical tasks. The modern development of the enterprise is not possible without the implementation of a high-quality investment policy. The efficiency of economic activity of economic entities depends on the investment policy carried out at the national, sectoral, regional and corporate levels, which allows to attract the available investment resources to the maximum extent. However, increasing the scale of investment without achieving an acceptable level of efficiency of investment resources does not ensure obtaining the necessary economic result. The process of formation and use of its investment resources has a decisive influence on the efficiency of the enterprise's investment activity. The issue of choosing sources of financing investment activities is particularly acute.

Analysis of recent publications on the problem. Both domestic and foreign scientists paid attention to the study of investment resources of enterprises and the sources of their formation. Among them, it is worth highlighting the works of such scientists as Andrianov A. Iu., Bard V. S., Basov M. H., Blank I. O., Bocharov V. V., Brihkhem Ye., Boiarko I., Koiuda V., Maiorova T., Cherep A., Kuntsevych V. O., Kucheruk T. Iu., Vovk O. M., Peresada A., Tereshchenko O.,

Horiachuk A. F., Markevych K., Darbi Sh., Sheremet V. V. etc. Despite the high level of development of the outlined topic, it is important to analyze the topic in more detail.

Allocation of previously unsolved parts of the general problem. Despite the high level of development of the outlined topic, the analysis of the latest research and publications confirms the relevance of this topic for everyone who is involved in the theoretical or practical aspects of attracting investment resources and the sources from which they are formed, both in the national economy and in individual economic sub- objects. The theoretical field of the mentioned problem is quite wide and multifaceted, which requires scientific analysis and generalization.

Formulation of research objectives (problem statement). The purpose of the research is to analyze the investment resources of enterprises and to study the impact of investment resources on the development of the enterprise as a whole.

Materials and methods The methodological basis of the research is the results, scientific research and works of domestic and foreign scientists on investment issues, investment resources and the sources from which they are formed. In the process of solving the tasks, general scientific and special research methods were used,

namely: historical-logical method, structural analysis, analogies, scientific abstraction, methods of theoretical and systematic generalization, analysis and synthesis, quantitative and qualitative analysis.

An outline of the main results and their justification. Implementation of investment activities is a necessary condition for the stable functioning and development of the enterprise. However, increasing the scale of investment without reaching an acceptable level of its efficiency does not ensure obtaining the necessary economic result. The processes of formation and use of investment resources (IR) of the enterprise have a decisive influence on the efficiency of investment activity (Lehinkova, N. & Bondar, Yu., 2020).

Article 1 of the Law of Ukraine «On Investment Activities» provides the following definition of investments: «Investments are all types of property and intellectual values that are invested in objects of entrepreneurial and other types of activity, as a result of which a profit (income) is created or a social effect is achieved». This definition, in general, corresponds to the international approach to investment activity as a process of investing resources (goods, property and intellectual values) in order to obtain profit, income, dividends (social effect) in the future. That is, the investor refuses to satisfy his current needs based on the expected satisfaction of them in the future, but already in a larger amount.

For the formation and development of a modern economy, a prerequisite is an increase in the activity of investors, the activation of investment activities in the country, as well as the attraction and effective use of investments. Because effective development of business entities and the country's economy as a whole is impossible without the implementation of certain investment projects. Thanks to investment activities, significant changes in the economy, improvement of the socio-economic development of the country and the creation of a competitive global economy can take place. (Pikulina, N., Samoilenko, D., Horiashchenko, Yu., et al., 2021). The competitive position of the country on the world market is determined by the investments that form the production potential. The growth of national income is also related to the realization of investments. So, the current state of Ukraine's investment policy and ways of attracting investments, in particular foreign ones, is a very relevant issue for research, as it will contribute to the development of the state's economy.

One of the important factors of social

development is investment activity, as it ensures the reproduction of the labor force, the renewal of the fixed assets of the production and non-production spheres, as well as the entire reproductive process in the economy. The intensity and efficiency of investment activity is the key to sustainable economic development (Nechyporuk, O., 2021).

Investment resources are, first of all, resources aimed at improving the productive forces of the enterprise, representing economic resources that increase the economic capital of the company. These are any investments (monetary, property, intellectual, etc., including rights to them, and have a monetary value) in entrepreneurial, economic and other activities for profit, with the aim of changing the financial and economic results of the enterprise, obtaining the opportunity to participate in management company and (or) full control over it. Any investments, regardless of the source: national - funds from the state budget, regional – funds from the budget of the subject of the territory, municipal – funds from city budgets, as well as corporate, private, collective, foreign (Horiashchenko, Yu. & Knysh, O., 2022).

In the management of IR, an important place is occupied by the classification of investments, which allows you to understand the types of investments, aimed at exerting influence on the object of management and choosing the optimally effective method of management tools and mechanisms, in other words, the classification of investments reveals the subject-object relations of the management of investment processes.

To ensure compliance of the investment strategy with modern requirements, it must necessarily be coordinated with the set of potential investment resources of the enterprise, determined by the terms of achieving the goal; expected profit and possible risks and uncertainty of the conditions of implementation of investment programs (Lehinkova, N. & Bondar, Yu., 2020).

Therefore, the issues of substantiation of directions and resources, sources of investment support and financing of the development of enterprises came to the fore and became determining factors of ensuring their competitiveness and sustainable functioning in general. However, in terms of substantiating the financial and economic mechanism of ensuring and increasing competitiveness, they are relevant and require further development (Molnar, H., 2020).

An important condition for the modern development of enterprises is the formation of sufficient financial and credit and investment resources. Without an increase in investments and

an increase in the efficiency of their use, despite the fact that in any production the real basis of economic relations is financial relations, innovative processes are impossible as a priority for their socio-economic rise. Only competitive production sufficiently ensures its own expanded reproduction, food and income to the budget.

In order to form a clear idea of the degree of financing, to identify the main channels of financial and credit resources, to create an organizational and economic mechanism and favorable conditions for their development by local authorities, it is of great importance to conduct a real analysis of the sources of attracting financial and credit funds, to determine their structure and volumes (Ihnatenko, M. & Marmul, L., 2020).

Taking into account the foreign and domestic experience of investment theory, we have presented a generalized classification system of investment resources of the enterprise, which, along with traditional features, also contains additional features that can be used in the process of managing investment resources of production and economic systems (Prokhorova, V., Yemelianov, O., & Koleshchuk, O., 2021).

According to the traditional approach, the investment resources of the enterprise are divided according to the following characteristics:

1. According to the physical and material form, investment resources are divided into material (natural, labor, material and technical resources, that is, resources used for real investment and economic development of the enterprise), intangible (R&D, patents, licenses), informational, monetary and financial. In other words, material investment resources are presented in the form of goods, materials, raw materials, and semi-finished products, intangible – do not have a tangible form, and participate in the economic process and accumulation of profit. The monetary form of the company's investment resources is the most popular in our country. This is explained by the fact that such resources are quickly transformed into any form of assets that are necessary for conducting investment activities of the enterprise. Financial investment resources are presented in the form of financial instruments that are included in the registered capital of the enterprise (shares, bonds, deposits and bank certificates); although in practice they are rarely used.

2. According to the forms of ownership, state investment resources, investment resources of commercial and non-commercial organizations (mixed) are distinguished; investment resources of foreign investors.

3. According to state affiliation, investment

resources of the enterprise can be classified into resources of residents and non-residents of the country. Investment resources attracted with the help of residents allow the enterprise to better coordinate its economic activity with the state economic policy. They are more affordable for small and medium-sized enterprises. Investment resources, attracted with the help of non-residents, form mainly medium and large enterprises that carry out foreign economic activity. Mostly, they are involved in large real investment projects that are related to reconstruction and repurposing. But, unfortunately, despite the large amount of foreign capital on a global scale, it is quite difficult for domestic enterprises to obtain the specified resources, taking into account the political and economic situation in the country and the associated risks for investors

(Kryshan, O. & Reziapov, K., 2018).

4. According to the sources of formation from the point of view of the enterprise, investment resources are divided into three groups: own, borrowed and involved. The enterprise's own investment resources are the volume of funds that belong to it by ownership rights. Part of these funds provides an increase in the company's equity capital or its net assets (part of the net profit, the insurance amount for indemnification of property loss, depreciation deductions, etc.). An important positive feature of using one's own financial resources is reducing the risk of insolvency, ensuring the financial stability of the enterprise, as well as maintaining control over the organization's activities, independence from external investors and creditors.

Loan investment resources characterize funds raised for the development of the enterprise's investment activities based on the principles of return, maturity, and payment (bank loans, bond issuance, investment leasing, tax investment credit). Involved investment resources – investors' funds received from the sale of shares, shares and other contributions of individuals and legal entities, which are expected to be attracted in the future period.

5. According to groups of sources of attraction, they are divided into external and internal investment resources. At the same time, investment resources attracted from internal sources include money that is formed at the enterprise in order to ensure its development. Investment resources, the source of formation of which are external sources, are funds that the company receives from the outside (foreign investments, credits and loans).

However, it is necessary to distinguish between internal and external sources of financing the

enterprise's investment activities at the macroeconomic and microeconomic levels, since the above classification reflects the structure of internal and external sources in terms of their formation at the level of the national economy (Fedorenko, A., 2017).

6. Long-term, medium-term and short-term investment resources are distinguished by the term of involvement. This feature is typical for the resources involved and borrowed. Long-term investment resources characterize loan resources with a term of use of more than five years; medium-term – from one to five years (for financing the non-current and permanent part of the current assets of the enterprise); short-term investment resources limit the time of use of resources to one year.

7. According to the level of liquidity, high-, medium-, low-, and illiquid investment resources are distinguished. The speed of conversion of investment objects into monetary form is determined as the main factor of distribution. That is, highly liquid investment resources can be converted into cash within a month without losing market value. The term of conversion of medium-liquid investment resources is up to 6 months, and of low-liquidity up to 1 year and above. As for illiquid investment resources, they cannot be realized independently. They cannot be implemented independently.

8. According to the target direction of use, investment resources are divided into those used in the process of real and financial investment. With real financing, their volumes are planned for each real project, in accordance with the enterprise's investment program. For financial investment, resources are attracted to create or restructure a portfolio of investment instruments of the enterprise.

9. According to the level of provision of the stages of the investment process, the resources providing the pre-investment, investment and post-investment stages are distinguished. The peculiarity of this distribution is that it is used to ensure the implementation of individual investment projects.

10. According to the level of risk, high-risk, medium-risk, low-risk, risk-free and speculative investment resources are distinguished. This feature is used in the process of determining the optimal structure of investment financing. First, risk-free include own funds, and risk-generating resources include borrowed and borrowed funds.

11. According to the volume of formation, the maximum, optimal and minimum volume of investment resources of the enterprise are

distinguished. The maximum amount of investment resources of the enterprise is determined on the basis of the financial strategy of the enterprise's development and, accordingly, corresponds to the strategic financial goals of the enterprise's economic activity. The optimal amount of investment resources of the enterprise provides sufficient investment support for the high rates of development of the enterprise's operational activities. The minimum amount of investment resources of the enterprise ensures a sufficient level and timely renovation of operational non-current assets and the formation of the required amount of current assets.

12. According to the nature of the realization of the goals of the business entity, investment resources are divided, which are used to realize the strategic, current and operational goals of the enterprise. Such a feature is formed based on the main goal of accumulation of investment resources – meeting the needs of the enterprise in investment assets, optimizing their structure to ensure positive results of investment activities. In addition, the possibilities of such formation largely depend on the nature of the implementation of the company's goals.

13. According to the degree of novelty, traditional, innovative and specific investment resources are distinguished. Traditional sources include all generally accepted sources, while factoring, futures, swap, option, repo operations characterize new, innovative sources of investment resources that combine currency and credit and financial instruments. Specific investment resources include the treatment of Brihkhem Ye. and Ergardt M., which include the use of preferred shares, convertible securities, and warrants. Kovalev V.V. highlights deferred tax liabilities and emphasizes spontaneous financing as a type of long-term sources.

14. According to the degree of implementation of innovations, investment resources are divided into small innovative (resources used for the development of design, research and development works), medium innovative (resources for financing R&D projects) and highly innovative (resources for the implementation and implementation of scientific and research developments) (Nakonechna, O., Ustiuhoa, Zh. & Nakonechnyi, I., 2017).

During the management of the investment activity of the enterprise, it is necessary to understand it as an important type of financial and economic activity, which is the process of choosing, justifying and attracting investment resources for the purpose of implementing the

investment policy of the enterprise, aimed at increasing income, increasing the welfare of property owners and members of the labor team, and contributes to increasing the economic potential of the enterprise, competitiveness, solving social problems.

It has been established that the criteria for choosing a strategy for the formation of investment resources in a sector-wide section from the standpoint of ensuring regional development should be:

1. Economic (assessment of the deficit of investment sources and the need for investment resources);

2. Technological (assessment of innovative orientation and competitiveness in foreign markets);

3. Social (estimation of the level of employment, intellectualization of labor, material well-being) (Oskoma, O., Okunevych, I. & Dzhanumova, L., 2019).

The main goal of the formation of investment resources of the enterprise is to satisfy its needs in the acquisition of necessary investment assets and to optimize their structure from the standpoint of ensuring the effectiveness of investment activities. Effective formation of investment resources in relation to individual sources is the most important condition for the financial stability of the enterprise. In turn, the volumes and sources of the formation of investment resources are largely determined by the capital structure that has developed at the enterprise in the course of its economic activity, as well as the cost of raising capital (Melnychuk, Yu. & Chvertko, L., 2021).

The process of formation of investment resources involves consideration of possible sources of investment financing, taking into account the specifics of the economic activity of a particular enterprise. All sources of formation of investment resources are divided into three main groups: own, borrowed, involved.

1. Own:

- Part of net profit;
- Depreciation deductions;
- Insured sum for damages;
- Part of fixed assets reinvested through sale;
- A part of surplus current assets is immobilized in investment;
- Long-term financial investments, the maturity of which ends in the current year.

2. Borrowers:

- Investment loans from banks;
- Issue of company bonds;
- Targeted state credit;
- Tax investment credit

- Investment leasing;
- Investment sales;
- Funds of individuals.

3. Involved:

- Issue of company shares;
- Contributions of third-party domestic and foreign investors to the statutory fund;
- Funds for targeted investment provided free of charge by state bodies and commercial structures (Feniak, L., 2010).

The main problems that arise in the formation of sources of financing for investment activity are not only related to the lack of financial resources - it will always be there, just like the shortage of any resource. The problems are in the absence of a correct vision of the investment process at enterprises and the absence of basic approaches to the practical mechanism of financial support for the implementation of investment projects.

In our opinion, the solution to the issue of the formation of sources of financing investment activity should be reduced to the following actions.

First, the investment activity of the enterprise should be considered as a set of investment projects of different purposes and different scales. At the same time, the types of projects, the sequence of their implementation and scaling should clearly be tied to the strategic choice of the enterprise at one or another stage of its life cycle. Such an approach will contribute to the rationalization of investment activity, its ordering and effective forecasted formation and spending of financial resources.

Secondly, the well-known and rather wide classification variety of investment projects in this case should be considered in greater detail and brought into line with the stages of the enterprise's activity, which will allow solving the issue of comprehensive selection of sources of financing investment activities at all stages of the enterprise's life cycle. We believe that the entire set of possible classification approaches regarding investment projects of enterprises can be consolidated into business start-up projects, operation support projects, growth projects, development projects, as the necessary types of projects to ensure the successful longevity of the life cycle, which, depending on the stage of the cycle, have their own financing specificity. At the same time, it is worth noting that today's realities require the positioning of almost all projects as innovative, in particular startups, because they will contribute to the solution of the problems of effective initiation of the prolongation of the life cycle of the enterprise (see figure). We note that development projects are a wide variety of projects at any stage of the life

cycle, including repurposing and reengineering projects at the end of the cycle, the latter can be considered as the initiation of new business projects and reinvestment in new business. The success of such projects will, of course, depend on many factors, but the initial condition should be the innovativeness of the project, perhaps even it should be a project with startup ambitions (Pruntseva, H., 2020).

Thirdly, depending on the type of project, its scale, stage of the life cycle, it is necessary to take into account the specifics and possibilities of their financing from various sources. At the same time, the mechanisms of preliminary and preventive formation (in particular, accumulation) of financing sources should be involved. The most common possible sources of financing investment activity (own and borrowed funds, borrowing funds (loans, bond issuance by the company), venture funds, etc.) when adapted to different periods of the life cycle can be presented as a diverse combination of the following: own funds (units), fundraising (crowdfunding platforms), venture financing (external), attraction (external and internal) and borrowing (external and internal), own funds (additional contribution of shares by owners, depreciation deductions, profit, special accumulated funds of the enterprise), self-financing at the expense of income from financial and investment activities; venture self-financing of the development of promising innovative projects (in particular, through participation in venture funds), project financing by new owners (co-owners), own funds (as accumulations from a previous business) (Stakhurska, S., Tkachuk, S. & Stakhurskyi, V., 2022).

Investment resources necessary for the creation of new production facilities, improvement of the technical and organizational level of the production process and the sustainability of the enterprise as a whole, can be chosen among the variety of all sources of investment formation. However, in order for enterprises to materialize innovations and support innovative processes, it is necessary to implement an effective investment policy - to stimulate traditional sectors of the national economy, large technological enterprises, microelectronics, telecommunications enterprises and encourage them to work with the help of a new technical base (Khoroshun, Yu., Prodanova, L. & Zakharova O., 2021). It is also necessary to improve the legislative framework, since the imperfection of the legislative framework, the reduction of financing of innovative programs by the state has a destructive effect on the economy of the country as a whole.

Conclusions and perspectives of further research. The investment activity of the enterprise is a set of various-scale investment projects for various purposes. The basis of the rationalization of investment activity and effective forecasted formation and spending of financial resources should be the investment strategy of the enterprise, which is based on a strategic choice and one or another life cycle. Thus, it is possible to interpret IR from different angles, as resources aimed at improving the productive forces of the enterprise, representing economic resources that increase the economic capital of the enterprise, and as financial investments in economic activity for profit. Therefore, it can be considered that the formation of the optimal structure of investment resources to ensure a single comprehensive impact on the investment activity of the enterprise will be promising and will allow it to significantly increase its investment attractiveness and financial stability.

Therefore, in order to determine the optimal structure of sources, reduce the level of investment risks and prevent the threat of bankruptcy, it is necessary to take into account the strategic financial goals of the enterprise's development and the level of innovative activity when forecasting the amount of investment resources. In my opinion, it is the optimal and maximum volume of investment resources that can influence the increase in the level of investment and innovation activity of the enterprise and its market value.

The financial and economic condition and efficiency of the functioning of enterprises can be evaluated by many financial and economic indicators. In different situations and for different tasks, some of them more accurately determine the effectiveness of managing the competitiveness of enterprises in the industry, others – less accurately. Determination of financial and economic, resource and production capacity is especially important for strategic management; identification of external and internal factors that have the greatest influence on the increase. At the same time, constant monitoring of the relevant markets should be carried out; supply and demand for the relevant types of products and their dynamics; competition and market behavior of competitors. This will make it possible to develop effective marketing strategies of agricultural enterprises aimed at achieving, preserving and increasing their competitiveness. As a result, growth and modernization of production will be carried out; fill local and state budgets; solving social problems of workers and residents of rural areas.

Investments have a decisive influence on the

formation of the rate of economic growth of the country's economy. We draw attention to the following main functions performed by investments in the process of advanced reproduction:

1. Investment resources of enterprises ensure economic growth and qualitative renewal of fixed assets on a fundamentally new, competitive basis both at the level of an individual enterprise and the national economy as a whole.

2. At the expense of investment resources, progressive structural changes in social production are carried out, which affect the most important macroeconomic proportions.

3. Investments realize the achievement of scientific/technical progress and, on this basis, increase the efficiency of production both at the micro-level and at the macro-level. Among these

functions, the optimization of the most important macroeconomic proportion - the ratio between accumulation and consumption, on which the growth rates of production, the level of population consumption and the efficiency of social reproduction depend.

Summing up, it should be noted that making any investment decision requires substantiation of the strategy for the formation of investment resources, analysis of other methods and sources of attraction, detailed development of the financing scheme. Therefore, for a more effective development of a strategy for the formation of investment resources, it is necessary to evaluate each of the used sources, while it should be borne in mind that any of them has certain advantages and disadvantages.

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ДОСЛІДЖЕННЯ ОСОБЛИВОСТЕЙ ПІДПРИЄМНИЦЬКОЇ ДІЯЛЬНОСТІ В БУДІВЕЛЬНІЙ СФЕРІ

Актуальність. Підприємництво (підприємницька діяльність) — самостійна сфера діяльності, що здійснюється на власний ризик і спрямована на одержання систематичного прибутку від продажу товарів, використання майна, виконання робіт, надання послуг. Особи, які займаються підприємницькою діяльністю, повинні бути зареєстровані відповідно до закону, якщо інше не встановлено законом. Окремі випадки продажу товарів, виконання робіт чи надання послуг, які не приносять систематичного прибутку, не є підприємствами. Для торгівлі використовуються праця, нематеріальні активи, праця як самого підприємця, так і залучених ззовні. Немає гарантії, що витрачені гроші окупляться, а товар буде продано з прибутком. Це пов'язано з ризиком втрати всього або частини майна.

Мета і завдання: соціально-економічний розвиток, при цьому проаналізувати методичні основи взаємовідносин підприємництва та принципи їх прогнозування, пояснити шляхи підвищення їх соціальної ефективності шляхом використання фінансових, бюджетно-податкових механізмів стимулювання підприємницької діяльності у регіонах.

Результати досліджень. Роль держави в розвитку підприємництва, удосконалення її механізмів впливу на підприємництво, а також визначення шляхів обґрунтування державних програм у перспективному напрямку. На основі інформаційної бази науково-дослідної роботи створено підручники, книги, наукові статті та інші методичні посібники, написані вітчизняними та зарубіжними теоретиками в галузі менеджменту якості та бізнесу.

Матеріал і методи. Під час написання науково-дослідницької роботи використовувався контент-аналіз, аналіз із синтезом, а також методи дедукції та індукції.

Висновки. Використовуючи девелоперську діяльність підприємців будівельної сфери, проект базується на результатах нових відкриттів програм TILOS та ASTA. Роль держави в розвитку підприємництва, удосконалення її механізмів впливу на підприємництво, а також визначення шляхів обґрунтування державних програм у перспективному напрямку.

Ключові слова: підприємництво, збут, прибуток, будівництво

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STUDY OF CHARACTERISTICS OF ENTREPRENEURIAL ACTIVITY IN THE CONSTRUCTION SECTOR

Topicality. Entrepreneurship (entrepreneurial activity) is an independent field of activity, carried out at one's own risk, aimed at obtaining systematic profit from the sale of goods, use of property, performance of works, and provision of services. Persons engaged in entrepreneurial activity must be registered in accordance with the law, unless otherwise provided by law. Individual cases of selling goods, doing work or providing services that do not bring a systematic profit are not enterprises. The labor, intangible assets, and labor of both the entrepreneur himself and those involved from outside are used for trading. There is no guarantee that the money spent will be repaid, and that the product will be sold at a profit. This is associated with the risk of losing all or part of the property.

Aim and tasks: socio-economic development, at the same time, to analyze the methodical basis of mutual relations between entrepreneurship and the principles of its forecasting, to explain the ways of increasing their social efficiency by using financial, budget-tax mechanisms to stimulate entrepreneurial activity in the regions.

Research results. The role of the state during the development of entrepreneurship, to improve its mechanisms affecting entrepreneurship, as well as to determine the ways of justifying state programs in a prospective direction. Based on the information base of the research work, there are textbooks, books, scientific articles and other teaching aids written by local and foreign theorists in the fields of quality management and business.

Material and methods. During the writing of the research work, content analysis, analysis with synthesis, as well as

deduction and induction methods were used.

Conclusion. *Using the developer activity of entrepreneurs in the construction sector, the project is based on the results of new discoveries of TILOS and ASTA programs. The role of the state during the development of entrepreneurship, improving its mechanisms affecting entrepreneurship, as well as determining the ways of justifying state programs in a prospective direction.*

Keywords: *entrepreneurship, sales, profit, construction*

Entrepreneurship (entrepreneurial activity) is an independent field of activity, carried out at one's own risk, aimed at obtaining systematic profit from the sale of goods, use of property, performance of works, and provision of services. Persons engaged in entrepreneurial activity must be registered in accordance with the law, unless otherwise provided by law.

Problem statement and its connection with important scientific and practical tasks.

Factors influencing the development of the construction sector can be grouped as follows:

One of the factors determining the dynamic improvement of the construction sphere is technological progress. Technologies are significantly changing the methods of business organization in enterprises that offer services to consumers. Technological progress affects other types of services as well, from transportation to sales. The improvement of ideas leads to the creation of new types of activities, i.e. the creation of development service systems. Technological progress, economic improvement intensifies services (Boulos, Sartipi and Khoshaba .,2020)

The impact of economic factors on the construction sphere is conditioned by the dynamics of GDP, changes in demand for consumer products, standard of living, employment and income levels of the population. The role of financial and business services in the construction sector is increasing.

One of the factors that have a strong influence on the service sphere, like other areas of the economy, is the demographic factor. As a result of raising the standard of living, the longevity of the population increases, which in turn leads to the emergence of a number of service markets, for example, the market of insurance services (life insurance, deposit insurance). Japan and the USA can be shown as examples of the development of this type of markets.

One of the factors affecting the construction sphere is the natural environment. Industry and agriculture

It manifests itself in the correct liberalization of the regulatory influence of the state. For example, service industries (construction, communications, transportation, banking, etc.) are relatively heavily regulated by the state.

It may cause some problems in the service

sector. Thus, cultural differences between the United States and France created problems for the Walt Disney Company.

In any case, the field of entrepreneurship requires state intervention, which consists in the preparation and implementation of state support measures, the correction of administrative obstacles aimed at ensuring a high level of effective demand and the creation of highly qualified labor resources. Regardless of the level of development of countries, despite the spread of A. Smith's "invisible hand of the market" theory, much attention is paid to state regulation of entrepreneurship. The purpose of this work is to determine the problems of entrepreneurship development in the region based on the identified factors. The main results that constitute the novelty of the research are as follows:

- the world experience of entrepreneurship studies was interpreted at the regional level;
- Groups of factors determined for the development of entrepreneurship in the Tyumen region - efficiency of state support for entrepreneurship; high operational costs related to the development of new sales markets, infrastructure development, search and training of employees with the required qualifications;
- an assessment of the impact of selected factors on the level of development of entrepreneurship is provided;
- Identified the problems of entrepreneurship development in the Tyumen region;
- indicators of the effectiveness of regional programs supporting entrepreneurship (Gamil, Gharizadeh , 2019)

Analysis of recent publications on the problem

Scientific works of foreign and local authors formed the methodological basis of the research. Foreign authors base modern concepts of state regulation of entrepreneurship on the influence of the political factor in making economic decisions and, conversely, on the political consequences of making economic decisions related to entrepreneurship. G.J Stigler claimed that most economists idealize government regulatory mechanisms without considering political influence when deciding on subsidies to sectors of the economy. Empirically confirmed the

importance of this factor in making economic decisions. F. Den Butter, J. Hudson examined government regulation of entrepreneurship as "legally binding standards", compliance with which leads to an increase in the operating costs of companies. Their proposed standards "guarantee a level playing field" for entrepreneurs. We agree that high transaction costs hinder the development of entrepreneurship. S. Haggard, S. Maxfield, BR Schneider reviewed the concepts of interaction between entrepreneurship and the state, starting from the concept of "private sector as capital, sector, firm, association or network". This highlights that investment and growth are greatly influenced by the relationship between governments and the private sector. The article defines the political consequences of "making the majority of investment decisions in the capitalist economy by people who react to both market signals and expectations of the government's future activity" (Allahverdiyev., Gafarov., Ahmadv., 2018, p. 564). We agree that high transaction costs hinder the development of entrepreneurship. S. Haggard, S. Maxfield, BR Schneider reviewed the concepts of interaction between entrepreneurship and the state, starting from the concept of "private sector as capital, sector, firm, association or network". This highlights that investment and growth are greatly influenced by the relationship between governments and the private sector. The article defines the political consequences of "making the majority of investment decisions in the capitalist economy by people who react to both market signals and expectations of the government's future activity" (Allahverdiyev., Gafarov., Ahmadv., 2018, p. 564). We agree that high transaction costs hinder the development of entrepreneurship. S. Haggard, S. Maxfield, BR Schneider reviewed the concepts of interaction between entrepreneurship and the state, starting from the concept of "private sector as capital, sector, firm, association or network". This highlights that investment and growth are greatly influenced by the relationship between governments and the private sector. The article defines the political consequences of "making the majority of investment decisions in the capitalist economy by people who react to both market signals and expectations of the government's future activity" as a union or network" considered the concepts of interaction between entrepreneurship and the state. This highlights that investment and growth are greatly influenced by the relationship between governments and the private sector. The article defines the political consequences of

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Thus, today it is important for the state to take measures aimed at stimulating the development of entrepreneurship and supporting it. In this regard, an extremely important task is to create a state support system for small businesses and favorable conditions for attracting foreign investments. In addition, a whole system methodology for the development of small businesses and the use of funds for the development of this sector of the economy should be monitored (Allahverdiyev., Gafarov., Ahmadv., 2018, p. 564).

Allocation of previously unsolved parts of the general problem

Representatives of entrepreneurial structures distribute their problems in terms of importance as follows:

- Disadvantages of the tax system.
- Lack of working capital.
- Low effective demand of the population.
- High rent.
- Economic policy of the state.
- Non-availability of credits.
- High price of raw materials.
- Weak development of the domestic market.
- High rates for transportation.
- Lack of production space (Todhunter, Crowley, p.5)

Formulation of research objectives (problem statement).

Thus, for the successful development of modern entrepreneurship, it is necessary to ensure an optimal combination of the interests of the state, consumers and business entities. For this, an orderly and effective regulatory base of entrepreneurship should be implemented, which will stimulate business development and create favorable conditions for those who are ready to start and continue their business. At the same time, it is important that the state policy creates a reliable barrier to the continuous increase of

administrative obstacles in the way of small business activity. In addition, the level of regulation of the economy should be reduced, but this does not mean that less attention should be paid to this issue.

Thus, the development of entrepreneurial activity is a complex and contradictory process with a number of specific features that need to be taken into account. Entrepreneurship is indeed an indispensable force in economic dynamics, competitiveness and social well-being.

Materials and methods.

Research conducted in recent years shows that the business environment has become more competitive. How can companies gain an advantage in the face of this competition? By strengthening their products, services, tactics and organizational structure, companies can maintain their growth trends and position themselves in this competitive environment. But if marketers can't articulate this unparalleled value not only in clear and effective ways, but also in a highly dynamic, data-driven, real-time way, it won't work. To measure entrepreneurial growth and current state, the construction sector needs to come up with a method that matches its goals and objectives. To be able to measure the competition at the level of the construction sector, to distinguish the best strategy from others,

Based on the above considerations, the benefits expected from the investigation of entrepreneurial competition in the construction sector are as

follows:

Determining and measuring the competitiveness specific to the construction sector of Azerbaijan;

Identifying the parties that have lost or gained advantages by comparing the current situation with other countries that are interested parties of the research;

As in competitive countries, conducting comparison works in the Azerbaijan Construction Sector and informing the industry about the importance of the issue, etc.

"Crystal Absheron LLC" is the construction company we have chosen to evaluate the competitiveness of the Azerbaijan Construction Sector in the context of the specified factors. Determining the strengths and weaknesses of this construction company and determining what needs to be done in this sector is extremely important from the point of view of sustainable competition.

Crystal Absheron, one of the largest companies in the field of housing construction, is expanding its sales and service channels day by day.

It is no coincidence that "Crystal Absheron" is the first company that started cooperation with Asan Service as a result of trust, honesty and professionalism. Kristal Absheron satisfies every customer in comparison with its competitors.

At present, construction and repair works are being carried out in "Crystal Absheron" projects, and several projects are nearing completion.

Table 1

GZIT analysis in terms of competitiveness of "Kristal Absheron" construction company

Strengths	Weaknesses
<ul style="list-style-type: none"> ➤ The company has the ability to develop projects on a global scale; ➤ The degree of use of high technology; ➤ Facilitated information and technology transfer; ➤ Intensification of competition; ➤ Development of diplomatic relations between countries; ➤ Development of new projects; Qualified staff; ➤ Having a high capacity for researching customer expectations and producing projects that meet expectations; ➤ Increasing investments; ➤ New design and technique searches and differentiation efforts are high. 	<ul style="list-style-type: none"> ➤ In general, the low level of education of middle-level workers; ➤ Lack of development of general quality awareness and insufficient use of high quality standards; ➤ Inadequate use of teamwork and proposal development tools; ➤ Low tendency of the organization to develop innovation; ➤ Use of the same project by many different companies.

Facilities	Dangers
<ul style="list-style-type: none"> ➤ Development of cooperation in the sector; ➤ Proper management of relations with customers; ➤ Use of new marketing methods; ➤ The application of smart technologies in the company increases the ability to differentiate; ➤ Development of prefabricated industry; ➤ Use of integrated design systems; ➤ Web-based project management systems are being used; ➤ Availability of multidimensional virtual design applications; ➤ Investing in the company nationally and globally (see Chart 1) 	<ul style="list-style-type: none"> ➤ High financial costs; ➤ Conservative structure of the company; ➤ Resistance to change; ➤ Need for changes in institutional structures.

Source: <https://www.kristalabsheron.az/less/article/2017/0companies-first-defe-kristal-absheron-made> – The amount of investment in the company in 2020.

An outline of the main results and their justification

As can be seen from the analysis, the company has a strong strategy among its competitors in the construction sector due to its strengths. In particular, making investments in the company on a national and global scale increases the dynamics of the company's development by benefiting the development of the construction sector. Foreign

investment in this company is mainly from Turkey - a sister country. For example, in 2019, the total amount of investment in the company was 40 million manat (for the construction of 12 buildings). 18 million manats belong to Turkey. In 2020, almost no foreign investment was made to the company. For 2020, the amount allocated by the country for the construction of 12 buildings was 39 million manats.

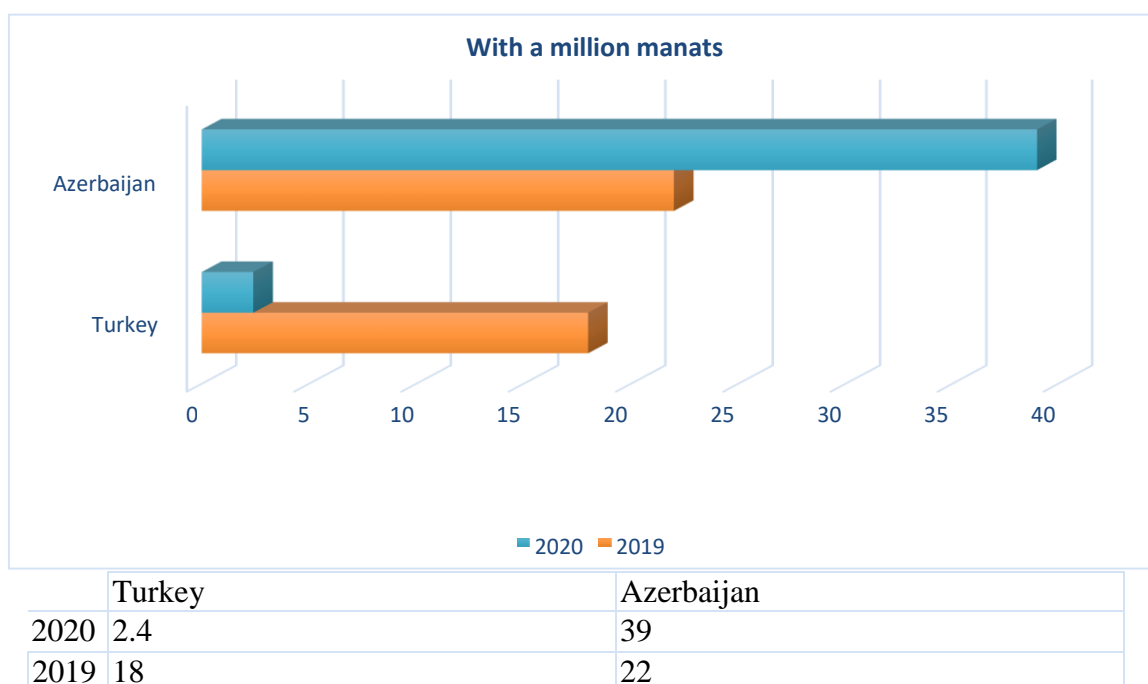


Fig. 1: The amount of investment in "Kristal Absheron" construction company, mln. manats

Source: <https://www.kristalabsheron.az/less/article/2017/0companies-first-defe-kristal-absheron-made> – The amount of investment in the company in 2020.

If we look at the general international practice of the construction sector, we can say that the creation of infrastructure required by new technology, the construction of transport roads, communication networks and buildings is always the area of interest of the construction industry. In the world of innovation, where the difference of time and space is lost, the organization of activities in the construction sector on a global scale is an important issue.

The idea that it is impossible to take maximum advantage of the opportunities presented by new

technology without cooperation between countries and companies in those countries is accepted in the central countries of capitalism and in the innovative world economic system with international cooperation and free market.

Developed countries want to take advantage of the opportunities offered by new technology and organize the safe movement of capital around the world at the click of a computer button. These issues also apply to the construction sector. In the international sphere, we can group the distribution of construction companies by country as follows.

Table 2

Distribution of international construction firms by country

The origin of the construction company	Number of companies among the top 225 companies	Total Revenue, mln. USD (2020)	Revenue Share among Top 225 companies, %
Chinese	50	56608.8	14.79
Azerbaijan	31	14583.3	3.82
Italy	23	32505.3	8.48
USA	22	44912.9	11.72
France	5	40020.8	10.45
India	5	2953.8	0.77
Canada	3	3191.7	0.83
Greece	3	6193.9	1.62

Source: Afyon Kocatepe University, IIBF Journal (C.XIV, SI, 2020)

Table 2 above shows the digital share of globally competitive Azerbaijani companies among the 225 companies that managed to enter the list and their share of the total revenue earned by all companies.

Within the scope of the study, national characteristics specific to the country were identified as part of competitiveness. Having a certain idea about Azerbaijan's experience and information about these countries and comparing these indicators with these countries will allow.

The competitiveness project is quite widespread throughout Europe and America. Many organizations are becoming interested in the concept of sustainable competitiveness, especially when they face global competition.

Taking risks is essential to strengthen competitiveness in the construction sector. Because it is impossible to make progress in any field, not only the construction sector, without taking risks. Because jumping into innovation, only creating

something new can differentiate a company (entrepreneurial entity) from others. What are these risks in the construction sector? What are the pros and cons of this? a risk analysis is needed to investigate all these.

Risk-taking refers to bold advances, such as the ability to venture into an unknown new market, invest resources, or borrow large amounts of money in a venture. Risk-taking refers to the tendency to support innovative projects even if the results and returns are uncertain. As a sub-dimension of entrepreneurial tendency in the construction sector, "risk-taking tendency" was investigated by GZIT analysis method in Table 3.

As it is known from the analysis, there are actually all kinds of favorable conditions for the development of the construction sector in Azerbaijan. But a new innovative project plan is needed to gain more market share and further strengthen integration into the world market.

GZIT analysis on risk-taking propensity in the construction sector

Strengths <ul style="list-style-type: none"> ➤ Most of the investors in the sector are small and medium entrepreneurs; ➤ Small entrepreneurs in the sector better monitor the market; ➤ Investors are close to customers and determine their requirements immediately; ➤ Small and medium entrepreneurs are owners and managers of enterprising enterprises; ➤ Small and medium entrepreneurs have high risk thresholds and uncertainty tolerance; ➤ As the level of education decreases, the propensity to risk increases. 	Weaknesses <ul style="list-style-type: none"> ➤ Limited financial resources of small and medium entrepreneurs; ➤ High debt costs of small and medium entrepreneurs; ➤ Weak tradition of feasibility and low propensity to identify uncertainties and proactive actions; Poor crisis management practices; ➤ Lack of training in marketing and management issues.
Facilities <ul style="list-style-type: none"> ➤ Renewal of guarantee programs related to entrepreneurship and employment; ➤ Aiming for effective labor policy implementation through vocational guidance and guidance services, as well as vocational training courses; ➤ The development of urban development on a national scale; High population growth rate in our country. 	Dangers <p>Regional risks (regional instability and conflict environment);</p> <p>Global economic crisis and decrease in demand for housing in the economy;</p> <p>Increasing debt costs;</p> <p>Low forecast-research trends for the future;</p> <p>Low risk computing efforts;</p> <p>Political risks;</p> <p>Financial risks;</p> <p>Construction risks;</p> <p>Environmental risks;</p> <p>Intense competition in the sector.</p>

Source: <https://www.kristalabsheron.az/less/article/2017/0companies-first-defe-kristal-absheron-made> – The amount of investment in the company in 2020.

Development of entrepreneurial activity in Azerbaijan and possibilities of use

The basis for the implementation of the main reforms for the development of entrepreneurship in the construction sector and the creation of favorable working conditions was laid by our national leader H. Aliyev, and currently President I. Under the leadership of Aliyev, this trend is still continuing in accordance with the requirements of the economic development strategy. Ensuring the stable and balanced development of the country's economy, accelerating the development of regions is one of the priorities of the current socio-economic development stage of our country and is successfully implemented within the framework of the adopted state programs.

The creation and activity of the Investment Promotion Fund in Azerbaijan is aimed at attracting foreign investments to the country. In addition to all this, working mechanisms have been created to protect the rights of entrepreneurs, and the number of obstacles has decreased as a result of their implementation. In our country, measures are constantly taken for the development of

business advice, information and business relations. But how is this trend in the countries of the world? For this, let's take a look at the statistical data on housing construction in some foreign countries (except the CIS countries) and Azerbaijan.

According to the indicators of investment indices, in 2019-2020, Azerbaijan lags behind other CIS member countries. However, if we look at the statistical indicators of the past years, it is possible to see the dynamics of development in our country. For example, in 2017 and 2018, the indicators were 2-3 times less than in 2019-2020. This is proof that the dynamics of development is increasing year by year.

The development of entrepreneurship in the construction sector in the country is one of the priorities of the economic policy. Comprehensive measures have been implemented in this area, for example, development of state-business relations, improvement of laws and administrative procedures in the trade environment, expansion of state support for entrepreneurship, development of education, business relations, etc.

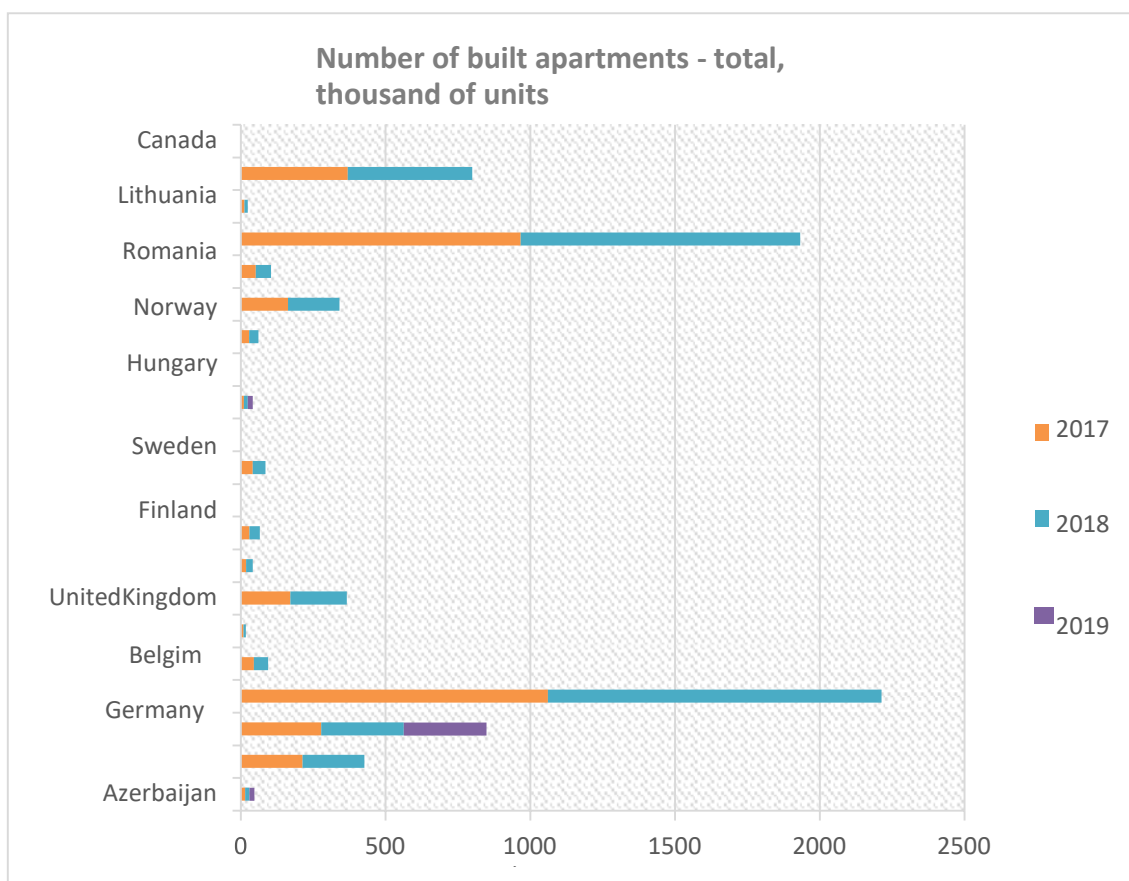


Fig. 2 International comparison of Azerbaijan and foreign countries

Source: https://www.stat.gov.az/menu/4/e-reports/az/06/006_p.php– State Statistics Committee 2020.

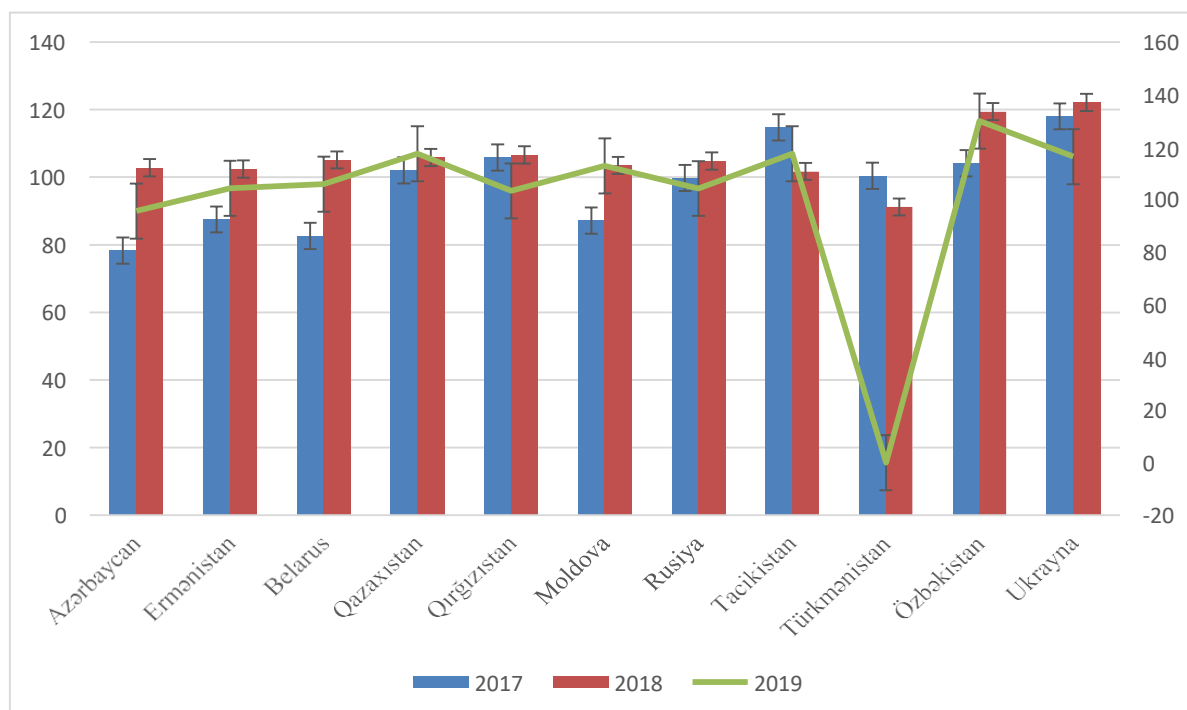


Fig. 3 Investment indices focused on fixed capital (2019 – 2020)

Source: https://www.stat.gov.az/menu/4/e-reports/az/06/006_p.php– State Statistics Committee 2020.

Another important point from the point of view of the development of entrepreneurial activity and

opportunities for use in Azerbaijan is the investment indices aimed at the main capital.

In recent years, the procedures and rules governing trade have been liberalized and the maximum import duty has been set at 15%. At the same time, the tax burden for entrepreneurs, including the introduction of electronic tax invoices, the introduction of electronic services and the introduction of agriculture, was reduced from 22% to 20%, and the personal income tax was reduced from 35% to 20%.

Until 2017, producers were exempt from all taxes except land taxes. The application of the "single window" principle in the registration of business entities in the construction sector has been ensured and online registration has been started. An effective mechanism for financing investment projects of entrepreneurs has been formed.

Thus, as a result of the continuous improvement of the rules for the use of preferential loans, the total volume of loans granted to enterprises has increased and the accessibility of loans to businessmen has expanded.

We believe that the following measures will be appropriate to stimulate small and medium entrepreneurship in the construction sector in the Republic of Azerbaijan:

Optimizing the sectoral, regional and technological structure of entrepreneurial activity;

Expansion of mutually beneficial cooperation, including production and cooperation, between small, medium and large enterprises;

Creation of a modern entrepreneurship model to support entrepreneurship, while continuing to create consulting services, information support, marketing services and other structures for entrepreneurs;

The higher the dynamics of business development, the more diversified the economy and the more dependent the economy is on one sector. In this regard, one of the main goals of the country's economy should be to improve the development of non-oil sectors of the economy (construction sector), to further improve the legislative system, as well as to ensure the flow of domestic and foreign investors. One of the most important factors in the development of the construction sector is undoubtedly economic and political stability. In the past, there are problems such as economic and political instability in Azerbaijan, which have a negative impact on the development of the country's construction sector. However, the achievement of political and economic stability after the 2000s had a positive effect on the sector, at least partially. New jobs were created for contractors and construction sector indicators reached record highs. During this period, contractors' investments in the construction

sector contributed significantly to national development.

There are more than 200 sub-sectors that provide access to the sector and continue their activities depending on the developments in the construction sector. This is the most important reason why the construction sector and therefore the contracting sector is called the "Engine of the Economy".

The labor force required by the construction sector creates ample employment opportunities for unskilled workers. Especially in the last ten years, the number of workers working in the sector reached 1 million 879 thousand people in 2019, along with the development of the construction sector in Turkey, a brother country in the international sphere.

According to World Statistics estimates, 4.6 million people work indirectly in the construction sector and building materials industry. This is 20% of the total employment in our country. More than 100 million people work in the construction sector worldwide. Considering all these features of the construction industry, it is estimated that the contribution of contractors to GDP reaches 35%.

The construction sector is generally a lucrative profession. In fact, it is a relative matter. For example, in 2019, due to the positive atmosphere in the sector, contractors got used to working with high profit rates. However, high profit rates increased market entry, which led to increased competition. Of course, this situation reduced the profit rates of the contracting companies. The profitability ratio of the sector, which was more than 30% at the beginning of 2019, has recently decreased to 20% or even 15%.

One of the important reasons for the decrease in profit rates is the costs. Land profitability is the most important reason behind rising costs, especially in recent years. In addition, increases in the prices of iron, cement, imported tools and equipment due to the increase in the exchange rate have a negative impact on costs.

In addition, problems in the construction sector with refunds of Value Added Tax (VAT) also have a negative impact on costs. Similarly, the construction sector in Azerbaijan has become more profitable than other industries for many reasons. Contractors now have to work under conditions of low profit rates and high competition, as in the manufacturing industry sector.

Construction workers include craftsmen, engineers, architects, occupational safety specialists and building inspectors, and people with experience in a variety of fields.

The licensing phase is a long period involving

the preparation of projects, the provision of necessary inputs during construction, the supervision of the work of subcontractors, compliance with all bureaucratic procedures and the payment of taxes.

As we mentioned in the previous paragraph, the construction sector in Azerbaijan is one of the sectors where perfect competition conditions prevail. Because there are many buyers and sellers who meet real competitive conditions in the sectors. Additionally, for a perfectly competitive market to be valid, market entry and exit must be easy, the market must be homogeneous, and buyers must be informed about the market. If we consider the construction sector, it can be seen that it meets all the conditions of a perfectly competitive market.

There is a general recession in the construction sector in Europe. Brexit still leaves many industries uncertain in Europe, as it is in the UK. The construction sector is also one of the areas most affected by uncertainty.

For example, the construction sector in Turkey is experiencing an active period due to the density of housing and infrastructure projects. The construction sector, which is one of the most important economic sectors of the country with the added value it creates, has a share of 30% in the economy with the sectors it indirectly affects, in addition to the 9% share in the GDP.

In general, we expect that the construction sector in Turkey and the world will continue to develop in the coming years. Research shows that China became the world's largest construction market in 2020, followed by the United States, India, Japan and Canada. While no significant change is expected in the ranking of the market

size, significant changes are expected in the ranking of the development speed of the construction sector.

In the 2019-2020 Sector Outlook study of our country's construction sector, we assume that if interest rates can be lowered further as targeted by the government, there will be a revival in the housing sector.

The management mechanism of the development of the entrepreneurial environment is an interconnected and orderly system of entrepreneurial structures with regional and especially local authorities (local government bodies).

According to the new changes to the legislation regulating local self-government, the tasks related to the formation of favorable conditions for the development of small and medium-sized enterprises in the construction sector are related to locally important issues, that is, they are under the direct authority of local self-government bodies.

Small businesses have 10% entrepreneurial spirit, 20% managerial and 70% technical spirit. It is not enough for an entrepreneur to have management skills alone. In order to keep the company afloat, many measures must be taken, such as attracting creative workers to start-ups, coordinating employees and building a corporate culture.

This issue is particularly important in the construction sector. Because the world experience in the innovative economic system - in the non-oil sector - is constantly developing. So, it is imperative that each of the entrepreneurs use world experience and start a new business based on all this.

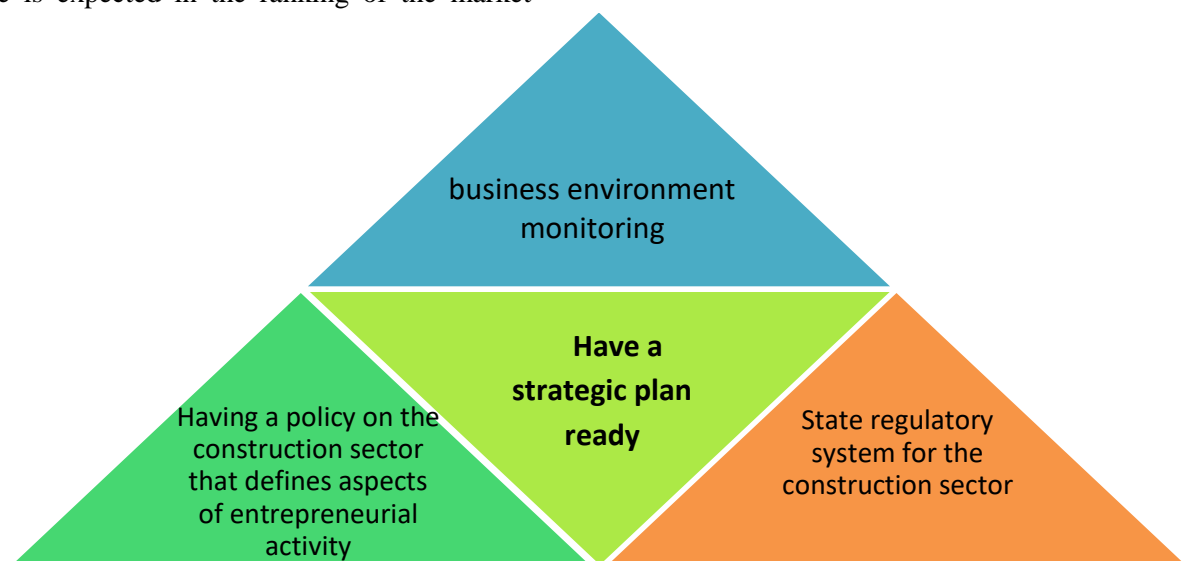


Fig. 4 Means of development of the state regulatory system for the construction sector

Source: <https://www.tandfonline.com/doi/abs/10.1080/01446199500000052>- External influences 2020.

In general, the mechanism for managing the development of the entrepreneurial environment in the construction sector includes the following components: the promotion of effective support for entrepreneurship, as well as the creation of appropriate business infrastructure. These functions are primarily aimed at tax regulation and supporting the social sphere, preventing negative external effects. Today, in the context of the formation of the construction sector, it is necessary

to develop a modern monitoring system that allows receiving timely and reliable information about the socio-economic processes occurring in the entrepreneurial structures of urban formations. One of the ways to solve this problem is the creation of information and analytical systems for regional management and monitoring both within the municipality and directly in the industrial complexes of the city.

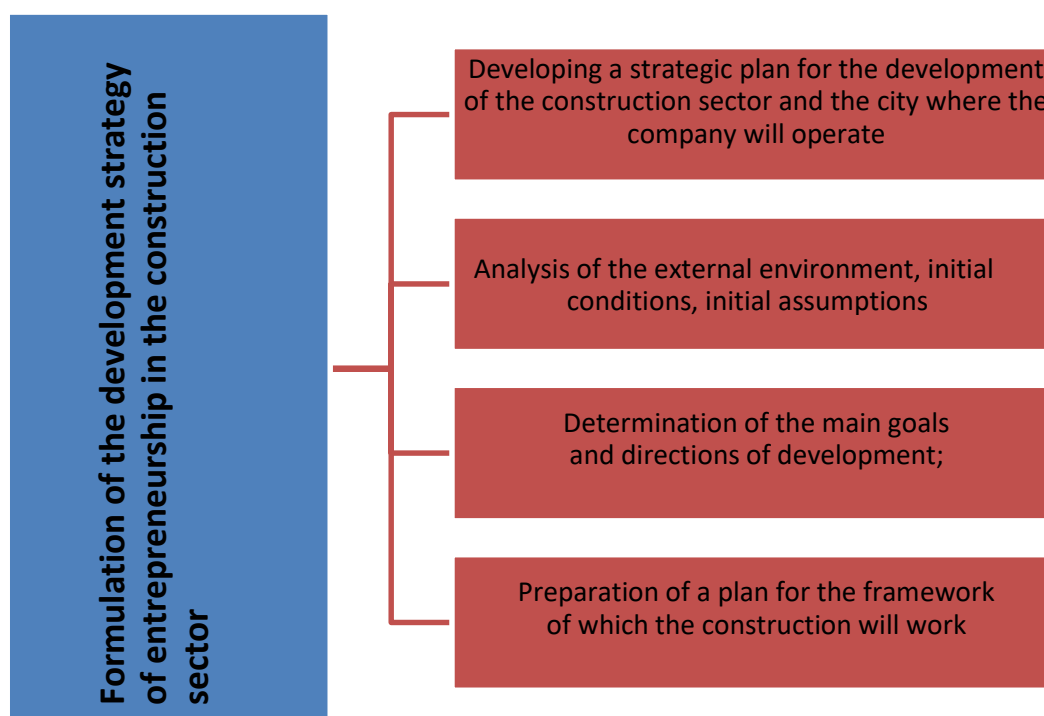


Fig. 5: Formulation of the development strategy of entrepreneurship in the construction sector

Source: <https://www.tandfonline.com/doi/abs/10.1080/01446199500000052>- Abstract 2020.

In a small town, especially in the construction sector, the period of formation and implementation of the development strategy of entrepreneurship is presented in the following form (diagram 3).

This procedure can change if the city has not yet prepared a plan for the development of the industrial policy of the city (region).

The monitoring system of the urban industrial complex will allow to independently evaluate the development trends of its economic situation in almost real time, to receive information about the economic situation and possible changes in the construction sector of the economy, to quickly analyze the financial situation of the enterprise and the most important socio-economic factors.

But what is the essence and purpose of the strategic goals and directions for the development of the construction sector? Some authors working in this direction equate industrial policy and industrial strategy. However, as research shows,

they have significant differences, namely, policy involves regulatory impact measures on business structures and strategy provides a transformative service in accordance with the general trends and directions indicated in the policy.

Conclusions and perspectives of further research. The development trend of entrepreneurship in the construction sector in large cities should seriously support the initiatives of the regional administration. The industrial policy of cities requires not only the correct determination of the main directions of development, but also the creation of effective mechanisms for the implementation of development plans. If we think that the city is half a company, we can draw an analogy between the cycle structure of the city's strategic plan and the strategic development structure of the commercial structures of the region (Bevan, 2020).

As a result, the economic development of small

and medium-sized cities directly depends on how dynamically the business environment develops. The process of environmental development requires constant monitoring, and this is only possible if there is a well-functioning governance mechanism in which industrial policy and monitoring are key components.

Based on the analysis of the place and role of entrepreneurial networks in the entrepreneurial system, the following main conclusions can be drawn:

➤ the formation of business networks contributes to the efficient development of the

activities of small and medium enterprises;

➤ there is a continuous trend towards the activation of network associations and the most relevant entrepreneurial networks that most fully solve the problems of ensuring adaptation in the market;

➤ The selection of the best ones is made taking into account the high variability of management decisions in the formation of work networks (choosing parameters, justifying their configuration, determining the types and forms of labor specialization, etc.)

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ТЕОРЕТИЧНІ ОСНОВИ ІНТЕЛЕКТУАЛІЗАЦІЇ МІСЬКИХ ТРАНСПОРТНО-ЛОГІСТИЧНИХ СИСТЕМ

Актуальність. Наукова стаття присвячена дослідницькому аналізу особливостей застосування інтелектуальних технологій для управління логістичними процесами, їх впливу на цифрову трансформацію та модернізацію логістичних систем. Інтелектуалізація є новою тенденцією в економічному розвитку країн, обумовлена інтелектуальними технологіями, включаючи хмарні обчислення, великі дані та Інтернет. Інтелектуальні сервіси програм, засновані на інтелектуальних терміналах, що надаються інтернет-підприємствами, приносять безпрецедентний ефект та виклик у цій галузі. Актуальність дослідження обумовлена цифровою трансформацією як світової економіки, так і України зокрема, в умовах чого формуються та застосовуються нові інформаційні технології та інтелектуальні системи, що дозволяють удосконалювати та модернізувати транспортно-логістичні процеси. У рамках статті розглянуто теоретичні аспекти інтелектуалізації логістичних процесів.

Мета та завдання. Метою роботи є дослідження теоретичних та методологічних засад реалізації концепції інтелектуалізації управління міськими транспортно-логістичними системами в умовах адаптивності.

Матеріали та методи. В роботі було використано методи теоретичного дослідження, а саме: метод аналізу, синтезу, метод сходження від абстрактного до конкретного, дедукції та індукції, також було використано в статті метод ідеалізації.

Результати. В процесі дослідження встановлено, що особливості транспортно-логістичних систем залежать від стратегій розвитку адміністративно-територіальних одиниць та драйвера зростання. Визначено найкращі країни у світі за критерієм ефективності логістики, що дозволило порівняти результати діяльності цих країн із українськими показниками. За результатами порівняльного аналізу обґрунтовано, що сильне положення європейських країн в рейтингу обумовлене ефективною роботою їх транспортної системи та орієнтацією на використання досягнень у сфері інтелектуальних технологій, на відміну від слабого становища України, яке обумовлено недостатнім використанням адаптивних інформаційно-комунікаційних технологій при організації складних ланцюжків постачання суб'єктами транспортно-логістичної інфраструктури. Охарактеризовано функціональні складові та об'єкти інтелектуальних транспортних систем. Встановлено, що в основному застосовуються автономні інтелектуальні транспортні системи, які не є інтегрованими, що, в свою чергу, знижує їх ефективність. Побудовано теоретико-прикладну модель розвитку міських транспортно-логістичних систем в умовах адаптивності, що ґрунтується на сучасному емпірично-теоретичному базисі розвитку міських транспортно-логістичних систем, які знаходяться під впливом процесів глобалізації, соціалізації та інтелектуалізації із застосуванням комп'ютерних, інформаційних і комунікаційних технологій при управлінні транспортними засобами та мережами у реальному часі. Означено ключові аспекти впливу на управління транспортною системою в умовах її соціалізації та інтелектуалізації. Обґрунтована необхідність розроблення стратегічних планів та програм реалізації щодо ефективного застосування прикладних технологій інтелектуальних транспортних систем, що сприятиме вирішенню транспортних проблем міст. Це дозволило визначити основні концептуальні засади адаптації інтелектуальних транспортних технологій до міської логістичної системи, яка на даний час знаходиться в умовах локальності, неоднорідності, з низьким рівнем адаптивності та впорядкованості.

Висновки. Бурхливий розвиток сучасних міст, збільшення кількості транспортних засобів, розвиток нових маршрутів збільшує обсяг інформації, необхідної для аналізу та прийняття оперативних рішень, що, в свою

чергу, стимулює активне використання інтелектуальних інформаційних технологій. Наразі розвивається новий етап логістики, який проявляється через соціалізацію та інтелектуалізацію логістичної діяльності, що передбачає безперервний процес отримання знань, їх збільшення, перетворення та обробка для знаходження ефективного рішення в управлінні системою на даний момент часу. Тому подальший розвиток міського транспорту повинен базуватись на застосуванні комп'ютерних технологій, а саме інтелектуальних транспортних систем. Містам та іншим територіально-адміністративним одиницям доцільно розробляти свої власні підходи, що відповідають їх власним унікальним характеристикам при розвитку інформаційно-транспортних систем.

Ключові слова: логістика, інтелектуалізація, інтелектуальні технології, логістичні процеси, інтелектуальні транспортні систем.

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THEORETICAL FOUNDATIONS OF URBAN TRANSPORT AND LOGISTICS SYSTEMS INTELLECTUALIZATION

Topicality. The scientific article is devoted to a research analysis of the features of intelligent technologies use for logistics processes managing, their impact on digital transformation and modernization of logistics systems. Intellectualization is a new trend in the economic development of countries derived from smart technologies, including cloud computing, mass data and the Internet. Intelligent program services based on intelligent terminals, provided by Internet enterprises, bring an unprecedented effect and challenge in this field. The relevance of the study derived from the digital transformation both the world economy and Ukraine, in particular, and within these conditions the new information technologies and intelligent systems are being formed and applied to improve and modernize transport and logistics processes. The article deals with theoretical aspects of the logistics processes intellectualization.

Aim and tasks. The purpose of the work is to study the theoretical and methodological foundations for the implementation of the intellectualization concept for the management of urban transport and logistics systems in terms of adaptability.

Materials and methods. The work used the methods of theoretical research, namely: the method of analysis, synthesis, the method of going from the abstract to the concrete, deduction and induction, and the method of idealization was also used in the article.

Research results. During the study it was found that the features of transport and logistics systems depend on the development strategies of administrative-territorial units and the growth driver. The best countries of the world were determined by the criterion of logistics efficiency, and that made it possible to compare the results of these countries with Ukrainian indexes. Based on the results of a comparative analysis, it is substantiated that the strong position of European countries in the ranking is due to the efficient operation of their transport system and focus on the use of achievements in the field of intellectual technologies, in contrast to the weak position of Ukraine, that is due to the insufficient use of adaptive information and communication technologies in organizing of complex supply chains by subjects of transport and logistics infrastructure. The functional components and objects of intelligent transport systems are characterized. It has been established that autonomous intelligent transport systems are mainly used, which are not integrated, that, in turn, reduces their effectiveness. A theoretical and applied model for the development of urban transport and logistics systems in conditions of adaptability is built, which is based on the modern empirical and theoretical basis of the development of urban transport and logistics systems, which are influenced by the processes of globalization, socialization and intellectualization involving the use of computer, information and communication technologies when controlling vehicles and transport networks in real time. The key aspects of influence on the management of the transport system in the conditions of its socialization and intellectualization are indicated. The necessity of strategic plans and programs developing to implement the effective use of intelligent transport systems applied technologies is substantiated, that will contribute to solve the transport problems of the cities. This made it

possible to determine the main conceptual foundations for the adaptation of intelligent transport technologies to the urban logistics system, which is currently in the conditions of locality, heterogeneity, with a low level of adaptability and orderliness.

Conclusion. *The rapid development of modern cities, the increase in the number of vehicles, the development of new routes increases the amount of information needed for analysis and prompt decision-making, and this, in turn, stimulates the active use of intelligent information technologies. Currently, a new stage of logistics is developing, which manifests itself through the socialization and intellectualization of logistics activities, that involves a continuous process of knowledge obtaining, its increasing, transforming and processing to find an effective solution in the system managing at a given time. Therefore, the further development of urban transport should be based on the use of computer technology, and namely intelligent transport systems. It is expedient for cities and other territorial-administrative units to develop their own approaches corresponding to their own unique characteristics in the development of information and transport systems.*

Keywords: *logistics, intellectualization, intelligent technologies, logistics processes, intelligent transport systems.*

Problem statement and its connection with important scientific and practical tasks. Modern challenges of economic development reveal the need for a technological reboot, which is impossible without the intellectualization of all processes. One of the systems with inertial development is the transport and logistics infrastructure. Today, when humanity lives and actively uses and develops technologies, it is impossible to imagine the transport sector without them. For almost a century, advanced traffic flow control technologies have been used. Technologies are also actively used by vehicle manufacturers for their modernization and improvement. More and more technologies are being applied to large transportation systems within urban logistics systems. The intensity of development of the transport and logistics infrastructure requires the development of methodological approaches to match the model of optimal functioning.

One of the key trends in the development of a modern transport and logistics system is the complexity of objects that form and support the movement of material flows. With the human involvement into the functioning of the transport and logistics system, it is necessary to move from the organization of material, financial, information and service flows and their management to the level of intellectualization of modeling, that allows to use knowledge in the process of effective management decisions developing. When this happens the systematization and formation of these functional processes occurs. In this regard, there was a need for a reliable methodology for the economic support of logistics operations, technologies, processes, structures, management systems, as well as methods of economic analysis and a system of indicators that make it possible to assess and calculate realistically the efficiency of the transport and logistics system (Bazhan, L. I., 2016).

The organization of transport and logistics activities is a topical issue for every enterprise, company, organization. The main task of the transport and logistics system is to supply

production with the necessary resources, as well as to sell products to the end consumer. Organization and control of transport and logistics processes system allows the enterprise to: ensure a high level of liquidity and profitability; maintain the required rate of raw materials supply to production facilities; promote the raw materials processing and the products sale. To achieve these goals, today there are a number of technologies used in the freight transport sector. A variety of such technologies in the scientific literature is covered by the definition of "intelligent transport systems" (ITS). Intelligent transport technologies can help to make the transport system more efficient, safer, more reliable, and reduce its negative impact on the environment.

From the beginning of the 21st century till the present day, the use of ITS to improve transport systems has passed a significant stage of development. In particular, this is very clearly demonstrated by the technologies that function through mobile phones, or GPS devices. They are used for cars, pedestrians, athletes, etc. Mobile phones are still indispensable assistants in transport and logistics systems around the world. Smart cards are a prime example of facilitating the use of transport systems in cities and simplifying of payment mechanisms for car and bicycle rental schemes in developed cities (Sayeg P. & Charles P., 2009).

Analysis of recent publications on the problem. Today, the strengthening of globalization processes in the world economy, the spread of new technologies are closely related to the commercial use of intellectual property - the growth of licensed trade, engineering, patent agreements, technologies provision, etc. The logistical problems of goods distribution and people movement, the development of the transport infrastructure of the city has been worrying mankind since ancient times. After the entrepreneurs launched inter-regional trade, people began to be interested in the issues of commodity logistics.

The logistics system of the city is a part of the urban infrastructure, characterized by significant dynamics and a single chain of its participants, which is based on the unity of transport and passenger flow management (Osipova T. A. & Kuznetsova A. A., 2021). Transport and logistics system of any city which was historically formed is now becoming one of the main problems hindering the development and circulation of economic resources, that is expressed in the growth of citizens' personal consumer spending, as well as in economic losses of enterprises and budgets of different levels. At the same time, the country's economic losses from inefficient transport and logistics activities of the city system can reach 3.2% of GDP or more (Savin G., 2020).

The scientific literature widely represents the fundamental and applied foundations of transport and logistics systems, systematizes the types of material, financial, information and service flows, identifies the key goals for the creation and functioning of logistics systems, and investigates their structural elements. In particular, these trends can be traced in the works of Bazhan L. (Bazhan, L. I. 2016), Singh S. and Chan I. (Singh S & Chana I. 2016), Mneimne F. et al. (Mneimneh F. et.al., 2017).

The formation of new digital technologies and intelligent systems allows for transformational processes aimed at the intellectualization of transport and logistics systems. The need to develop a methodology for the formation and management of a modern transport and logistics system using the principles of intellectualization is due to social and scientific views on comfortable human development, that is associated with new trends in the development of technologies and society, as well as with the need of economies transition to a new technological order with the priority of the logistics approach, taking into account current and prospective external and internal factors (Grigorak M. Yu., 2017). Legesy S. (Legacy C., 2017), Merineji S. et al. (Marinagi C., Trivellas P. & Sakas D. P., 2014) studied the impact of information technology on creating of competitive advantages throughout the supply chain. Baye H. (Baye, H.S., 2016) confirmed the moderating effect of logistics information systems on interorganizational collaboration and productivity. Volodkina A. with co-authors (Volodkina, A., et.al., 2022) and Fedonenko M. (Fedonenko, M.V. 2019) studied the organization of urban traffic, taking into account the tasks of intellectualization of transport infrastructure based on the symbiosis of participants within the projected multi-agent system.

Grigorak M. (Grigorak M. Yu., 2017) notes that the concept of "intellectual logistics is to consider logistics as a synthetic management tool, integrated with an end-to-end logistics flow, aimed at optimizing of flow processes which are organized in the form of logistics systems, logistics chains or logistics networks, to achieve the tasks in hand and mutual value creating for all parties involved." The key feature in this concept is the integration of individual links by the effective use of information exchange by interacting subjects of economic relations. It is the creation of new knowledge that is the main asset of any subject of economic relations, and their active implementation is the main aspect of intellectualization.

Allocation of previously unsolved parts of the general problem. The development of an efficient transport and logistics system of the city is significantly influenced by negative external effects caused by the fact of active "consumption" of the city territory, industrial enterprises and the population, including the aggravation of environmental problems, their congestion with the transport network and the growth of intracity, transport and logistics costs. And all these aspects must be taken into account when developing models for optimizing the transport and logistics systems of cities (Savin G. 2020, Mneimneh F., Srour I., Kaysi I., Harb M., 2017, Grigorak M. Yu. 2017, Fedonenko, M.V. 2019, Næss, P., Saglie, I.-L., Richardson T., 2020, Sultana S., Salon D., Kuby M. 2019).

Classical models for optimizing of the logistics systems functioning do not reflect the costs and losses of a human, in essence, separately considering the process of functioning of logistics systems, supply chains, excluding it from consideration. By introducing a person into the context of considering the functioning of logistics systems, from the issues of flows organizing and their managing, we rise to the level of intellectual activity in the search for effective management models. Known flows in logistics are complemented by intelligent flows, i.e. the level of awareness of logistics production processes is assessed from the standpoint of intelligent processing, that is primarily related to management and decision-making in intelligent logistics. And all these aspects must be taken into account when developing models for optimizing the transport and logistics systems of the cities.

Therefore, taking into account the existing achievements and taking into account the significant contribution of scientists to the development of the main provisions of transport

logistics, additional research requires a theory and methodology for the formation and functioning of intelligent flows in the transport and logistics system and their use in the process of its managing.

Formulation of research objectives (problem statement). The aim of the work is to study the theoretical and methodological foundations to implement the intellectualization concept for the management of urban transport and logistics systems in terms of adaptability.

Materials and methods. The main general scientific methods used at the theoretical level of research can include the following methods: analysis and synthesis, induction and deduction, ascent from the abstract to the concrete, idealization and formalization, axiomatic method, systematic approach.

Analysis is a method of scientific research by decomposing a subject on the component, while the synthesis is a combination of those obtained during the analysis parts to the whole. Methods of analysis and synthesis in scientific creativity are organic are interconnected and can take different forms depending on properties of the object under study, the purpose of the study, the degree of knowledge object, the depth of penetration into its essence.

The method of going from the abstract to the concrete is general the form of the movement of scientific knowledge is a reflection of reality in thinking. According to this method, the process of cognition seems to be divided into two relatively independent stages: the first stage – from sensory-specific to his abstract definitions; the second stage is the descent from the abstract definitions of the object to the concrete in cognition.

A mental construction in which a conclusion about some element of the set is made on the basis of knowledge general properties of the whole set. The content of deduction as a method knowledge is the use of general scientific provisions in research specific phenomena.

Induction means the transition from the partial to the general when a conclusion is made on the basis of knowledge about part of the class subjects in relation to the class as a whole. Deduction and induction are mutually opposite methods of cognition.

The method of idealization is the mental construction of objects that do not exist in realities or which are practically impossible. The purpose of idealization: to deprive real objects of some of their inherent properties and endow (mentally) these objects with certain unreal and hypothetical properties (S.Vazhynskyi, T. Shcherbak., 2016,

Yatskevich, I.V., Maslii, N.D., 2021).

An outline of the main results and their justification. The peculiarity of transport and logistics systems is determined by a number of factors which depend on the chosen strategy for the development of the country's administrative and territorial units and growth key driver. The effectiveness of the models of the transport and logistics infrastructure development of different countries is confirmed by their positions in the logistics performance rating (LPI – LogisticsPerformanceIndex), that is a system of indicators and allows to compare countries according to six parameters and a general index. LPI is calculated as the weighted average value of the country according to the following key parameters (World Bank Group. 2007, 2010, 2012, 2014, 2016, 2018):

- 1) efficiency of the registration process (i.e. speed, simplicity and predictability of formalities) by the border control authorities, including customs;
- 2) quality of trade and transport infrastructure (for example, ports, railways, roads, information technologies);
- 3) simplicity of organization of delivery at competitive prices;
- 4) competence and quality of logistics services (for example, transport operators, customs brokers);
- 5) the ability to track cargo;
- 6) timeliness of goods shipment to the destination within the planned or expected delivery time.

The list of countries with the highest evaluation of logistics efficiency and Ukraine during 2012, 2014, 2016 and 2018 is presented in Table 1.

According to the results of the rating, the top ten countries with the most efficient transport and logistics system include the vast majority of European countries, Ukraine takes only the 66th place out of 160. The strong position of European countries in the rating is due to the efficient operation of their transport system and focus on the use of achievements in the field of intellectual technologies. The weak position of Ukraine in the field of logistics development is due to the insufficient use of adaptive information and communication technologies in the organization of complex supply chains by subjects of transport and logistics infrastructure. Therefore, one of the important directions for the economic development of the country as a whole is adherence to the trends of intellectualization of the transport and logistics system of the cities, which is understood as a continuous process of information obtaining,

its increase, transformation and processing in order to find the optimal solution in the management of transport and logistics systems at a given time.

The origin of intelligent transportation systems dates back to the 1960s when the Electronic Route Navigation System was developed in the USA. However, the World Congress in Paris in 1994 accelerated the development and deployment of intelligent transportation systems to improve traffic

management systems around the world. Since then, numerous ITS programs have been developed by various organizations around the world and customized to suit specific needs. It has become a global phenomenon that has captured the attention of the automotive industry and transportation professionals as well as political decision makers (Gritsenko, S.I., Vinichenko, I. A. 2020).

Table 1

List of countries with high evaluation of logistics efficiency and Ukraine, rating

Country	LPI				Custom				Infra-structure				International transportation				Quality and competence of logistics				Tracking and tracing				Timeliness			
	2012	2014	2016	2018	2012	2014	2016	2018	2012	2014	2016	2018	2012	2014	2016	2018	2012	2014	2016	2018	2012	2014	2016	2018	2012	2014	2016	2018
Germany	4,03	4,12	4,23	4,20	3,87	4,10	4,12	4,09	4,26	4,32	4,44	4,37	3,67	3,74	3,86	3,86	4,09	4,12	4,28	4,31	4,05	4,17	4,27	4,24	4,32	4,36	4,45	4,39
Sweden	3,85	3,96	4,20	4,05	3,68	3,75	3,92	4,05	4,13	4,09	4,27	4,24	3,39	3,76	4,00	3,92	3,90	3,98	4,25	3,98	3,82	3,98	4,38	3,88	4,26	4,26	4,45	4,28
Belgium	3,98	4,04	4,11	4,04	3,85	3,80	3,83	3,66	4,12	4,10	4,05	3,98	3,73	3,80	4,05	3,99	3,98	4,11	4,07	4,13	4,05	4,11	4,22	4,05	4,20	4,39	4,43	4,41
Austria	3,89	3,65	4,10	4,03	3,77	3,53	3,79	3,71	4,05	3,64	4,08	4,18	3,71	3,26	3,85	3,88	4,10	3,56	4,18	4,08	3,97	3,93	4,36	4,09	3,79	4,04	4,37	4,25
Japan	3,93	3,91	3,97	4,03	3,72	3,78	3,85	3,99	4,11	4,16	4,10	4,25	3,61	3,52	3,69	3,59	3,97	3,93	3,99	4,09	4,03	3,95	4,03	4,05	4,21	4,24	4,21	4,25
Netherlands	4,02	4,05	4,19	4,02	3,85	3,96	4,12	3,92	4,15	4,23	4,29	4,21	3,86	3,64	3,94	3,68	4,05	4,13	4,22	4,09	4,12	4,07	4,17	4,02	4,15	4,34	4,41	4,25
Singapore	4,13	4,00	4,14	4,00	4,10	4,01	4,18	3,89	4,15	4,28	4,20	4,06	3,99	3,70	3,96	3,58	4,07	3,97	4,09	4,10	4,07	3,90	4,05	4,08	4,39	4,25	4,40	4,32
Denmark	4,02	3,78	3,82	3,99	3,93	3,79	3,82	3,92	4,07	3,82	3,75	3,96	3,70	3,65	3,66	3,53	4,14	3,74	4,01	4,01	4,10	3,36	3,74	4,18	4,21	4,39	3,92	4,41
Great Britain	3,90	4,01	4,07	3,99	3,73	3,94	3,98	3,77	3,95	4,16	4,21	4,03	3,63	3,63	3,77	3,67	3,93	4,03	4,05	4,05	4,00	4,08	4,13	4,11	4,19	4,33	4,33	4,33
Ukraine	2,85	2,98	2,74	2,83	2,41	2,69	2,30	2,49	2,69	2,65	2,49	2,22	2,72	2,95	2,59	2,83	2,85	2,84	2,55	2,84	3,15	3,20	2,96	3,11	3,31	3,51	3,51	3,42

Source: formed by the author based upon data of World Bank Group, 2007, 2010, 2012, 2014, 2016, 2018

ITS includes developments in information technology, computing and telecommunications, together with knowledge in the transport sector. It can be said that intelligent transport systems are the combination and application of computer, information and communication technologies to control vehicles and transport networks in real time (Sayeg P., Charles P. 2009). Given that the structure of information and telecommunication

technologies foresees the directions of development, planning and their use. In general, the national logistics structure defines the types of activities and functions which are necessary for the provision of ITS user services organized as nine directions of functional processes (Figure 1). They cover all functional elements (Sayeg P., Charles P. 2009): traffic management, commercial vehicle management, their monitoring and control, transit

traffic management, emergency management, driver and travel services, electronic payment services, data archiving, and maintenance and construction management.

The latest technologies in the field of communication play a significant role in stimulating of the development in the application of ITS. They cover the areas of the communications, multimedia, Internet, wireless communications, director and sensor systems, vehicle tracking systems, ways of communications with the vehicle and infrastructure, etc. These technologies contribute to the collection and dissemination of information in real time. According to research results (Gritsenko, S.I.,

Vinichenko, I. A. 2020), the global market of intelligent transport systems by 2026 may reach about \$78 billion USD, and in the forecast period from 2019 to 2026 it will grow at an average annual growth rate of about 12%.

In general, until today, among ITS technologies, the autonomous systems developed by various organizations are mainly used. And this is the reason that they are not integrated into a single system and do not interact with each other, and this reduces their effectiveness. This is often due to the fact that ITS systems have been associated with large infrastructure projects and there is no strategic framework for planning and using ITS (Sayeg P., Charles P. 2009).

Intelligent transport systems	
Functional elements	Objects
Ensuring of control and monitoring for vehicles	Vehicle monitoring status; automatic control of the vehicle; automatic danger notification
Urban transportation management	Urban vehicles; services of making plan and schedule for urban transportation; urban vehicles maintenance; safety and coordination of urban transportation; toll collection; work schedules of urban vehicles operators; road facilities nearby for travelers
Services management in emergency situations	Emergency service location; vehicles for emergency situations; law enforcement structures location; disaster response and evacuation
Providing of services to drivers and travelers	Travel planning services; data about the services of the Internet service provider; services for travelers by kiosks; joint trips; information services for travelers; routing and route determination services; personal driver services; personal traveler service
Archived data management	
Provision of electronic payment services	Card interfaces for travel; centralized payment processing; electronic payment collection; electronic payment for parking; electronic payment
Provision of electronic payment services	Vehicles with microcomputers; activities on the road with microcomputers; working areas; information about the environment
Traffic control	Intersections of highways with railway tracks; emissions; travel demand; emergency situations; traffic control; device control
Management of vehicles for cargo and commercial transportation	Cargo data available on board; administration; data collection; motorway facilities; driver; transport fleet

Fig. 1. Functional components and objects of intelligent transport systems

Source: formed on the basis of data Sayeg P., Charles P. 2009

Thus, systematizing the conducted studies, it is advisable to build a theoretical and applied model for the development of urban transport and logistics systems in the conditions of adaptability

inherent in modern times (Fig. 2). This model is based on the modern empirical theoretical basis for the development of urban transport and logistics systems, which are influenced by the processes of

globalization, socialization and intellectualization involving the use of computer, information and communication technologies when controlling vehicles and transport networks in real time.

Usually within the same country, it is can be identified the significant differences in transport logistics and ITS application, as small cities have different characteristics and needs in comparison with large cities. However, now in the management of the transport system, which activities manifest the processes of socialization and intellectualization, the following key aspects of influence can be identified:

- increasing of intellectual resources role in the creation of a competitive development strategy of the company, city, region and country as a whole;
- change of the vector for labor products from material to intellectual;
- increasing of the level of education, spirituality and enterprises social orientation.

In order to apply ITS applications effectively,

above all it is necessary to develop a strategic plan and implementation programs. Their implementation will provide significant benefits and the highest efficiency of ITS when solving the transport needs of any city. This is very important because often ITS equipment is used in the most simple way, such as collecting information without its proper processing and use. The new systems are not well integrated into the previous transport and logistics systems. Often ITS are not compatible with each other. Accordingly, uniform specification standards are needed to encourage wider use of ITS. National strategies and standards for the development of ITS are still actively developing today, but even in those developed countries where significant progress has already been made at the national level, standards and protocols of the city level are just beginning to appear.

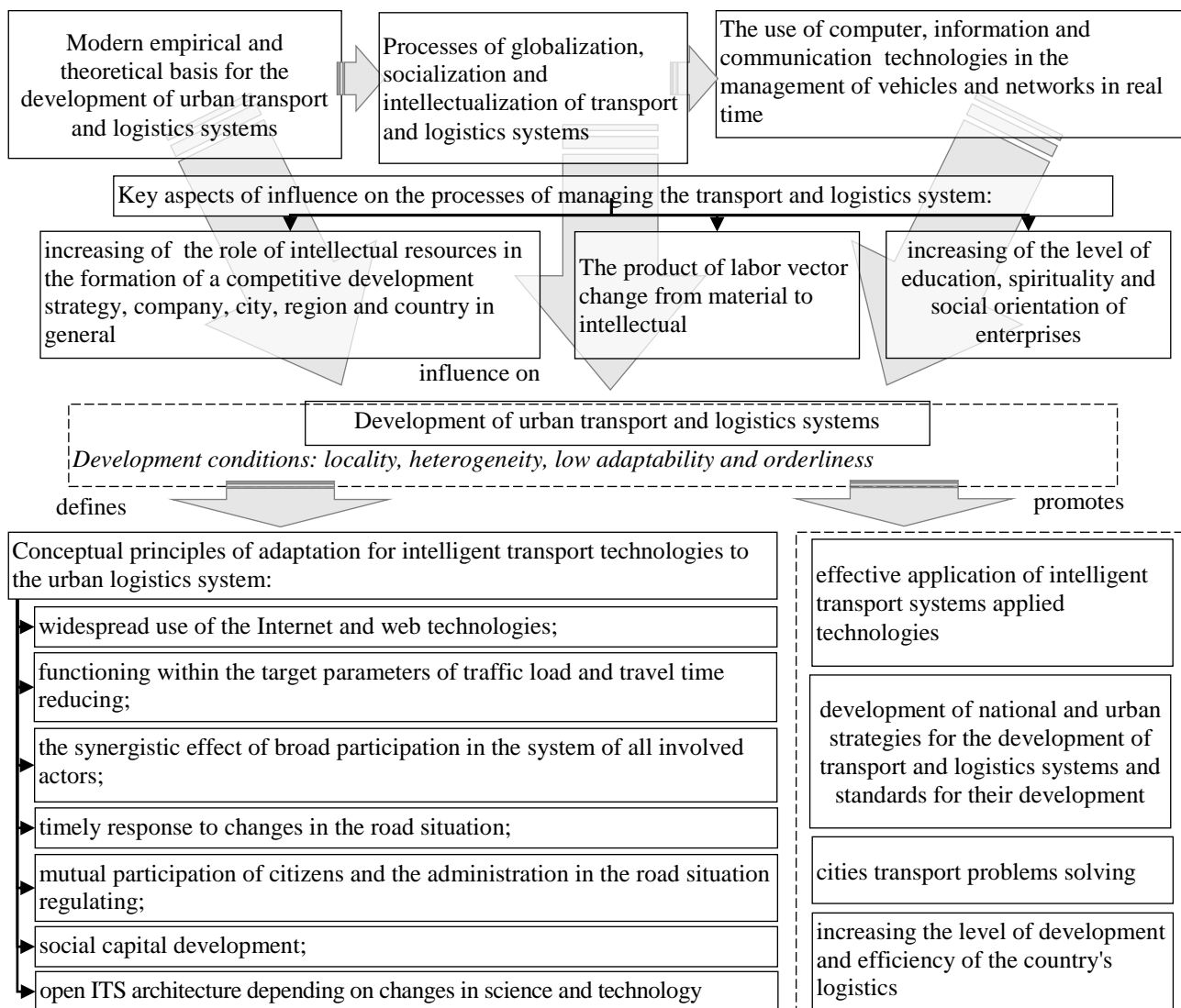


Fig. 2. Theoretical and applied model of urban transport and logistics systems development in conditions of adaptability
Source: constructed by the authors

Summarizing, it should be noted that the adaptation of intelligent transport technologies to the urban logistics system is based on such basic conceptual foundations as: widespread use of the Internet and web technologies; functioning within the target parameters for reducing transport loading and travel time; synergistic effect from wide participation in the system of all involved actors; timely response to traffic conditions changing; mutual participation of citizens and administration in the regulation of the traffic situation; development of social capital; open architecture of ITS depending on changes in science and technology. The applied information technologies in the field of logistics in Ukraine are at the stage of transformation, transition to international standards and norms for the formation of transport and logistics databases and communication systems and are characterized by locality, heterogeneity, low adaptability and orderliness level.

Conclusions and perspectives of further research. Summing up, it should be noted that the rapid development of modern cities, the vehicles quantity increase in the streets, the development of new routes increases the amount of information needed for analysis and prompt decision-making.

This, in turn, gives an impetus to the active introduction of intelligent information technologies.

And today the information component has become an integral part of the urban life. Today we can say that a new stage in the development of logistics has begun. This stage is manifested by the socialization and intellectualization of logistics activities, that provides a continuous process of knowledge obtaining, its increasing, transforming and processing to find an effective solution in managing of the system for the time being. These processes are characterized by the following key aspects: increasing of intellectual resources role in creation of a competitive development strategy for a company, city, region and country as a whole; change in the vector for labor products from material to intellectual; increasing of the level of education, spirituality and enterprises social orientation. Therefore, the further development of urban transport should be based on the use of computer technology, namely intelligent transport systems. It is advisable for cities and other territorial-administrative units to develop their own approaches that meet their own unique characteristics during the development of information and transport systems.

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НАДІЙНІСТЬ ТРАСПОРТУВАННЯ ВАНТАЖІВ ЯК ОСНОВНА ЦІЛЬОВА ФУНКЦІЯ ПЕРЕВЕЗЕНЬ ВАНТАЖІВ ВОДНИМ ТРАНСПОРТОМ ЗА УМОВ ВІЙСЬКОВИХ РИЗИКІВ.

Актуальність. Традиційно маршрути вибирали за принципом найкоротшого логістичного плеча. Але в умовах війни вплив військових ризиків та динамічний характер їх зміни стає значно більшими за сукупний вплив інших ризиків. Це обумовлює необхідність використання надійності як основної цільової функції перевезення кардинальної зміни підходів до раціонального вибору найбільш доцільного з варіантів перевезення і, у випадку зростання загрози, швидкої зміни наступних етапів маршруту транспортування вантажів навіть, якщо попередні етапи маршруту перевезення вже виконанні.

Мета та завдання. Метою роботи є розробка математична модель оцінювання надійності перевезень водним транспортом за військових загроз та розробки алгоритму системи підтримки прийняття рішень щодо нейтралізації впливу загроз транспортуванню. Досягнення мети дослідження зумовило необхідність постановки і вирішення наступних завдань: провести математичну формалізацію задачі та виділити параметри впливу на інтегральну функцію надійності; проаналізувати параметри впливу та визначити найбільш значимий з них; розробити алгоритм системи підтримки прийняття рішень щодо нейтралізації впливу загроз транспортуванню; визначити дієві шляхи нейтралізації загроз.

Матеріали та методи. В роботі застосовувалися різні методи: контент-аналізу для встановлення, що цільова функція надійності може розраховуватися за різними ознаками; порівняльного аналізу для виявлення таких ознак; математичної формалізації для формування моделі оцінювання надійності перевезень та розробки алгоритму системи підтримки прийняття рішень щодо нейтралізації впливу загроз транспортуванню; крутого сходження для вибору найбільш доцільного з варіантів перевезення і, у випадку зростання загрози, альтернативного варіанту маршруту.

Результати. Розроблена математична модель оцінювання надійності перевезень водним транспортом за військових загроз та сформований алгоритм системи підтримки прийняття рішень щодо нейтралізації впливу загроз транспортуванню вантажів. Для цього вирішенні наступні завдання: проведено математичну формалізацію задачі та виділено параметри впливу на функцію надійності; проаналізовано параметри впливу та визначено найбільш значимий з них; розроблено алгоритм системи підтримки прийняття рішень щодо нейтралізації впливу загроз транспортуванню; визначені шляхи нейтралізації загроз.

Висновки. Вказано, що ризики, пов'язані з агресією РФ мають поглинаючий характер щодо всіх інших ризиків. Встановлено, що за динамічної зміни ризиків перевезення вантажів в умовах війни постає задача не тільки виявлення величини ризику але і його темпу зміни, тому, що виявлення темпу зміни ризику дає можливість його прогнозу. Встановлено, що за військових дій функція надійності стає основною цільовою функцією управління перевезеннями вантажів водним транспортом. Встановлено, що в час, який передував широкомасштабним бойовим дій основним ризиком є час примусової затримки суден, тому інтегральна функція надійності транспортування вантажів водним транспортом є обернено пропорційна часу затримки суден. За використання розробленої моделі встановлена величина функції надійності і її зміни в січні 2022-ого року.

Ключові слова: водний транспорт, цільова функція надійності, математична модель, алгоритм, нейтралізація загроз.

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RELIABILITY OF CARGO TRANSPORTATION AS THE MAIN OBJECTIVE FUNCTION OF CARGO TRANSPORTATION BY WATER TRANSPORT UNDER THE CONDITIONS OF MILITARY RISKS

Topicality. Traditionally, routes were chosen based on the principle of the shortest logistical arm. But in the conditions of war, the impact of military risks and the dynamic nature of their change becomes much greater than the combined impact of other risks. This necessitates the use of reliability as the main objective function of transportation, a radical change in approaches to the rational selection of the most appropriate transportation options, and, in the event of a growing threat, the rapid change of the next stages of the cargo transportation route, even if the previous stages of the transportation route have already been completed.

Aim and tasks. The aim of the work is the development of mathematical model for assessing the reliability of water transportation under military threats and the development of an algorithm for a decision-making support system for neutralizing the impact of threats to transportation. Achieving the goal of the research made it necessary to set and solve the following tasks: carry out a mathematical formalization of the problem and identify parameters of influence on the integral function of reliability; analyze the impact parameters and determine the most significant of them; to develop an algorithm for a decision-making support system for neutralizing the impact of threats to transportation; to determine effective ways of neutralizing threats.

Materials and methods. Various methods were used in the work: content analysis to establish that the target reliability function can be calculated based on various features; comparative analysis to identify such features; mathematical formalization for the formation of a transportation reliability assessment model and the development of a decision-making support system algorithm for neutralizing the impact of threats to transportation; a steep ascent to choose the most expedient transportation options and, in the event of an increased threat, an alternative route option.

Research results. A mathematical model for assessing the reliability of water transportation under military threats was developed and an algorithm for the decision-making support system was formed to neutralize the impact of threats to cargo transportation. For this solution, the following tasks were performed: mathematical formalization of the problem was carried out and parameters of influence on the reliability function were selected; influence parameters were analyzed and the most significant of them was determined; the algorithm of the decision-making support system for neutralizing the impact of threats to transportation was developed; defined ways of neutralizing threats.

Conclusion. It is indicated that the risks associated with the aggression of the Russian Federation are absorbing in relation to all other risks. It has been established that due to the dynamic changes in the risks of cargo transportation in the conditions of war, the task arises not only of identifying the magnitude of the risk, but also its rate of change, because identifying the rate of risks change makes it possible to forecast it. It was established that during military operations, the function of reliability becomes the main target function of managing the transportation of goods by water transport. It was established that in the time preceding large-scale hostilities, the main risk is the time of forced delay of ships, therefore the reliability water transportation integral function of goods is inversely proportional to the time of ships delay. Using the developed model, the value of the reliability function and its changes in January 2022 were determined.

Keywords: water transport, reliability objective function, mathematical model, algorithm, threat neutralization.

Problem statement and its connection with important scientific and practical tasks. During large-scale military operations, the risks for the transportation of goods by water transport increase significantly. Carriers and logistics companies, with relatively small levels of military threat,

preferred routes that corresponded to the principle of a shorter logistics arm. Thus, in the majority of cases, these routes corresponded to two target functions of transportation: lower transportation costs and shorter transportation time. But in the conditions of war, the impact of military risks and

the dynamic nature of their change becomes much greater than the cumulative impact and changes over time of all other risks. That is why in the article Bazaluk et al (2020) the nature of such influence is called «absorbing». This necessitates a radical change in approaches to the rational selection task of the most expedient transportation options and, in the event of a growing threat, a rapid change of the next stages of the cargo transportation route, even if the previous stages of the transportation route have already been completed.

Analysis of recent publications on the problem. A significant scientific contribution to the risks assessment of transporting goods by water transport was made by domestic scientists O.M. Kibik, T. A. Vorkut, O. Ye. Bilonoh, Yu.F. Kulaiev, N.H. Metelenko, A.P. Petrov, V.O. Rybalkin, Yu.M. Tsvietov, V.H. Chekalovets, I. O. Tkachenko etc. Foreign scientists: T.G. Fowler, E. Sørård, S. Kristiansen, F. Kaneko have done significant work on this problem. A detailed review of scientific works on this topic is provided F. Goerlandt, J. Montewka (Goerlandt et al (2015)).

Optimizations problems of transportation by water transport of Ukraine and specifics the target functions formation are devoted, in particular, to the works of such scientists as S. V. Ilchenko (Ilchenko a et al (2017)), L.V. Miezhina (Ilchenko b et al (2018)), Y. V. Zahorodnia, S. V. Maksymov (Zahorodnia & Maksymov (2021)), O. O. Karpenko (Karpenko et al (2018)), V. P. Vlasova (Vlasova et al (2020)) etc.

In recent years, works have been devoted to the issue of taking into account the significant impact treats level on cargo transportation L. Veselovská (Veselovská (2020)), T. Charonnapharat, P. Chaopaisarn (Charoennapharat & Chaopaisarn (2022)) and, in particular, military threats - M. Tarashevskiy (Tarashevskiy (2020)), S. Kotenko (Kotenko et al (2022)).

Allocation of previously unsolved parts of the general problem. Despite a significant number of scientific works on the analysis and forecasting of the transportation risks of goods by water transport and the optimization of target functions, the problem of the goods transportation by water transport, with the allocation of reliability as the main function under the conditions of military risks and the use of other target functions as functions of the second, secondary order, a reliable solution is not found.

Formulation of research objectives (problem statement). The purpose of the work is the development of a mathematical model for assessing

the reliability of water transportation under military threats and the development of an algorithm for a decision-making support system for neutralizing the impact of threats to transportation.

Achieving the goal of the research made it necessary to set and solve the following tasks:

- carry out a mathematical formalization of the problem and identify parameters of influence on the integral function of reliability;
- analyze the impact parameters and determine the most significant of them;
- to develop an algorithm for a decision-making support system for neutralizing the impact of threats to transportation;
- to determine effective ways of neutralizing threats.

Materials and methods. The application of the content analysis method to scientific sources made it possible to establish that the objective function of reliability can be calculated according to various features. Using the method of comparative analysis allows you to identify a set of such features. Reliability is mostly inversely proportional to the risks of transportation, which can be measured by various parameters: the preservation of the cargo, its integrity, the time of unplanned delays, etc.

Application of the method of mathematical formalization allows presenting it as follows:

$$d\vec{Y}/dt = \frac{d\vec{y}_1}{dt} + \frac{d\vec{y}_2}{dt} + \frac{d\vec{y}_3}{dt} + \dots; \quad (1)$$

where \vec{Y} – the vector of the integral reliability function; $\vec{y}_1, \vec{y}_2, \vec{y}_3, \dots, \vec{y}_i$ – its components according to various characteristics, t – time.

Condition (2) establishes the significance of the component by sign:

$$\frac{d\vec{y}_i}{dt} = \{0, \delta t_{\text{впл}} \gg T \text{ or } \vec{y} \leq \vec{y}_{\min}\} \quad (2)$$

where $\delta t_{\text{впл}}$ – the upper time interval of the component influence \vec{y}_i ; T – time interval selected for analysis, \vec{y}_{\min} – the minimum value of the component for the need to take into account its influence on the integral function.

The conducted analysis was based on the time interval that preceded large-scale military operations on the territory of Ukraine: 2018-2021 and January 2022. The conducted analysis established that there was no sinking of merchant ships at that time, no damage to cargo as a result of military operations either. Therefore, the delay of ships by the aggressor, unauthorized under international law, was considered as the main risk factor for the reliability of cargo transportation by sea.

The significant component of the integral reliability function in the general case depends on the group of factors:

$$\vec{y}_i = f(x_1, x_2, x_3, \dots, x_n) \quad (3)$$

where $x_1, x_2, x_3, \dots, x_n$ – influencing factors on \vec{y}_i .

In order to predict the dynamics of the reliability function, it is necessary to have data on the change in the factors affecting it over time:

$$\frac{d\vec{y}_i}{dt} = f\left(\frac{dx_1}{dt}, \frac{dx_2}{dt}, \frac{dx_3}{dt}, \dots, \frac{dx_n}{dt}\right) \quad (4)$$

If the specified group of factors is not detected, \vec{y}_i analyzed by the risk factor, which must be represented by real numbers. Since the main risk is determined by the time of forced extralegal delay of vessels, the risk is a function depending on this parameter. Thus, the integral reliability function is inversely proportional to the vessel delay time parameter.

If it is necessary to take into account other target functions as functions of the second, secondary order, we use the following mathematical model:

$$opt_{\vec{\varphi}}[\varphi_1(\vec{\vartheta}_1), \varphi_2(\vec{\vartheta}_2), \varphi_3(\vec{\vartheta}_3), \dots, \varphi_n(\vec{\vartheta}_n)] \quad (5)$$

$$\vec{\vartheta}_1, \vec{\vartheta}_2, \vec{\vartheta}_3, \dots, \vec{\vartheta}_n \in \vec{\Omega} \quad (6)$$

$$(\varphi_1, \varphi_2, \varphi_3, \dots, \varphi_n) \in \vec{\varphi} \quad (7)$$

$$(\vec{\vartheta}_1, \vec{\vartheta}_2, \vec{\vartheta}_3, \dots, \vec{\vartheta}_n) \exists (\vec{a}_1, \vec{a}_2, \vec{a}_3, \dots, \vec{a}_n) \quad (8)$$

where $\varphi_1, \varphi_2, \varphi_3, \dots, \varphi_n$ – reliability objective function and second-order objective functions; $\vec{\varphi}$ – the resulting vector of target functions; $\vec{\Omega}$ – vector of parameters; $\vec{w}_1, \vec{w}_2, \vec{w}_3, \dots, \vec{w}_n$ – parameter vectors for each of the objective functions; $\vec{a}_1, \vec{a}_2, \vec{a}_3, \dots, \vec{a}_n$ – constraint vectors for objective functions.

At the next stage of implementation of the proposed algorithm, the rational choice of the most expedient transportation options and, in the event of a growing threat, the rapid change of the next stages of the cargo transportation route is performed using the standard method of steep ascent of the response surface in the space of defined target functions, their parameters and time.

The most expedient of the transportation options and, in the event of an increase in the threat, the alternative option of the following stages of the cargo transportation route is performed using the standard method of steep ascent of the response surface in the space of defined target functions, their parameters and time.

An outline of the main results and their justification. The risk impact delay of cargo ships on the integral reliability function is manifested, in particular, in the fact that it significantly affects trade relations with partner countries.

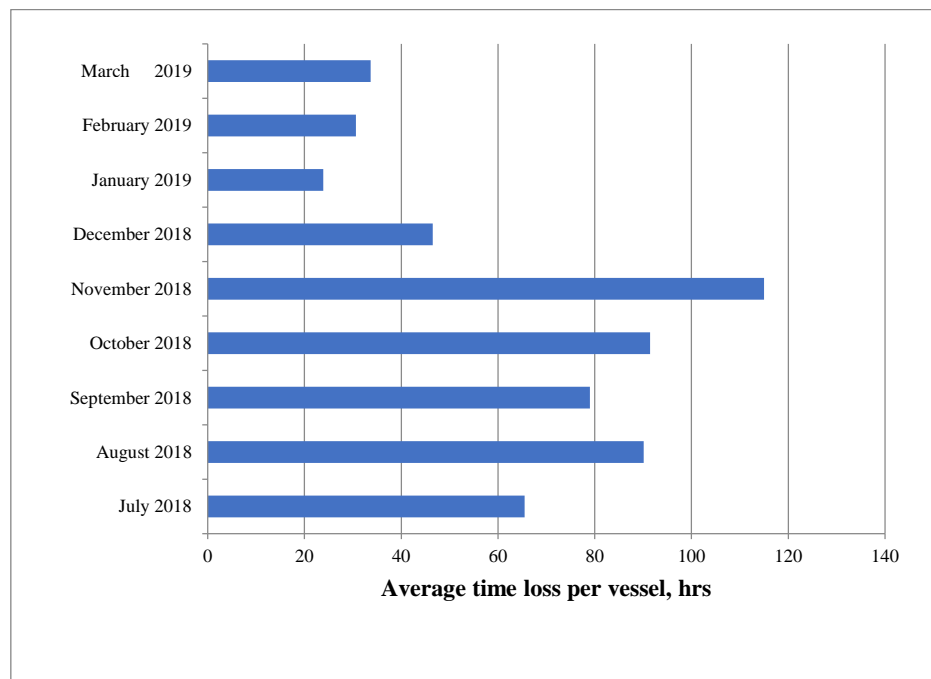


Fig. 1. Average monthly loss of time per vessel due to delays in the Sea of Azov, the Kerch-Yenikal Canal and the Kerch Strait.

Source: own development according to the data Black Sea news, (2021).

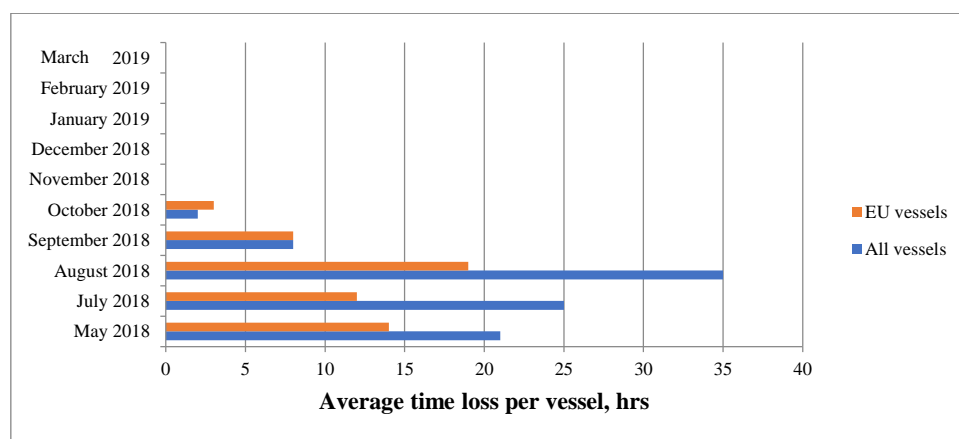


Fig. 2. Average monthly loss of time per vessel due to delays in the waters of the Sea of Azov.
Source: own development according to the data Black Sea news, (2021)

Table 1.

Delay of vessels leaving the Sea of Azov in the direction of the Black Sea (January 2022)

Name of the vessel	Arrival date/time	Date/time of dispatch	Duration. hrs	Flag	Country of owner
MARYLAND	31.12 23-00	02.01 10-0	35	Liberia	Estonia
GALISA	31.12 09-00	02.01 00-00	39	Vanuatu	Turkey
PRINCESS EMAN	31.12 21-00	02.01 11-00	38	Malta	Bulgaria
PHOENIX	01.01 15-00	02.01 10-00	19	Bulgaria	Bulgaria
SIMA	01.01 02-00	02.01 11-00	33	Sierra Leone	Turkey
SPARTA	03.01 07-00	04.01 11-00	28	Liberia	Malta
SANTANA	03.01 00-00	04.01 12-00	36	Liberia	Austria
METALLICA	04.01 10-00	10.01 12-00	146	Malta	Switzerland
GHADA A	04.01 13-00	09.01 14-00	121	Togo	Turkey
ALI A	07.01 01-00	20.01 08-00	319	Togo	Greece
STELLINA	07.01 09-00	10.01 18-00	81	Malta	Switzerland
CENGIZ AMCA	07.01 10-00	10.01 17-00	79	Liberia	Turkey
SELECTA	08.01 22-00	10.01 18-00	44	Liberia	Austria
QUEEN SARA	08.01 20-00	10.01 18-00	46	Sierra Leone	Turkey
AVERSA	09.01 03-00	10.01 19-00	40	Panama	Turkey
SPRING	09.01 16-00	16.01 19-00	171	Belize	Honduras
DAYTONA-H	09.01 07-00	10.01 18-00	35	Comoros	Lebanon
UTE	09.01 06-00	10.01 17-00	35	Antigua and Barbuda	Germany
KAREWOOD GLORY	11.01 02-00	17.01 08-00	150	Bahamas	Ukraine
VALMIERA	11.01 22-00	19.01 08-00	178	Comoros	Marshall Islands
SENATA	11.01 18-00	17.01 08-00	134	Liberia	Austria
MAORI	16.01 18-00	20.01 08-00	86	Malta	Ukraine
GOLDEN ARROW	17.01 20-00	20.01 16-00	68	Panama	Egypt
MEDUSA S	17.01 02-00	20.01 16-00	86	Togo	Turkey
ATA	17.01 05-00	20.01 17-00	84	Panama	Turkey
NEW WAY	17.01 07-00	21.01 17-00	106	Moldova	Ukraine
ASTOL	18.01 02-00	21.01 16-00	86	Comoros	Turkey
GOGLAND	19.01 12-00	20.01 16-00	28	Cyprus	Marshall Is.
VOLGO-BALT206	19.01 16-00	21.01 11-00	43	Sierra Leone	Turkey
AMIR BEY	20.01 10-00	22.01 08-00	46	Tanzania	Lebanon
PEACE	20.01 20-00	22.01 08-00	36	Bulgaria	Bulgaria
AKOMENA	20.01 12-00	21.01 10-00	22	Malta	Bulgaria
HERMES	21.01 18-00	22.01 16-00	22	Moldova	Ukraine
KALELI ANA	21.01 10-00	22.01 15-00	29	Comoros	Turkey
GUNCE AKAY	22.01 04-00	22.01 22-00	18	Panama	Turkey
TZAREVNA	23.01 02-00	25.01 12-00	58	Malta	Bulgaria
TZAREVICH	23.01 03-00	25.01 12-00	57	Malta	Bulgaria
FERAHNAZ	23.01 22-00	25.01 12-00	34	-	Turkey
FORTUNA	25.01 18-00	26.01 00-00	6	Barbados	Liberia
FIRAT	25.01 13-00	26.01 00-00	11	Comoros	Turkey
NIMET TORLAK	26.01 15-00	28.01 11-00	44	Liberia	Turkey
LILY-HA	26.01 01-00	31.01 21-00	124	Togo	Lebanon
SEA BREEZE	26.01 13-00	29.01 19-00	78	Togo	Lebanon

MEKHANIK YUZVOVICH	26.01 22-00	28.01 12-00	38	Palau	Ukraine
PHOENIX	26.01 12-00	26.01 16-00	4	Bulgaria	Bulgaria
ADASTAR	27.01 09-00	28.01 11-00	26	Liberia	Turkey
LUCKY	27.01 16-00	29.01 12-00	44	Liberia	Greece
STAR II	28.01 08-00	29.01 12-00	28	Malta	Turkey
GUNCE AKAY	28.01 08-00	29.01 12-00	28	Panama	Turkey
RHONE	28.01 11-00	29.01 13-00	26	Vanuatu	Turkey
MERRY M	28.01 05-00	29.01 12-00	31	Comoros	Turkey
MILLAC	29.01 01-00	31.01 20-00	67	Comoros	Lebanon
FEDERAL COLUMBIA	30.01 08-00	01.02 16-00	56	Marshall Is.	Canada
SARA S	30.01 19-00	01.02 17-00	46	Togo	Panama
FEDERAL LEDA	31.01 12-00	01.02 16-00	28	Marshall Is.	Canada
EGE BEY	31.01 03-00	01.02 16-00	37	Cook islands	Turkey
MARYLAND	31.01 21-00	01.02 16-00	19	Liberia	Estonia

Source: according to the data Black Sea news. (2022).

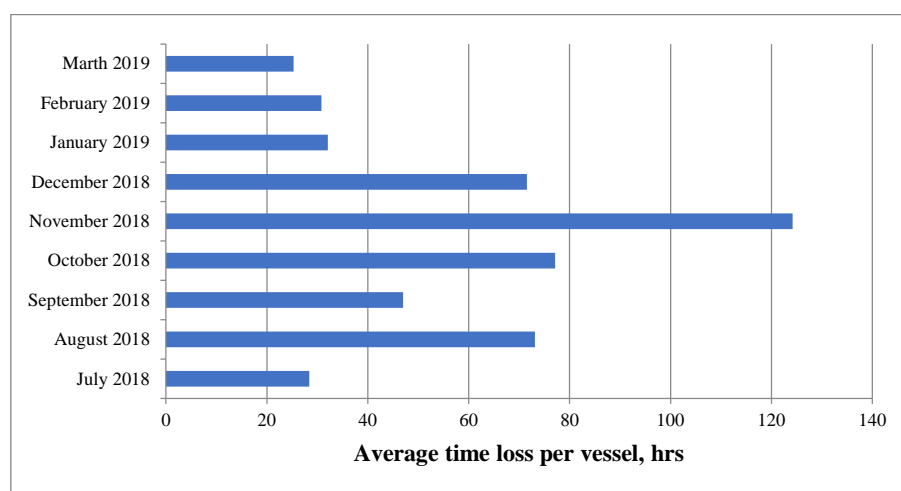


Fig. 3. Average monthly loss of time per vessel on the way to the ports of Mariupol and Berdyansk due to delays at the entrance to the Sea of Azov

Source: own development according to the data Black Sea news. (2021).

If in 2018 the average monthly delay time of ships of EU countries was 11.2 hours per ship, i.e. 58.3% of the average monthly delay time of ships of all countries, then in 2021 this time increased to 36.8 hours per ship.

The delay region is also important. As shown by the comparison of data Fig. 2 and Fig. 3 the delay time of vessels in the open sea is significantly less than the delay time on the way to the ports of Mariupol and Berdyansk for delays at the entrance to the Sea of Azov.

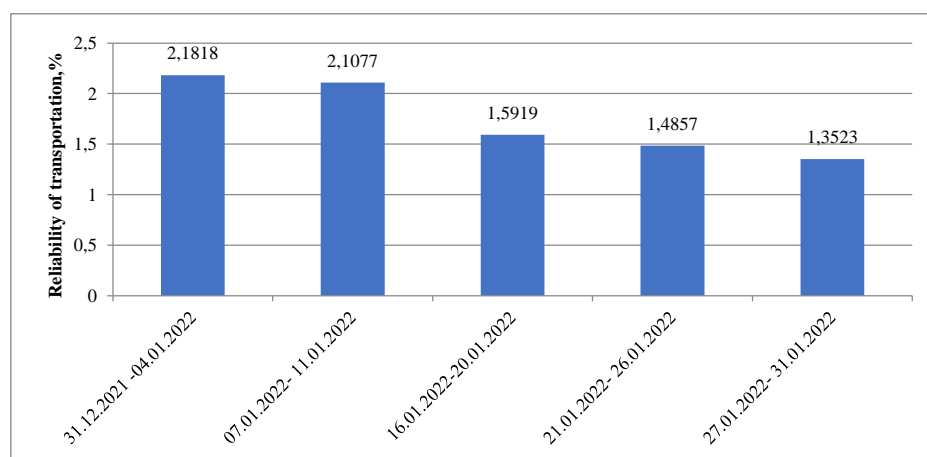


Fig. 4. Reliability of cargo transportation in the Sea of Azov, the Kerch-Yenikal Canal and the Kerch Strait.

Source: own development according to the data Black Sea news. (2022).

According to the Table. 1 calculations of the reliability of transportation and its changes in a short time were carried out using the data. Analysis of the results for a steady decrease in the reliability of cargo transportation before the time of large-scale hostilities (see Fig. 4).

Neutralize the risk of delay of merchant vessels of the Russian Navy is military countermeasures, in particular, as shown by the analysis of Fig. 2 and Fig. 3. the time of delay of ships in the open sea is the escort of merchant ships by ships of the Navy

of Ukraine and not the desire of the aggressor to raise the stakes of military confrontation at this time. Another effective way is to change transportation routes, including using other types of transport. For this purpose, it is necessary to develop different transportation options depending on the growth of the threat level.

The given analysis made it possible to form an algorithm of the decision support system for neutralizing the impact of threats to the transportation of goods by water transport (see Fig. 5).

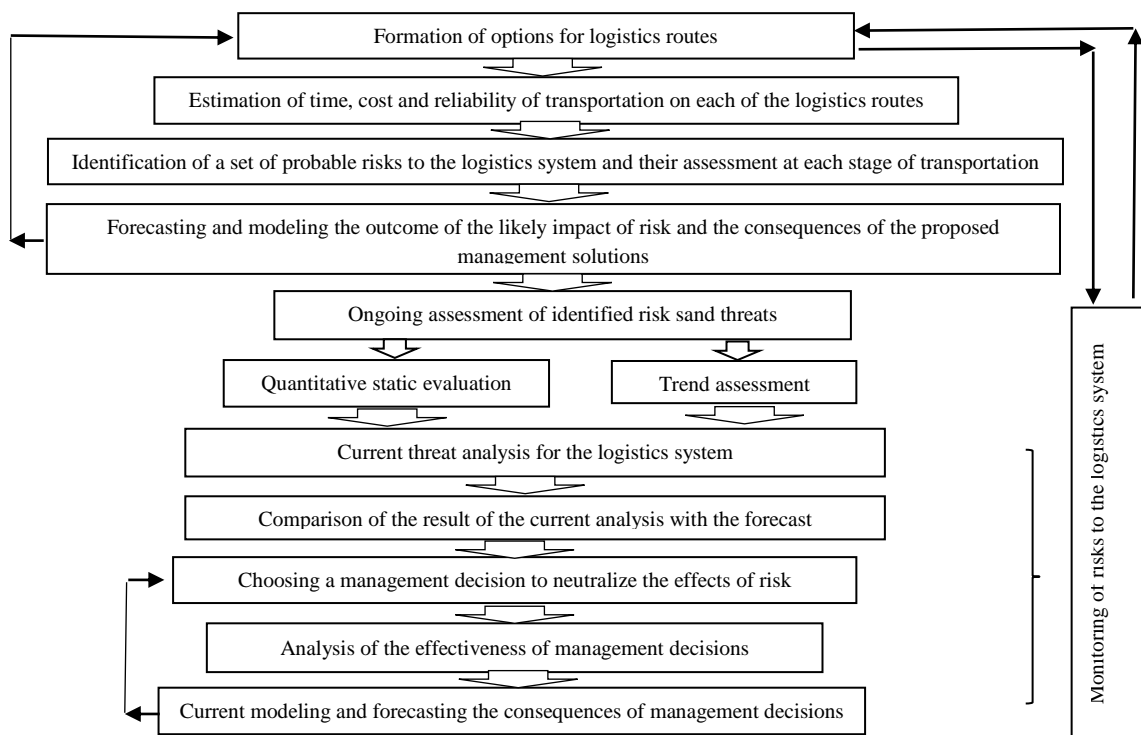


Fig. 5. Algorithm of the decision support system for neutralizing the impact of threats to the transportation of goods by water transport

Source: own development

The specified algorithm allows for the development of options for management solutions of different levels for the increasing risks of cargo transportation by water transport.

Conclusions and perspectives of further research. The given results of the scientific research allow us to draw the following conclusions and provide the following recommendations:

1. Military risks, even at a relatively small level of threats, have an absorbing nature in relation to all other risks.

2. Due to the dynamic changes in the risks of cargo transportation, the task is not only to identify the magnitude of the risk, but also the rate of its change. Identifying the rate of change of risk makes it possible to assess it at certain time intervals, which are determined by the time

required to transport the cargo along the selected route, the technological requirements of production, the volume of warehouse stocks, etc.

3. During military operations, the function of reliability becomes the main target function of managing the transportation of goods by water transport.

4. The dynamic change in the level of threats makes it necessary to manage cargo transportation in real time.

5. In the time preceding large-scale hostilities, the main risk is defined as the time of forced illegal delay of ships.

6. This leads to the fact that the integral reliability transportation function of the goods by water transport is inversely proportional to the delay time parameter of ships.

7. An effective way of neutralizing the risk of

delay of merchant ships of the Russian Navy is escorting the indicated vessels by ships of the Navy of Ukraine. Another effective way is to change transportation routes, including using other types of transport. For this purpose, it is necessary to develop different transportation options depending on the growth of the threat level.

8. The proposed algorithm of the decision-making support system for neutralizing the impact of threats to the transportation of goods by water transport allows developing options for management solutions of different levels for the growth of transportation risks of goods by water transport.

9. A sharp increase in the time and number of delays of ships in a tangential way indicates the approach of large-scale military operations.

In general, the obtained results of the study make it possible to achieve the necessary levels of reliable transportation of goods by water transport, even in conditions that precede large-scale military operations.

For future research in this direction, to reduce the level of threats, it is worth developing an algorithm for reorienting transportation routes in real time.

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АНАЛІЗ ТРЕНДІВ РЕЛЕВАНТНОГО РИНКУ НА ПРИКЛАДІ РИНКУ ЯЄЦЬ І ЯЄЧНИХ ПРОДУКТІВ НА БАЗИСІ СИМУЛЯЦІЙНОГО МОДЕЛЮВАННЯ

Актуальність. В умовах воєнного стану та майбутнього повоєнного відновлення, національну економіку доцільно розглядати у формі трьохрівневої системи ринків зокрема нішевого ринку яєць, а саме: національного ринку – на вищому рівні, регіональних ринків – на мезорівні; мережі локальних ринків – на нижчому рівні цієї ієрархії. Попри те, що локальні ринки перебувають на нижчому рівні, вони виконують далеко не найменшу роль у функціонуванні національної економічної системи у теперішній час, оскільки фактично виступають платформою всієї піраміди воєнного та повоєнного стану. Актуальним питанням є визначення пріоритетів інституційного забезпечення функціонування ринку яєць та яєчних продуктів. Зокрема це стосується ліцензування та квотування експортних поставок. Запровадження вищезазначених заходів буде сприяти ідентифікації небезпечних джерел, котрі виникають у відтворювальному процесі. Одночасно створюється підґрунтя для поліпшення навколишнього природного середовища. Пріоритетами мають бути виробництво екологічно чистої продукції та її переробка, утилізація відходів виробництва, комбінування споріднених технологічних процесів та ін. Це дозволить запровадити перспективні проєкти, підвищити ефективність логістичних маршрутів товарних поставок, посилить коопераційні зв'язки між ланками ланцюгів. Стратегічні пріоритети економічного розвитку нішевого ринку яєць для продовольчої безпеки лоя населення України в умовах економічного відновлення на продовольчому ринку.

Мета та завдання. Метою дослідження є обґрунтування та поглиблення теоретико-методичних засад й розробки практичних рекомендацій щодо формування системи ринку яєць та яєчних продуктів у воєнний час на базисі симуляційного моделювання.

Для досягнення поставленої мети передбачається вирішення наступних завдань: 1. Проаналізувати тренди розвитку виробництва і обігу яєць та яєчних продуктів України; 2. Охарактеризувати стан ринку яєць та яєчних продуктів в Україні; 3. Визначити стратегічні пріоритети розвитку ринку у післявоєнний час на базисі симуляційного моделювання.

Матеріали та методи. Отже, завдяки методу симуляційного моделювання і прогонів симуляцій, можна прогнозувати стан і функціонування об'єкта в реальних умовах, тим самим запобігти негативним наслідкам, ризикам в умовах недостатньої інформації, які можуть виникнути в процесі роботи організації повоєнних проєктів зокрема її інфраструктури на прикладі ринку яєць та яєчних продуктів.

Результати. Реалізація харчових яєць від підприємства виробника відбувається за різними каналами реалізації, зокрема посередницьким структурам, дилерській мережі, супермаркетам за оптовими цінами, які значно нижчі, ніж поточні ринкові і не впливають на рівень рентабельності виробника. Тому в цій сфері з'являються додаткові можливості для бізнесу і відтворювальної структури релевантного ринку яєць. Війна додатково посилює проблемні питання, які пов'язані з масштабним скороченням споживчого попиту на продукцію, порушенням логістичних схем товарних поставок тощо. У цих обставинах актуальним є питання визначення стратегічних пріоритетів розвитку ринку яєць та яєчних продуктів в умовах післявоєнного економічного відновлення. Проаналізувати тренди розвитку виробництва і обігу яєць та яєчних продуктів в Україні; Визначити чинники стратегічні пріоритети розвитку ринку у післявоєнний час на базі симуляційного моделювання. Сучасний стан функціонування ринку яєць та яєчних продуктів ринків сільськогосподарської продукції є наслідком трансформацій, які протягом останніх десятиріч відбувалися в складі агроринку продуктів України. Товарний ринок що досліджується має три виміри: географічний, товарний та часовий, по відношенню до яких доцільно визначати тенденції його розвитку. Основні пріоритети

передбачають: відновлення провідних позицій виробників яєць та яєчних продуктів на зовнішніх ринках; підтримка вітчизняних виробників з метою протистояння надмірному імпорту; відновлення завершених ланцюгів товароруху з високою доданою вартістю; формування рівноправного конкурентного середовища між крупними, середніми та дрібними учасниками ринку; формування міжрегіональних зв'язків на умовах нових форм співпраці, зокрема кластерної організації учасників; стимулювання розвитку органічного виробництва яєць та яєчних продуктів; на рівні регіонів розробити та впровадити програми відновлення та стабілізації функціонування регіональних ринків яєць та яєчних продуктів.

Висновки. 1. Україна тривалий час позиціонується як гарант продовольчої безпеки в багатьох країнах світу завдяки традиційно потужному продовольчому експорту у тому числі яєць та яєчних продуктів. Внесок України до світового продовольчого ринку у 2021 р. був еквівалентним забезпеченню харчуванням близько 400 млн. осіб. 2. Ринок яєць та яєчних продуктів є одним з провідних агропродовольчих ринків в країні, який відіграє важливу роль у забезпеченні продовольчої безпеки країни. До особливостей ринку слід віднести: а) стабільність географічних та товарних меж ринку, які зорієнтовані на масового споживача при низькому рівні заміності продукції; б) переважно олігопольний тип ринку, провідна частка якого розподілена між декількома крупними вертикально-інтегрованими компаніями в) наявність потужного експортного потенціалу (8-ме місце в світі серед експортерів даного продукту); г) стабільно позитивне зовнішньоторгівельне сальдо за рахунок продажів продукції до азіатських країн, включаючи Китай, Японію та Корею, а також до окремих країн ЄС, зокрема, ФРН. Тобто, ринок є найбільш розвиненим серед агропродовольчих ринків країни та має значний потенціал для подальшого розвитку. 3. Дослідження довело, що ринок яєць та яєчних продуктів за останні 10 років мав позитивні тенденції розвитку за винятком періоду 2015 – 2016 рр. у зв'язку із окупацією Криму та частини Донбасу. Обсяг виробництва яєць у 2021 р. становив 853,3 млн. шт., що у 20 разів перевищує обсяг виробництва у 2010 р. Це свідчить про наявність низки факторів, які сприяли такій позитивній тенденції: прискорений обіг капіталу, суттєві обсяги залучених інвестицій в технічне переоснащення та розширення виробничих потужностей, сучасний менеджмент тощо. 4. В той же час ринок має низку проблем, які стримують його розвиток. До основних з них слід віднести: а) проблему зниження собівартості продукції (частка енергоносіїв, в першу чергу природного газу, у структурі собівартості продукції на початку 2022 р. досягала 25-30%, що суттєво знизило за ціновим фактором конкурентоспроможність продукції на міжнародних ринках); б) проблему згладжування сезонності коливань цінових показників яєць та яєчних продуктів; в) проблему стабільності постачань продукції на зовнішні ринки та ряд інших проблем.

Ключові слова: продовольча безпека; релевантний ринок яєць і яєчних продуктів; механізм; симуляційне моделювання.

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ANALYSIS OF TRENDS IN THE RELEVANT MARKET ON THE APPLIED MARKET OF EGGS AND EGG PRODUCTS ON THE BASIS OF SIMULATION MODELING

Topicality. In the conditions of martial law and the future post-war reconstruction, it is advisable to consider the national economy in the form of a three-level system of markets, in particular the niche market of eggs, namely: the national market - at the highest level, regional markets - at the meso level; networks of local markets are at the lower level of this hierarchy. Despite the fact that local markets are at a lower level, they play far from the smallest role in the functioning of the national economic system at the present time, since they actually act as the platform of the entire pyramid of the war and post-war state. An urgent issue is determining the priorities of the institutional support for the operation of the market of eggs and egg products. In particular, this applies to licensing and quotas for export supplies. Implementation of the above-mentioned measures will contribute to the identification of dangerous sources that arise in

the reproduction process. At the same time, the basis for improving the natural environment is created. Priorities should be the production of ecologically clean products and their processing, disposal of production waste, combining related technological processes, etc. This will make it possible to implement promising projects, increase the efficiency of logistics routes for product deliveries, and strengthen cooperative ties between chain links. Strategic priorities of the economic development of the niche egg market for the food security of the population of Ukraine in the conditions of economic recovery in the food market.

Aim and tasks. The purpose of the study is to substantiate and deepen the theoretical and methodological foundations and develop practical recommendations for the formation of the market system of eggs and egg products in wartime on the basis of simulation modeling.

To achieve the goal, the following tasks are to be solved: 1. To analyze trends in the development of production and circulation of eggs and egg products in Ukraine; 2. Describe the state of the egg and egg products market in Ukraine; 3. Determine the strategic priorities of market development in the post-war period on the basis of simulation modeling.

Materials and Methods. So, thanks to the method of simulation modeling and simulation runs, it is possible to predict the state and functioning of the object in real conditions, thereby preventing negative consequences, risks in conditions of insufficient information that may arise in the process of the organization of post-war projects, in particular its infrastructure, on the example of the egg market and egg products.

Research results. The sale of edible eggs from the manufacturer's enterprise takes place through various sales channels, in particular, intermediary structures, dealer networks, supermarkets at wholesale prices, which are significantly lower than the current market prices and do not affect the level of profitability of the manufacturer. Therefore, additional opportunities for business and the reproductive structure of the relevant egg market appear in this area. The war additionally intensified problematic issues related to a large-scale reduction in consumer demand for products, disruption of logistics schemes for product supplies, etc. In these circumstances, the question of determining strategic priorities for the development of the market of eggs and egg products in the conditions of post-war economic recovery is relevant. Analyze trends in the development of production and circulation of eggs and egg products in Ukraine; To determine the factors and strategic priorities of market development in the post-war period on the basis of simulation modeling. The current state of functioning of the market of eggs and egg products in the markets of agricultural products is a consequence of the transformations that have taken place in the composition of the agricultural markets of Ukraine during the last ten years. The commodity market under investigation has three dimensions: geographical, commodity and time, in relation to which it is expedient to determine the trends of its development. The main priorities include: restoring the leading positions of producers of eggs and egg products in foreign markets; support of domestic producers in order to resist excessive imports; restoration of completed commodity chains with high added value; formation of an equal competitive environment between large, medium and small market participants; formation of interregional ties under the conditions of new forms of cooperation, in particular cluster organization of participants; stimulating the development of organic production of eggs and egg products; at the regional level, develop and implement programs for the restoration and stabilization of the functioning of regional markets for eggs and egg products.

Conclusions. 1. For a long time, Ukraine has been positioned as a guarantor of food security in many countries of the world thanks to traditionally strong food exports, including eggs and egg products. Ukraine's contribution to the world food market in 2021 was equivalent to providing food for about 400 million people. 2. The market of eggs and egg products is one of the leading agro-food markets in the country, which plays an important role in ensuring the country's food security. Market features include: a) stability of geographic and commodity market boundaries, which are oriented toward the mass consumer with a low level of substitutability of products; b) predominantly oligopoly type of market, the leading share of which is distributed among several large vertically integrated companies c) presence of strong export potential (8th place in the world among exporters of this product); d) a stable positive foreign trade balance due to sales of products to Asian countries, including China, Japan and Korea, as well as to certain EU countries, in particular, Germany. That is, the market is the most developed among the country's agro-food markets and has significant potential for further development. 3. The study proved that the market of eggs and egg products had positive development trends over the past 10 years, with the exception of the period 2015-2016 due to the occupation of Crimea and part of Donbas. The volume of egg production in 2021 amounted to 853.3 million pieces, which is 20 times higher than the volume of production in 2010. This indicates the presence of a number of factors that contributed to such a positive trend: accelerated capital turnover, significant volumes of involved investments in technical re-equipment and expansion of production facilities, modern management, etc. 4. At the same time, the market has a number of problems that restrain its development. The main ones include: a) the problem of reducing the cost of production (the share of energy carriers, primarily natural gas, in the structure of the cost of production at the beginning of 2022 reached 25-30%, which significantly reduced the competitiveness of products on international markets in terms of the price factor ; b) the problem of smoothing the seasonality of price fluctuations of eggs and egg products; c) the problem of stability of product supplies to foreign markets and a number of other problems.

Keywords: food safety; the relevant market for eggs and egg products; mechanism; simulation modeling.

Problem statement and its connection with important scientific and practical tasks. Ensuring the country's food security is one of the

primary directions of the state's socio-economic policy in the war and post-war period. Along with the undeniable mission of ensuring national

sovereignty, it determines the state's status in the international agri-food arena. Food security implies a state of the state's economy, which guarantees a stable supply of agricultural raw materials to the processing industry, a sufficient number of safe and wholesome food products to the population, and reasonable independence from the import of raw materials and food (Burkynskyi B.V., Lysyuk V.M., 2008). Such an important and at the same time multi-vector context of the formation of food security of Ukraine in war and post-war times provides for:

- first, planned steps in the direction of substantiating and making management decisions in the context of determining priorities for strengthening the country's food security, in particular, in relation to the market of eggs and egg products;

- secondly, the introduction of systematic monitoring of satisfaction of consumer needs of the population in affordable, high-quality and ecologically clean food products;

- thirdly, the development of indicators for assessing the level of food supply of food markets in accordance with the strategic priorities of market functioning in the war and post-war period.

Therefore, the substantiation and improvement of the theoretical and methodological foundations and the development of practical recommendations for the formation of the food security system of Ukraine, using the example of determining the strategic priorities for the development of the market of eggs and egg products, acquire a fundamentally new relevance under the modern conditions of the internationalization of the global agro-food market, the openness and increased competition of the national economy. The functioning of the market is influenced by both global processes in the agro-food markets and internal economic problems (Burkynskyi B.V., Laiko O.I., Andreeva N.M., 2020). Thus, the consequences of the global food crisis will lead to the emergence of serious problems in global food security: a further increase in world food prices (according to the FAO forecast, due to the war in Ukraine, world prices for food and feed may increase by 20%), a global jump in inflation, which receives the greatest growth in countries with underdeveloped and unstable economies (the countries of the Middle East, North Africa, etc. (The World Economic Forum, 2022)).

The war in Ukraine had a negative impact on the market and caused a decline in production by almost 70%. Currently, the market is under the influence of the strengthening of global negative processes taking place in international agri-food

markets (primarily the growing agri-food crisis), and the strengthening of internal economic problems of the functioning of the market (increasing energy prices, disruption of completed product supply chains, low level of population income etc). This significantly increases the dependence of the market on the external environment, which will negatively affect the pace of market revival in the post-war period.

As for domestic economic influences, they will depend on the energy factor, market conditions, and the level of state support for farmers. The real danger for the agricultural sector of the market is not inflation. And depending on the expensive loans, which will become extremely difficult for egg market subjects to attract. Another factor, in addition to the increase in the price of electricity and gas, which will definitely affect agricultural production, is the increase in prices for poultry feed.

Analysis of recent publications on the problem. The work of well-known domestic economists, including V. Andriychuk, Paskhaver, (Yu. "Kernasyuk, 2022), O. Khodakivska, M. Babich and others, is devoted to the study of the fundamental bases of the formation of food security, including the country's egg market. The mechanisms and features of food security management in the context of state agrarian policy are revealed in the works of M. Gladiy, E. Dankevich, P. Sabluk, and others. Among the domestic agrarian economists, especially meaningful proposals regarding the formation of the food security system of Ukraine in the direction of the implementation of the goals of sustainable development were reflected in the works and others. (B. Burkynskyi, 2021), (S. Kolodynskyi, 2021), (T. Lozova, 2021), (O. Nikishina, 2019) focused close attention on the substantiation of food security assessment indicators. Scientists such as (S. Sklyanova, N. Badanova, 2019), (N. Tarakanov, P. Antonyuk, 2022) made a significant contribution to the research of the development of the egg and egg products market and their technological properties. This determined the relevance of the choice of the research topic, its theoretical and practical significance.

Allocation of previously unresolved parts of the general problem. The market of eggs and egg products has a number of problems that restrain its development. The main ones include the following:

1. The problem of reducing the share of energy carriers, primarily natural gas, in the cost structure of production. At the beginning of 2022, costs for natural gas consumption accounted for an average

of 25-30% of the total cost of production. In such conditions, commodity producers, especially small and medium-sized ones, are forced to suspend business, as the lack of diversified production leaves them with the opportunity to operate with negative profitability. In order to reduce gas prices, the Government approved a decision and developed a mechanism to provide producers of socially significant food products with gas of their own production at a fixed preferential price, including for chicken eggs (State Statistics Service of Ukraine, 2022). In addition, during the war period, a decision was made regarding state control over restraining "the growth of prices for socially significant products (Kramskyi S.O., 2022). This measure contributed to the search for reserves to reduce costs for the production and sale of socially important food products, in particular, chicken eggs.

2. The problem of seasonality of price fluctuations of eggs and egg products. The peculiarity of the market is that, unlike grain, dairy and other agro-food markets, small and medium-sized commodity producers have certain advantages regarding the use of seasonality of price fluctuations. In the summer, when the prices of chicken eggs are the lowest, they have the opportunity to "can" the production, and in the fall, when the demand and prices of chicken eggs increase, they plant the birds again. Large manufacturers cannot afford such a scheme of work, because the technological cycle is established, they have obligations under contracts, etc. Therefore, poultry should be planted constantly in the farm according to the technological cycle.

3. The problem of stability of product supplies to foreign markets. In the situation of a high level of competition on the world markets, only powerful domestic producers of eggs and egg products, which have all the conditions for expanded production and the use of modern infrastructure for servicing export supplies, have opportunities for large-scale export. This is explained by the fact that export supplies involve the formation of product batches according to various requirements regarding volumes, delivery terms, must have a competitive price, high quality products that will meet all international product safety standards. In addition, exporters should constantly work on researching the situation on foreign markets, legislative changes, etc.

Therefore, in order to minimize the manifestations of the global food crisis, it is necessary to protect and support production in the field of eggs and egg products of poultry farms in

Ukraine as soon as possible in the conditions of martial law, taking advantage of the opportunities of influence of Ukraine on global food policy, which it gained thanks to the achievement of leading positions in the world markets of certain types of agricultural products, as well as intensifying cooperation with international and intergovernmental organizations, in particular FAO, regarding the economic transformation of food systems in conditions of war and instability (WIOD, World Input-Output Database, 2022).

Formulation of research objectives (problem statement). The purpose of the study is to substantiate and deepen the theoretical and methodological foundations and develop practical recommendations for the formation of the market system of eggs and egg products in the post-war period on the basis of simulation modeling.

In order to achieve the set goal, the following tasks should be solved: 1. To analyze trends in the development of production and circulation of eggs and egg products in Ukraine; 2. Describe the state of the egg and egg products market in Ukraine; 3. Determine the strategic priorities of market development in the post-war period on the basis of simulation modeling; 4. To justify proposals for the reproductive development of the market of eggs and egg products in the conditions of war and post-war recovery of the economy.

Materials and Methods. So, thanks to the method of simulation modeling and simulation runs, it is possible to predict the state and functioning of the object in real conditions, thereby preventing negative consequences, risks in conditions of insufficient information that may arise in the process of the organization of post-war projects, in particular its infrastructure, on the example of the egg market and egg products.

An outline of the main results and their justification. The market of eggs and egg products is one of the leading agro-food markets, which plays an important role in ensuring the country's food security. Market features include: a) stability of geographic and commodity market boundaries, which are oriented toward the mass consumer with a low level of substitutability of products; b) predominantly oligopoly type of market, the leading share of which is distributed among several large vertically integrated companies: the OvostarUnion group of companies, the Avangard agricultural holding PJSC, the Inter-Agrosystems group of companies, and the Landgut Ukraine group of companies, which in total account for up to 70% of industrial egg production and almost 100% of egg products; c) the presence of a strong export potential (up to 30% of the total

production), which ensured the leading role of Ukraine in the world market of eggs and egg products (8th place in the world among exporters of this product; d) a stable positive foreign trade balance due to product sales to Asian countries, including China, Japan and Korea, as well as to certain EU countries, in particular, Germany.

The geographic boundaries of the market have a three-level hierarchy, namely: national, regional and local levels. In the conditions of martial law and post-war reconstruction, local market boundaries should play a leading role in balancing supply and demand, as they ensure maximum flexibility of relations between producers and consumers of products. Identification of the territorial boundaries of the market is carried out according to the following approaches: 1) product-price approach - the market is limited to the area where agreements with a homogeneous product are implemented at the same price, which also takes into account the costs of transporting products from the producer to the consumer and/or the buyer's costs of searching for the desired product at an acceptable price; 2) administrative-territorial approach – the market is limited to the boundaries of an administrative-territorial unit: city, district, region, etc. A commodity market can be relevant if the main parameters of market boundaries are defined in it: commodity, temporal and territorial. Determining the limits of the commodity market on the example of eggs and egg products, according to the "Methodology for determining the monopolistic dominant position of business entities on the market. The product boundaries of the studied market, in accordance with the Methodology for determining the monopolistic dominant position of economic entities on the market (Burkinskyi B.V., Andreeva N.M., 2018), should be determined by defining a group of interchangeable goods (product groups), within which the consumer can switch from consuming one commodity to consuming another under normal conditions of goods. Numerical studies show that the market of eggs and egg products belongs to the group of agro-food markets with a low level of product substitutability.

Time limits of the market create a time cycle during which the structure of the market, the ratio of demand and supply on it does not change significantly. According to this parameter, the market under investigation is characterized by certain stability. Instead, this level can be allocated only for a certain product (group of products) and at the same time not coincide with the territory of the region. "Indeed, individual local markets can

be geographically located entirely within the territory of a region (administrative-territorial unit), but can also go beyond its boundaries - cover parts of individual regions, several regions or several countries (Burkinskyi B.V., Laiko O.I. Horyachuk V.F., 2021). The structure of the relevant market of eggs and egg products is represented by a set of four sectors according to the stages of formation, addition, transformation and consumption of quality parameters of the product, namely: agricultural (poultry), production, trade and consumer (Fig. 1).

Based on the market parameters listed above, it is possible to determine the leading trends occurring in the market of eggs and egg products.

According to the Methodology for determining the monopoly (dominant) position of economic entities on the market, the territory of the state is its territorial limits of the national market of eggs and egg products (Burkinskyi B.V., Andreeva N.M., 2018). Therefore, it should be considered that the egg market is niche, that is, it occupies less than 40% of the volume, which is a sign of the territorial and geographical limits of the market of eggs and egg products. The Ukrainian market of eggs and egg products is characterized by the capacity indicator and the degree of openness and belongs to the category of state markets based on a set of features that determine its territorial boundaries.

The functioning of the market is influenced by both global processes in the agro-food markets and internal economic problems.

Thus, the consequences of the global food crisis will lead to the emergence of serious problems in global food security: a further increase in world food prices (according to the FAO forecast, due to the war in Ukraine, world prices for food and feed may increase by 20%), a global jump in inflation, which receives the greatest growth in countries with underdeveloped and unstable economies (the countries of the Middle East, North Africa, etc. (The World Economic Forum, 2022).

As for domestic economic influences, they will depend on the energy factor, market conditions, and the level of state support for farmers. The real danger for the agricultural sector of the market is not inflation. And depending on the expensive loans, which will become extremely difficult for egg market subjects to attract. Another factor, in addition to the increase in the price of electricity and gas, which will definitely affect agricultural production, is the increase in prices for poultry feed (Burkinskyi B.V., Nikishina O.V., Tarakanov N.L., 2022).

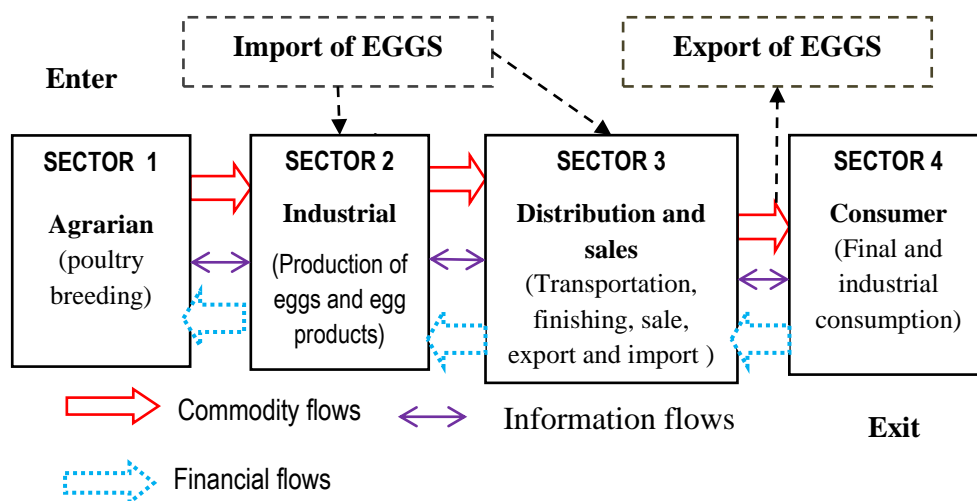


Fig. 1. Reproductive structure of the relevant market for eggs and egg products.

* *Source:* Lozova T.P. Theoretical and methodological foundations of the logistic development of the market of fruit and berry products of Ukraine. [Ph.D. Economy of science]. Odesa: IPREED of NASU. URL: https://impeer.org.ua/wp-content/uploads/2021/08/Lozova_aref.pdf

It should be noted that over the past half century, in connection with the use of modern computer systems and programs, the method of simulation modeling has become widespread, for obtaining estimates and possible results of various situations in the simulation of projects. Because simulation modeling is a method that allows you to build market models that describe virtual processes as they would happen in reality. It is possible to imitate the behavior of those organizations, economic projects, real experiments that are quite expensive, impossible or dangerous. The essence of the simulation modeling method is to simulate the process of functioning of this network at any given time interval on the example of the egg market. Before touching on the solution of issues through simulation modeling, it is necessary to agree on the conceptual apparatus and terminology.

So, simulation modeling (situational modeling) is a method that allows you to build models that describe processes as they would happen in reality. Such a model can be "played" in time both for one trial and for a given set of them. The task of stimulation modeling is to reproduce the behavior of the studied system based on the results of the analysis of the most significant relationships between its elements, or in other words, to develop a simulator of the studied subject area for conducting various experiments (Matolikov D.P., 2018). Thus, it is possible to simulate the behavior of those objects with which real experiments are expensive, impossible or dangerous. Which is quite a convenient method from a practical point of view. Determining the duration of the simulation

run or the required number of repetitions of each run (sample size), which ensures the specified accuracy of the simulation results. Determination of the duration of the transition mode (analysis of the established state), assignment of initial conditions (initial state). The following tasks are also solved here: choosing the correct modeling step, since it is the modeling step that depends on the accuracy of reproduction in the simulation model of chains of events that take place in the real system; control of repeatability of results; establishing stopping rules, reducing the dispersion of outputs (special methods of reducing dispersion are used), reducing the simulation error due to the presence of pseudorandom number generators in the simulation model, and many others (Maximei I.V., 2022). Let's consider the main tasks of tactical planning. Determination of the required number of runs. The main methods of organizing runs: repeated runs, the method of subintervals (runs are divided into groups, the average is calculated). To make a statistical analysis on over the entire sequence of the simulated random process, either the simulation is repeated several times (method of repeated runs), or simulated for a longer time (the method of extended runs). The main methods of setting the duration of a simulation run: Often, the simulation completion time is specified. The method controlling the sample size (automatic stopping rules are applied): assignment of a certain number of components entering the model input, assignment of the number of components processed in the system, etc. In order for the results obtained on the simulation model to be statistically significant,

they seek to increase the accuracy of the simulation results by repeating the experiment and averaging the obtained results. The most common mistake in simulation modeling is not paying enough attention to the evaluation of the input data. That is, a lot of effort is spent on programming the model, then one run is performed and the obtained estimates are considered "real". "In fact, in order to obtain correct, meaningful results in simulation modeling, it is necessary to use statistical methods for the development and analysis of simulated situational experiments (Danchuk V.D., 2020). Such a model can be "played" in time both for a single test and for a given number of simulation runs. Therefore, for the description, planning, analysis and optimization of project simulations, the simulation model turned out to be the most appropriate. It can have the following expression:

Suppose that a number of n runs are performed, each with a different sequence X ; E of random numbers. Then we get a matrix of simulation implementations $\{y_{ij}\}$ ($i=1, \dots, n; j=1, \dots, m$). Let Y_{ij} – be the value of the investigated indicator of the egg market, which was obtained during the i -th independent run at time j (as before). Let's determine the values of X_i – the post-war average of the i -th simulation run, which corresponds to the stationary regime:

$$X_i = \frac{\sum_{j=1}^m Y_{ij}}{m}, \quad (1)$$

These quantities are independent and identically distributed. For them, you can find a point estimate of the economic-mathematical expectation using the formulas:

$$E(X_i) = \bar{X} = \sum_{i=1}^n X_i \frac{m}{n-\alpha}, \quad (2)$$

and also find an estimate of the economic variance:

$$S^2 = \frac{\sum_{i=1}^n [X_i - \bar{X}]^2}{n-1}, \quad (3)$$

The confidence interval in which the economic-mathematical expectation of the quantity X_i falls with probability $1-\alpha$ is determined by the formula:

$$\bar{X} \pm t_{n-1, \frac{\alpha}{2}} \sqrt{\frac{S^2}{n-1}}, \quad (4)$$

The validity of economic indicators of the egg market depends on the number of repeated runs of the simulation model n on simulations or a computer. To achieve the specified validity t according to the level of reliability α , the following sequence of actions should be performed: n runs of the model are performed in advance according to formulas (1)–(3), point estimates and the confidence interval are calculated at the given level of reliability α , if the 50% confidence interval of

the egg market obtained according to the formula, more than t , then possible situations on the market of eggs and egg products and approximate statistics, from the simulations of the number of 1000 simulation runs, a data sample with the highest indicators in % is selected (Maximei I.V., 2022). A distinctive feature of simulation experiments from field tests is the ease of repeating and reproducing the conditions of the experiment.

Analysis of trends and problems of the raw and production sectors of the market of eggs and egg products. The production of egg products began to develop in Ukraine in the early 2000s, and almost all the first producers focused only on export. In 2011, 4.2 thousand tons of dry egg products were delivered to foreign markets (Nikishina O.V., Lozova T.P.). The export of egg products from Ukraine entered a new upward trajectory in 2018. "According to the results of the analysis of the world market of eggs and egg products, in 2019, 7.8 thousand tons of dry and 6.2 thousand tons of liquid egg products arrived on the world market from Ukraine, which exceeds the indicators of 2018 by 98% and 24%, respectively (Kernasyuk Yu.P., 2022)". In 2021, export volumes were almost three times larger - 11.9 thousand tons of products. The largest export volumes were recorded in 2013-2014, but then, due to the loss of production capacities in non-controlled territories, the production volumes of egg products decreased.

The opening of the EU market in 2014 influenced changes in the structure of egg products production. Since the consumption of mainly liquid egg products is typical for EU countries, many domestic producers reoriented themselves to this type of egg products. In 2017, the volume of production of liquid egg products exceeded the volume of dry egg products for the first time, and in 2018, the production of dry egg products even decreased by 1.9%. In general, in 2019, 7.8 thousand tons of dry and 6.2 thousand tons of liquid egg products arrived on the world market from Ukraine, which exceeds the indicators of 2018 by 98% and 24%, respectively (State Statistics Service of Ukraine, 2022).

At the same time, it should be noted that despite the fact that 86 eggs are used to produce 1 kg of powder, and only 22 eggs for the same mass of liquid egg product, dry egg products are stored longer and are more convenient to transport. Therefore, according to forecasts, the production of dry egg products in Ukraine should develop dynamically in the medium term. "According to the State Statistics of Ukraine, the poultry population decreased by 1.8% from October 2020 to October 2021 to 234.03 million heads: in

agricultural enterprises it decreased by 1.7% (to 118.36 million heads), in households - by 2.0% (up to 115.67 million heads). For example, more than 120 million heads are grown annually in Japan. The dynamics of the poultry population in Ukraine is shown in the table below. 1,2 and fig. 2. (State Statistics Service of Ukraine, 2022).

From 2010 to 2014, the poultry population in Ukraine grew, although every year at a slower

pace. This is due to the saturation effect of the egg market. The political and military events of 2014-2015 were reflected in the poultry industry with a sharp decline in production by 11.7%. From 2015 to 2020, the market recovered and stabilized. Every year, the rate of decline of the egg market decreased, and in 2020 it was positive for the first time in the amount of 4.1% (Kramskyi S.O., 2022).

Table 1.

Dynamics of the poultry population in Ukraine for 1991-2021, million units. (on January 1)

Product	1991	2001	2015	2019	2020	2021	2022
Farms of all categories							
Domestic bird of all kinds, including	244,1	123,3	212,7	209,4	220,0	200,0	201,4
chickens	212,3	103,8	193,9	191,9	202,5	183,5	186,6
roosters	11,5	9,1	5,4	4,1	4,1	3,5	3,4
geese	17,2	8,1	11,3	11,7	11,4	11,4	9,9
ducks turkeys	3,1	2,3	2,1	1,7	1,9	1,6	1,5
Enterprises							
Poultry of all kinds, including	131,5	25,1	121,3	116,8	127,1	109,1	112,7
chickens and roosters	120,8	24,2	120,0	115,3	125,8	107,9	111,7
geese	0,8	0,4	0,4	0,4	0,3	0,3	0,2
ducks turkeys	0,5	0,0	0,7	0,8	0,9	0,8	0,8
Households							
Poultry of all kinds, including	112,5	98,0	91,2	96,7	92,7	90,8	88,8
chickens and roosters	91,5	79,6	73,8	76,7	76,7	75,6	74,9
geese	9,6	8,4	5,1	3,9	3,9	3,4	3,4
ducks	8,8	7,7	10,9	11,3	11,1	11,1	9,8
ducks turkeys	2,6	2,3	1,4	0,9	1,0	0,7	0,7

* Source: State Statistics Service of Ukraine. URL: <http://www.ukrstat.gov.ua>.

As follows from the given data, the dynamics of egg production in the pre-war period was characterized by steady development. Analysis of the poultry population in Ukraine during the analyzed period increased from 24.6 to 202.2 million poultry, and accordingly, the production of eggs. The recession occurred in 2014-2016. And was due to the drop in the solvency of the population and economic difficulties in

maintaining small and medium-sized businesses in Ukraine. But since 2017, there has been an increase in the consumption of eggs and egg products (turkey, quail, ostrich - poultry). Therefore, additional opportunities for business and the reproductive structure of the state egg market appear in this area. Analysis of egg consumption confirms the following in the table 2:

Table 2.

Dynamics of egg production by category of farms in Ukraine

Products	1990	1995	2000	2005	2010	2015	2020	2021
Farms of all categories								
Eggs of all kinds, million pcs.	16,3	9,51	8,81	17,08	16,87	16,61	16,11	14,01
Enterprises								
Eggs of all kinds, million pcs.	10,1	4,2	3,0	10,2	9,8	9,3	8,9	7,0
including farms								
Eggs of all kinds, million pcs.	–	0,01	0,01	0,08	0,07	0,1	0,1	0,1
Households								
Eggs of all kinds, million pcs.	6,2	5,3	5,8	6,8	7,0	7,3	7,2	7,0

* Source: State Statistics Service of Ukraine. URL: <http://www.ukrstat.gov.ua>.

The production volume of chicken eggs in Ukraine exceeds 850 million units. At the same time, the level of consumption per person had an upward trend (Table 3). According to the results of 2021, there was a further increase in production indicators, despite the war in the country and the

crisis that was present in the economy of Ukraine. But the war made its adjustments. Thus, it is very difficult to predict the development of the egg market at the present time in conditions of permanent uncertainty.

Table 3.

Analysis of egg consumption by region of Ukraine for the period 2000-2020.

Consumption of eggs per person per year \ pieces									
Region of Ukraine	2000	2005	2010	2015	2016	2017	2018	2019	2020
UKRAINE	166	238	290	280	267	273	275	282	278
Crimea	167	234	290	-	-	-	-	-	-
Vinnyska	187	260	304	293	285	293	293	294	299
Volynska	142	193	244	274	255	267	272	274	285
Dnipropetrovska	128	231	298	298	289	294	304	304	303
Donetska	180	266	308	253	251	262	254	255	251
Zhytomyrska	187	251	307	304	302	313	321	321	318
Zakarpattia	191	241	274	252	249	254	255	267	281
Zaporizhzhka	129	238	290	291	265	267	257	262	275
Ivano-Frankivska	167	231	252	257	242	249	252	264	276
Kyivska	171	258	313	313	287	296	298	311	301
Kirovohradska	144	222	292	299	290	304	323	323	327
Luhanska	131	237	284	222	222	212	211	215	217
Lvivska	175	215	266	269	257	271	275	290	278
Mykolayivska	119	213	283	276	259	261	273	280	266
Odesa region	220	255	282	279	272	268	266	264	263
Poltavska	161	246	308	307	286	280	277	290	284
Rivnenska	153	233	295	291	271	275	279	290	278
Sumska	195	239	285	269	265	272	278	288	275
Ternopil'ska	187	217	269	286	278	275	272	290	280
Kharkivska	153	218	275	278	263	269	274	278	272
Khersonska	148	234	284	285	262	268	262	266	255
Khmelnitska	119	199	267	286	263	275	282	292	289
Cherkaska	199	221	296	297	272	276	281	287	275
Chernivtsi	181	243	298	281	261	264	267	277	281
Chernihivska	221	255	286	274	262	271	281	294	269

* Source: State Statistics Service of Ukraine. URL: <http://www.ukrstat.gov.ua>.

The consequences of the war and the food crisis will lead to the emergence of serious gaps in the world's global food security: a further increase in world food prices (according to the FAO forecast of March 11, 2022, due to the war in Ukraine, world prices for food and feed may increase by 20%); a global jump in inflation, which will primarily affect countries with underdeveloped, unstable economies in the Middle East and North Africa.

Development trends of the world market of

eggs and egg products. In 2021, the production of eggs in the world amounted to 71.8 million tons or 1150 billion pieces. More than half of them (58.5%) were produced in Asia, 20.8% in America, 15.7% in Europe, 4.6% in Africa and 0.4% in Oceania. The most chicken eggs were produced in China last year - 41.8% of the total number in the world. Table 3 shows the dynamics of egg production in relation to countries - the largest producers of chicken eggs (The World Economic Forum, 2022).

Table 4.

Dynamics of egg production in the countries of the world (thousand tons)

Countries in the world	2011	2016	2021	Growth rate for 2011-2021, %
China	25846	22749	23871	-8%
USA	5308	5339	5340	1%
India	2670	3060	3100	16%
Japan	2525	2554	2505	-1%
Mexico	2300	2337	2334	1%
Indonesia	1095	1123	1059	-3%
France	765	947	918	20%
Ukraine	780	855	911	17%
Turkey	744	824	865	16%
Spain	884	800	804	-9%
Iran	880	727	775	-12%
Italy	670	724	729	9%
Germany	800	790	689	-14%
Netherlands	610	627	619	1%
Poland	538	582	605	12%

* Source: The World Economic Forum URL: <https://www.weforum.org>.

In total, the 10 leading producers accounted for about 74.7% of the global production of chicken eggs and egg products last year. The production of eggs in EU countries in 2020 amounted to 6.93 million eggs, down from 7.09 million eggs in 2019 (The World Economic Forum, 2022)". "Growth in 2021 by 2.3% was due mainly to increased production volumes in Italy, Germany and the Netherlands. In 2021, Ukraine entered the TOP-10 and took eighth place in the ranking of the world's largest producers of eggs and egg products (State Statistics Service of Ukraine, 2022).

Asia, South America and Africa are entering the phase of growth in demand for eggs and egg products. Although the specific share of egg

production in the world is approximately 100 units. per person annually, but the range is from a high of 300 eggs per person in Japan and Denmark to zero in some African countries (WIOD, World Input-Output Database, 2022).

Net exports are calculated as the value of a country's total exports minus the value of its total imports. Thus, shown in fig. 5 statistics show the difference between the value of each country's fresh egg exports and its imports of the same product. As you can see, this rating differs from the general rating of exporters. Turkey rises to the first place, and Ukraine already occupies the 7th position (State Statistics Service of Ukraine, 2022).

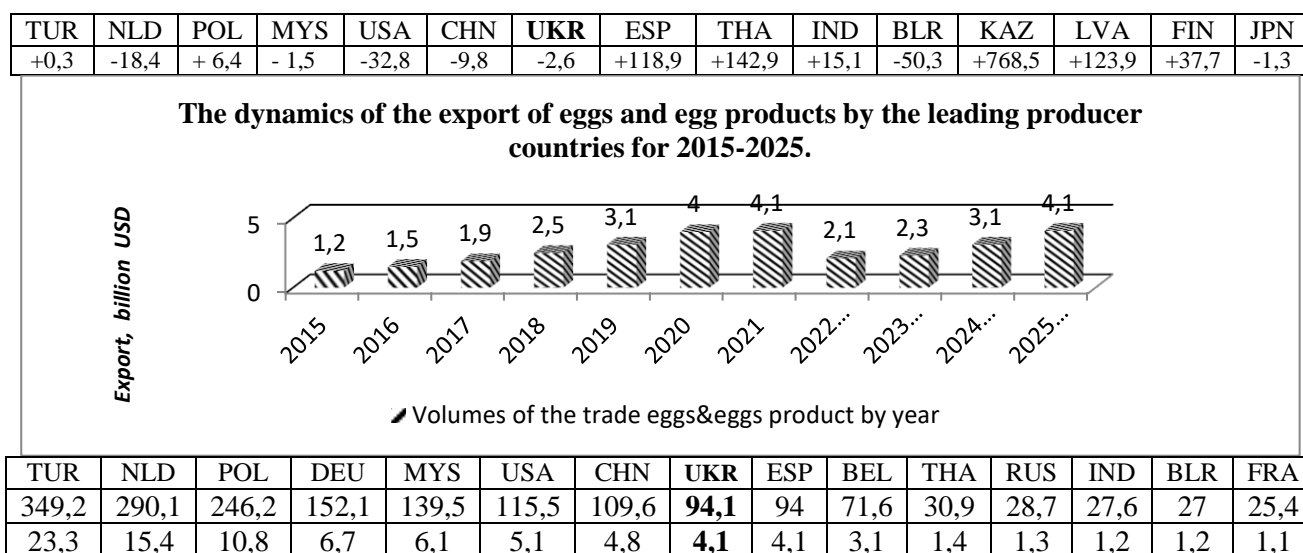


Fig. 2. Export of fresh eggs by country in 2015-2025, million USD, %

* Source: WIOD, World Input-Output Database. URL: <http://www.wiod.org>.

According to the "Poultry Union of Ukraine" association, the export of edible eggs since the beginning of the year amounted to 228 million pieces. This is 42% less than in the same period last year. The decrease in export volumes is connected with the military aggression of Russia, as a result of the occupation of territories and the destruction of production facilities, there was a

decrease in their production. The blocking of sea transportation and the increase in the cost of logistics negatively affects the volumes and financial indicators of exporters. The largest importers of Ukrainian eggs are the EU countries, Singapore, the UAE, and the State of Israel (Nikishina O.V., Lozova T.P., 2019).

Table 5.

Ukraine's foreign trade in eggs and egg products in 2021.

Name	Export	Cost, thousand USD	Import	Cost, thousand USD	Balance, thousand USD
	Quantity thousand pcs.		Quantity thousand pcs.		
407000000 Birds' eggs in shell, fresh, preserved or boiled:					
TOTAL	40304,71	44,59	3378,90	11,02	33,57
407110000 - domestic chickens (Gallus domesticus)					
TOTAL	219,30	0,98	2469,01	10,15	-9,17
407210000 - domestic chickens (Gallus domesticus)					
TOTAL	40082,53	43,60	909,77	0,87	44,47
407290000 - Other:					
TOTAL	2,87	0,01	0,00	0,00	0,01

407299000 - Other:					
TOTAL	2,80	0,01	0,00	0,00	0,01
TOTAL	4619,8	12,1	94,4	0,6	11,5
TOGETHER	85231,98	89,18	6852,04	22,64	66,54

* *Source:* State Statistics Service of Ukraine. URL: <http://www.ukrstat.gov.ua>.

In recent years, the export-import balance in Ukraine in the trade of eggs and egg products has been positive, mainly due to sales of products to Asian countries, including China, Japan and Korea, as well as to certain EU countries, in particular, Germany (72% of the export volume is eggs in the shell, 14% each - powdered and liquid eggs). The export of Ukrainian eggs, which has grown significantly since, was mainly due to sales to Asian countries, including China, Japan and Korea.

Strategic priorities for the development of the egg and egg products market in the post-war period should be defined as:

- restoration of leading positions of producers of eggs and egg products in foreign markets;
- support of domestic manufacturers in order to resist the excessive growth of import volumes;
- "restoration of completed commodity chains with high added value;
- formation of an equal competitive environment between large, medium and small market participants;
- formation of interregional ties under the conditions of new forms of cooperation, in particular cluster organization of participants;
- stimulating the development of organic production of eggs and egg products (Sklyanova S., Badanova N., 2019).

At the regional level, the strategic priorities of market development listed above are to be specified taking into account the characteristics of the raw material base, production capacities, and the dynamics of consumer demand. Thus, at the level of the regional market within the Odesa region, it is proposed to introduce targeted support to small producers, to establish the sustainable operation of leading producers of eggs and egg products: LLC "Lymanska", LLC "Chornomorska", LLC "Tatarbunarska", LLC "Bilaivska", PJSC "Bessarabian Broiler" and other; implementation by business entities of systemic safety methods in primary production industries, especially in relation to the cultivation of products of animal origin (eggs, egg products) and their further processing and sale (Kramskyi S.O., 2022).

In the post-war period, a further strengthening of the negative trend in the growth of production

costs is predicted. "Experts believe that such a significant increase in prices, almost 3 times, at the end of 2022 and with its further increase is primarily related to the increase in the price of feed, the reduction of production capacity, the impact of changes in the global situation towards the increase in the price of eggs and egg products (Tarakanov M.L., Antonyuk P.O., 2022). Solving this urgent issue involves the introduction of measures to reduce the cost of production, due to the formation of integrated complete chains, smoothing out the seasonality of production, primarily in the autumn-winter period, stimulating the introduction of modern technologies, improving the logistics schemes of product deliveries.

The main priorities include:

- restoration of leading positions of producers of eggs and egg products in foreign markets;
- support of domestic producers in order to resist excessive imports;
- restoration of completed commodity chains with high added value;
- formation of an equal competitive environment between large, medium and small market participants;
- formation of interregional ties under the conditions of new forms of cooperation, in particular cluster organization of participants;
- stimulating the development of organic production of eggs and egg products.
- at the regional level, develop and implement programs for the restoration and stabilization of the functioning of regional markets for eggs and egg products.

In order to ensure the above-listed priorities of the post-war development of the market of eggs and egg products, the following is proposed:

- reduce the value-added tax rate (as an option - to 7-10%), primarily on social types of egg products in order to ensure the competitiveness of products on the domestic market in relation to imports;
- to introduce tools for strategic planning of the export of egg products in combination with maintaining the stability of supplies and regulating their volumes on the basis of concluding long-term

contracts with foreign consumers, which will make it possible to level the dependence on price and other cyclical fluctuations on international markets;

- to provide additional support to small and medium-sized producers by creating an equal competitive environment between large, medium and small participants by promoting the creation of cooperative associations, introducing adaptive programs and targeted subsidies, in particular, for breeding work, introducing a preferential tax regime for socially significant egg products ;

- promote the acceleration of the turnover of products with high added value by creating networks of distribution centers for end-to-end planning of product supplies from the production of raw materials to the sale of finished products to end consumers, strengthening the role of wholesale trade in the situation of localization of reproductive processes in the market, promote the attraction of investments in the processing of raw materials.

Conclusions and perspectives of further research. As a result of the research, the following conclusions and suggestions can be made.

1. For a long time, Ukraine has been positioned as a guarantor of food security in many countries of the world thanks to traditionally powerful food exports, including eggs and egg products. Ukraine's contribution to the world food market in 2021 was equivalent to providing food for about 400 million people.

2. The market of eggs and egg products is one of the leading agro-food markets in the country, which plays an important role in ensuring the country's food security. Market features include: a) stability of geographic and commodity market boundaries, which are oriented toward the mass consumer with a low level of substitutability of products; b) predominantly oligopoly type of market, the leading share of which is distributed among several large vertically integrated companies c) presence of strong export potential (8th place in the world among exporters of this product); d) a stable positive foreign trade balance

due to sales of products to Asian countries, including China, Japan and Korea, as well as to certain EU countries, in particular, Germany. That is, the market is the most developed among the country's agro-food markets and has significant potential for further development.

3. The study proved that the market of eggs and egg products had positive development trends over the past 10 years, with the exception of the period 2015-2016 due to the occupation of Crimea and part of Donbas. The volume of egg production in 2021 amounted to 853.3 million pieces, which is 20 times higher than the volume of production in 2010. This indicates the presence of a number of factors that contributed to such a positive trend: accelerated capital turnover, significant volumes of involved investments in technical re-equipment and expansion of production facilities, modern management, etc.

4. At the same time, the market has a number of problems that restrain its development. The main ones include: a) the problem of reducing the cost of production (the share of energy carriers, primarily natural gas, in the structure of the cost of production at the beginning of 2022 reached 25-30%, which significantly reduced the competitiveness of products on international markets in terms of the price factor) ; b) the problem of smoothing the seasonality of price fluctuations of eggs and egg products; c) the problem of stability of product supplies to foreign markets and a number of other problems.

To justify proposals for the reproductive development of the egg market using the mechanism in the conditions of post-war economic recovery. To determine the factors and strategic priorities of market development in the post-war period on the basis of simulation modeling.

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ВПЛИВ ІННОВАЦІЙНОЇ ДІЯЛЬНОСТІ НА РІВЕНЬ ПРИБУТКОВОСТІ ПІДПРИЄМСТВ

Актуальність. Сьогодні прибутковість підприємства – є головним показником економічної стабільності, конкурентоспроможності, ефективності та сенсом створення та подальшого існування підприємства будь-якої сфери діяльності. Головною метою стратегії розвитку та ефективності діяльності підприємства є забезпечення достатнього рівня конкурентоспроможності та отримання максимального прибутку, тому пошук та обґрунтування шляхів підвищення прибутковості підприємств завжди є актуальною проблемою. В сучасному світі, у період активного розвитку науково-технічної та інноваційної діяльності, величезний вплив на рівень прибутковості сучасних підприємств має впровадження інновацій у діяльність підприємств.

Мета та завдання. Метою статті є дослідження впливу інноваційної діяльності на рівень прибутковості підприємств. Для досягнення поставленої мети було вирішено наступні завдання: розглянуті поняття інноваційна діяльність та прибутковість підприємства; визначено вплив інноваційної діяльності на рівень прибутковості підприємства; проаналізовано основні показники інноваційної активності українських підприємств.

Матеріали та методи. У процесі підготовки дослідження використовували загальнонаукові методи пізнання, спостереження, абстрактно-логічного мислення, системного підходу, економічної інтерпретації. Методи системного підходу до вирішення завдань, а також аналізу, синтезу та єдності логічного аналізу та діалектичного розвитку, історичного підходу, статистичні гіпотези та залежності, експертні дослідження.

Результати. У статті розглянуто поняття інноваційна діяльність та прибутковість підприємства; визначено вплив інноваційної діяльності на рівень прибутковості підприємства; проаналізовано основні показники інноваційної активності українських підприємств. Запропоновано напрями максимізації прибутку та заходи, що спрямовані на підвищення прибутковості підприємств.

Висновки. Прибутковість будь-якого підприємства можна підвищити за рахунок впровадження результатів інноваційної діяльності. Впровадження інновацій дозволяє виробляти продукцію більш якісною та менш енерговитратною, а діяльність підприємства більш ефективною. Але, можна казати, що однією з головних проблем впровадження інновацій на підприємствах, є неготовність керівництва до впровадження їх у свою господарську діяльність. Хоча ефективність від їх використання може значно покращити прибутковість суб'єктів господарювання. Інноваційна діяльність є напрямом максимізації попиту на продукцію, як різноманіття форм організації бізнесу, як етап інноваційної бізнес-стратегії підприємства. Розвиток та стан інноваційного середовища впливає на рівень прибутковості підприємств. Впровадження інновацій, проведення інноваційної діяльності на підприємстві дозволяє сформувати такі напрями максимізації прибутку як: продуктивний, технологічний, організаційно-управлінський, ресурсний, ринковий. Для розвитку та активізації інноваційної діяльності вітчизняних підприємств в країні необхідно формування та впровадження системи цілеспрямованих заходів: розробку і запровадження механізму надання пільг підприємствам, що впроваджують і реалізують результати інноваційної діяльності; надання інноваційним підприємствам кредитів зі зниженою кредитною ставкою; зниження оподаткування прибутку підприємств, що розробляють, впроваджують інновації та використовують екологічно небезпечні технології та інші. Запропоновані заходи допоможуть

сформувати сприятливий інноваційний клімат, стимулювати підприємства підвищувати зацікавленість у розробці та впровадженні наукомістких технологій, що в свою чергу приведе до підвищення їх прибутковості на конкурентоспроможності на світовому ринку. В країні відсутній достатній взаємозв'язок між обсягами фінансування інновацій для промислових підприємств та їх власним капіталом, впровадження результатів інноваційної діяльності на вітчизняних підприємствах доцільно з метою підвищення їх прибутковості, для визначення інноваційної стратегії розвитку, для прийняття управлінських рішень та підвищення ефективності та конкурентоспроможності. Перспективою подальших досліджень у цьому напрямку є виявлення взаємозв'язку між інноваційною діяльністю підприємств та їх вартісними показниками в галузевому розрізі та розробка універсальної моделі оцінки впливу інноваційного розвитку підприємства на його прибутковість.

Ключові слова: інновація, інноваційний продукт, ринок інновацій, інноваційна діяльність, інноваційний розвиток підприємства, інноваційний потенціал, ринок праці, трудові ресурси, конкурентоспроможність, фінанси підприємства.

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INFLUENCE OF INNOVATIVE ACTIVITIES ON THE LEVEL OF PROFITABILITY OF ENTERPRISES

Topicality. Today, the profitability of the enterprise is the main indicator of economic stability, competitiveness, efficiency and the meaning of the creation and further existence of the enterprise in any field of activity. The main goal of the strategy for the development and efficiency of the enterprise is to ensure a sufficient level of competitiveness and obtain maximum profit, therefore, the search and justification of ways to increase the profitability of enterprises is always an urgent problem. In the modern world, during the period of active development of scientific, technical and innovative activities, the introduction of innovations into the activities of enterprises has a huge impact on the level of profitability of modern enterprises.

Aim and tasks. The purpose of the article is to study the impact of innovative activity on the level of profitability of enterprises. In order to achieve the set goal, the following tasks were solved: the concepts of innovative activity and profitability of the enterprise were considered; the influence of innovative activity on the level of profitability of the enterprise is determined; the main indicators of innovative activity of Ukrainian enterprises are analyzed.

Materials and methods. In the process of preparing the study, general scientific methods of cognition, observation, abstract-logical thinking, a systematic approach, and economic interpretation were used. Methods of a systematic approach to solving problems, as well as analysis, synthesis and unity of logical analysis and dialectical development, historical approach, statistical hypotheses and relationships, expert research.

Research results. The article examines the concept of innovative activity and enterprise profitability; the influence of innovative activity on the level of profitability of the enterprise is determined; the main indicators of innovative activity of Ukrainian enterprises are analyzed. Directions for profit maximization and measures aimed at increasing the profitability of enterprises are proposed.

Conclusion. The profitability of any enterprise can be increased due to the implementation of the results of innovative activities. The introduction of innovations makes it possible to produce products of higher quality and less energy consumption, and the operation of the enterprise is more efficient. But it can be said that one of the main problems of introducing innovations at enterprises is the unpreparedness of management to implement them in their economic activity. Although the efficiency of their use can significantly improve the profitability of business entities. Innovative activity is the direction of maximizing the demand for products, as a variety of forms of business organization, as a stage

of the enterprise's innovative business strategy. The development and state of the innovation environment affects the level of profitability of enterprises. The introduction of innovations, the implementation of innovative activities at the enterprise allows to form such areas of profit maximization as: product, technological, organizational and management, resource, market. For the development and activation of innovative activities of domestic enterprises in the country, it is necessary to form and implement a system of targeted measures: development and introduction of a mechanism for granting benefits to enterprises that implement and realize the results of innovative activities; providing innovative enterprises with loans at a reduced credit rate; reduction of income taxation of enterprises that develop, implement innovations and use ecologically dangerous technologies, etc. The proposed measures will help create a favorable innovation climate, stimulate enterprises to increase their interest in the development and implementation of knowledge-intensive technologies, which in turn will lead to an increase in their profitability and competitiveness on the world market. In the country, there is no sufficient relationship between the amount of innovation financing for industrial enterprises and their own capital, the implementation of the results of innovation activity at domestic enterprises is expedient in order to increase their profitability, to determine an innovative development strategy, to make management decisions and increase efficiency and competitiveness. The prospect of further research in this direction is the identification of the relationship between the innovative activities of enterprises and their value indicators in the sector and the development of a universal model for assessing the impact of the innovative development of the enterprise on its profitability.

Keywords: innovation, innovative product, innovation market, innovative activity, innovative enterprise development, innovative potential, labor market, labor resources, competitiveness, enterprise finances.

Problem statement and its connection with important scientific and practical tasks.

Today, the profitability of the enterprise is the main indicator of economic stability, competitiveness, efficiency and the meaning of the creation and further existence of the enterprise in any field of activity. The main goal of the strategy for the development and efficiency of the enterprise is to ensure a sufficient level of competitiveness and obtain maximum profit, therefore, the search and justification of ways to increase the profitability of enterprises is always an urgent problem. In the modern world, during the period of active development of scientific, technical and innovative activities, the introduction of innovations into the activities of enterprises has a huge impact on the level of profitability of modern enterprises.

Analysis of recent publications on the problem. Theoretical and practical issues that are devoted to the problems of innovation, innovative activity, innovative development and profitability of enterprises are considered in many works of domestic and foreign scientists, namely in the works of O. Amosh, I. Ansoff, V. Geets, V. Grynvoi, S. Ilyashenko, A. Peresady, V. Seminozhenko, L. Fedulova and many others, but the problem of the impact of innovative activity on the level of profitability of enterprises is still relevant today.

Allocation of previously unsolved parts of the general problem.

Despite the many existing theoretical studies in economic sources on the problem of profitability of enterprises, modern economic conditions require the search for new, innovative ways of increasing their profitability, which necessitates the need for constant development and improvement of

enterprise development strategies. The constant search for new ways and areas of increasing profitability require an in-depth theoretical study of the impact of innovations and innovative activities on the profitability and innovative development of a modern enterprise.

Formulation of research objectives (problem statement). The purpose of the article is to study the impact of innovative activity on the level of profitability of enterprises.

To achieve the goal, the following tasks were solved:

- the concepts of innovative activity and profitability of the enterprise are considered;
- the influence of innovative activity on the level of profitability of the enterprise is determined;
- the main indicators of innovative activity of Ukrainian enterprises were analyzed.

Materials and methods. In the process of preparing the study, general scientific methods of cognition, observation, abstract-logical thinking, a systematic approach, and economic interpretation were used. Methods of a systematic approach to solving problems, as well as analysis, synthesis and unity of logical analysis and dialectical development, historical approach, statistical hypotheses and relationships, expert research.

An outline of the main results and their justification.

The main goal of the creation and efficiency of the enterprise is to make a profit, the level of profitability maximally reflects the financial capabilities of the enterprise and its ability to expand the economic activity of the enterprise.

Profitability as an indicator of the economic efficiency and effectiveness of the enterprise's activity is its ability to generate a positive financial

result from the implementation of economic activity, which is reflected in the excess of income over expenses in an amount sufficient for future effective functioning. The profitability of the enterprise is an important indicator of its development, as it affects the level of competitiveness, investment attractiveness, financial condition and business activity of the enterprise.

The innovative activity of the enterprise determines its ability to use scientific, technical and intellectual potential in the industry. In the conditions of the development of innovative activities of the enterprise, the transfer of production to the manufacture of completely new equipment, the application of new technologies, the provision of new types of services and the performance of new works is understood. That is, innovative activity consists in finding the latest modern ideas in the field of engineering, technology and organization and management in production. The goal of innovative activity is achieved in the course of performing various exploratory, fundamental, scientific studies, which end with the development of a practical model and the introduction of innovations in the form of innovations to the market. Performance of works within the framework of innovative activities includes independent development of innovations, as well as their acquisition, licensing, patenting and distribution of own innovative ideas (Myktyjuk P. P., Krysjko Zh. L., Ovsjanjuk-Berdadina O. F., Skochyljas S. M., 2015).

Innovative activity is the activity of scientists aimed at ensuring that scientific and technical ideas, inventions, and innovations are brought to a result suitable for practical application and their implementation on the market in order to meet the needs of society for competitive products and services, that is, it is one of the forms of investment activities carried out with the aim of implementing the achievements of scientific and technical progress in production and the social sphere.

Innovative activity plays a major role in the process of increasing the profitability of the enterprise, since it is the development of new technical and technological solutions, improvement of the basic principles of enterprise management that create conditions for updating the innovative processes and products of the enterprise and contribute to economic growth. The constant updating of equipment and technologies makes the innovation process the main condition for the production of competitive products, maintaining and expanding the positions of enterprises on the

market, increasing productivity, as well as the efficiency of the enterprise (Illiashenko S.M., 2016).

Innovative activity is aimed at using the results of scientific and technical progress and intellectual resources in practice with the aim of obtaining innovative products, services, equipment, technology, systems for improving the production process. The introduction of new equipment and technologies ensures the renewal of the material and technical base, reduces resource intensity, and also contributes to the process of increasing the efficiency, profitability and competitiveness of enterprises.

The application of innovations, the implementation of innovative activities at the enterprise allows to form the main directions of profit maximization (fig. 1): product, technological, organizational and management, resource, market.

Based on the direction of profit maximization, innovations can be classified according to the following factors: innovations that increase the value of the enterprise, product innovations, technological innovations, production innovations, pricing innovations, innovations in marketing and advertising, etc. From this, it is possible to propose the following measures that should contribute to the growth of the cost, efficiency of operations and increase the profitability of enterprises due to the use of the results of innovative activities (fig. 2).

It can be said that the implementation of the results of innovative activities in production can significantly increase the profitability of the enterprise, but the state policy on increasing the perception of innovations by enterprises should be aimed at ensuring the formation and effective functioning of a system of mechanisms capable of stimulating the demand for innovations by manufacturers, namely: buying new, modern innovative equipment and technologies; increase the amount of existing intangible assets; update the range of products and improve their quality.

The experience of the countries of the European Union in the implementation of directions for stimulating innovative activity can be noted in this positive way:

- the state supports and stimulates enterprises that develop and implement innovations,
- companies are given tax benefits,
- the system of protection of intellectual property objects is improved and developed,
- there is a direction of foreign investments in the innovation sphere,
- clusters are created,
- a public-private partnership is established to

encourage innovation,

- the development of human capital is supported,
- training and upgrading of staff qualifications in the innovation field, etc. is supported.

Today, Ukraine lacks a perfect system of incentives for the development of the process of developing innovations and introducing them into the activities of enterprises. The main reasons for this are the economic, financial, payment, technical

and technological crisis, the decrease in macroeconomic demand for innovations, which led to the inability of many domestic enterprises to preserve and increase the quality of human potential for the development and implementation of innovations. One of the significant problems of the low innovative activity of Ukrainian enterprises is that the main source of financing the implementation of innovations today is the enterprises' own funds, which are limited.

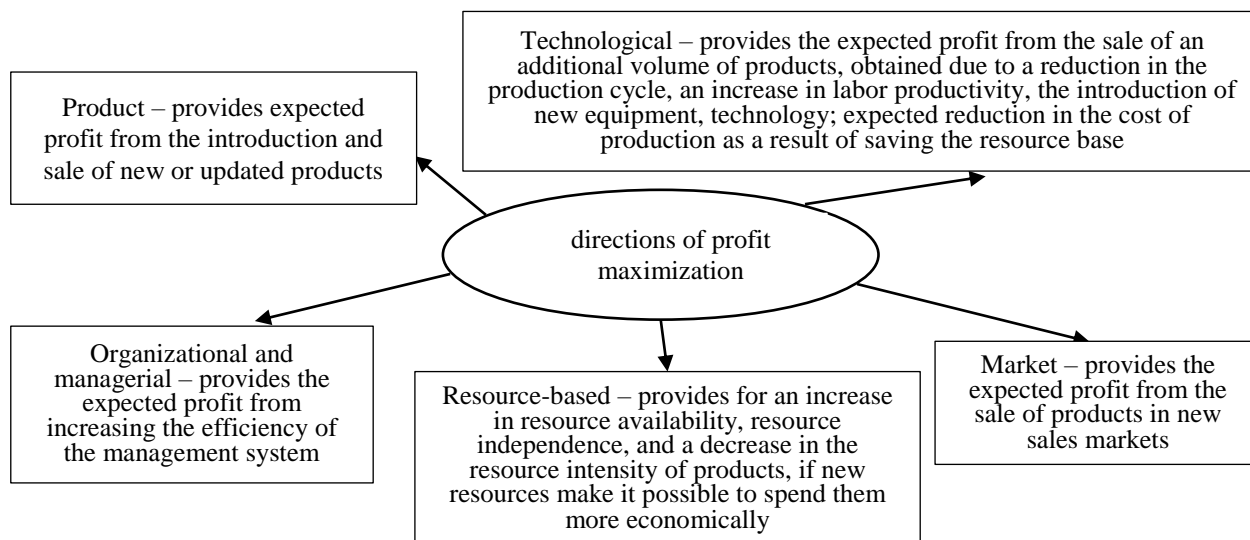


Fig. 1. Directions of profit maximization

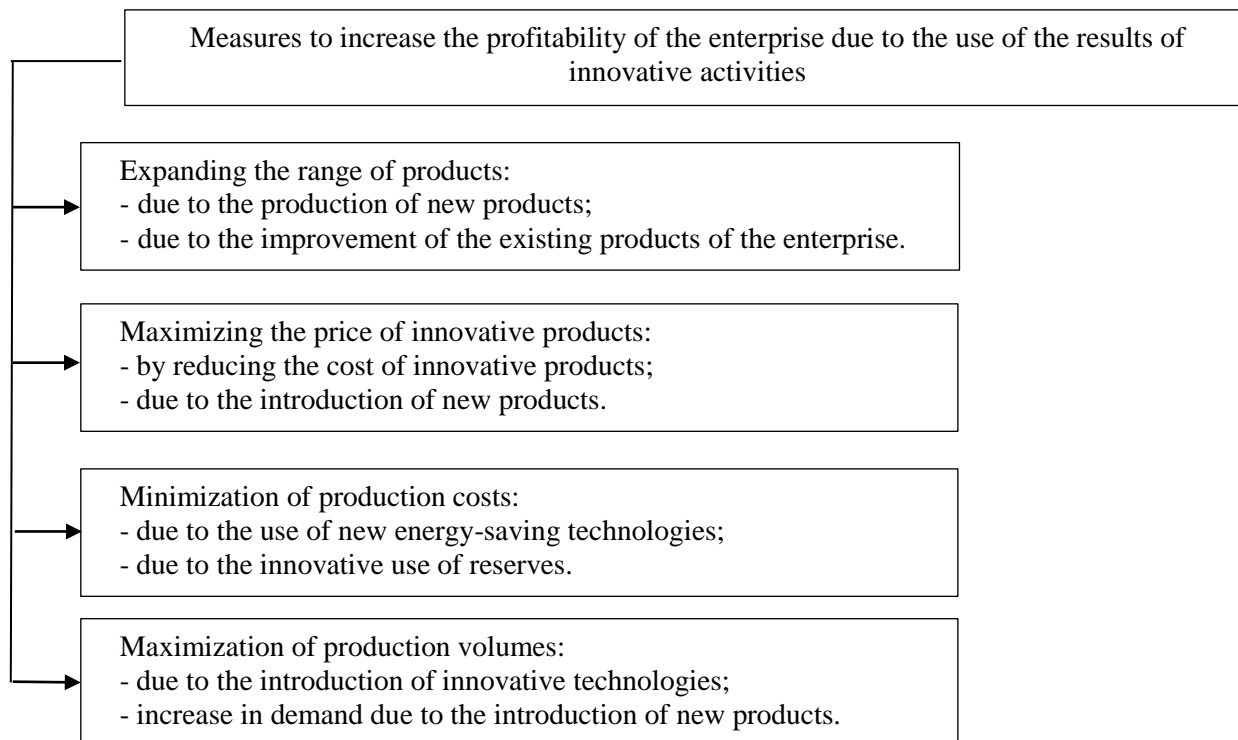


Fig. 2. Measures to increase the profitability of enterprises

In Ukraine, an appropriate base has not been formed for the development of intellectual potential and human creativity, the state does not sufficiently support the development of innovative activity in the economy, does not pay enough attention to the mechanisms of moral and economic motivation and other forms of state support for invention. The country is on the path of innovative development only when the share of domestic enterprises engaged in the development and mastering of innovations is greater than the share of enterprises that purchase innovations and do not carry out research and development on their own.

In Ukraine today, there are very few domestic enterprises engaged in scientific research and the implementation of innovations, as most of them buy new technologies abroad, replacing them with outdated ones, and not the best, not the newest and not the most efficient ones. The world's leading companies sell their outdated innovations to Ukraine, thereby stimulating their own new developments (Zianko V.V., 2015).

The analysis of the information of the State Statistics Service of Ukraine (Derzhavna sluzhba statystyky Ukrainy) showed that during the period 2016-2020, the innovative activity of Ukrainian enterprises decreased, namely: the total amount of costs for innovative activity decreased almost twice from UAH 23229,5 million in 2016 up to UAH 14406,7 million in 2020 most of it is lost on the purchase of machines, equipment and software, this happened mainly at the expense of own funds.

In 2020 scientific research and development in Ukraine was carried out by 769 organizations, which is 19% less than in 2019 (950), due to a decrease in the number of organizations in the business sector by almost two times.

In order to maintain the required level of scientific and technological potential, the share of GDP that should be spent by the country on innovative activities is recommended by the European Union to be within 3-3,3%. According to experts' estimates, with a scientific intensity of less than 0,9% of GDP, science ceases to perform an economic function and performs only a cognitive function. The analysis of the information of the State Statistics Service of Ukraine (Derzhavna sluzhba statystyky Ukrainy) showed that during the period 2016-2020, the innovative activity of Ukrainian enterprises decreased, namely: the total amount of costs for innovative activity decreased almost twice from UAH 23229,5 million in 2016 up to UAH 14406,7 million in 2020 most of it is lost on the purchase of machines, equipment and software, this happened mainly at the expense of own funds.

At that time, it was 0,41% in Ukraine, 3,4% in Sweden, 3,19% in Austria, 3,18% in Germany, 2,96% in Denmark, 2,89% in Belgium, 2,79% in Finland, 2,79% in France 2,19%; in North Macedonia, Romania, Malta, Latvia and Cyprus from 0,37% to 0,64%. The highest values of this indicator are Israel 4,93% and South Korea 4,64%, Japan 3,24% and the USA 3,07%, China 2,2%.

The share of the number of enterprises that introduced innovations in the total number of industrial enterprises decreased from 16,6% in 2016 to 14,9% in 2020, while the volume of innovative products (goods, services) sold in the total volume of products sold by industrial enterprises increased from 0,7% in 2017 to 1,9% in 2020, but is constantly decreasing compared to previous years (Derzhavna sluzhba statystyky Ukrainy).

In 2020 – 1086 patents for inventions were issued in the name of national applicants, which is 13% less than in 2019. The low level of patenting of Ukrainian inventions abroad is mainly explained by their lack of financial resources, which deprives them of the opportunity to protect the right on inventions in other countries (Nauka ta innovaciji).

In 2020 – 1298 technologies created with budget funds were transferred, which correspond to strategic priority areas of innovative activity, which is 96,3% of the total volume of transferred technologies created with state budget funds. The transfer of these technologies was carried out mainly in the domestic market – 96,8% (Nauka ta innovaciji).

The volume of revenues from the transfer of technologies in 2020 (Derzhavna sluzhba statystyky Ukrainy) amounted to UAH 225,8 million due to the growth of revenues in the domestic market, which is 12,2% more than in 2019. In the foreign market, revenues decreased by 3,7 times. On the domestic market, 755 transferred technologies are new for Ukraine, on the foreign market, all 41 technologies are new.

Today, an important role in the innovative development of any country is played by the assessment of the ability of its enterprises to perceive innovative activities.

Ukraine participates in international ratings for evaluation of innovation potential and innovation capacity (Pysarenko T.V., Kuranda T.K., Kvasha T.K. ta in., 2021). The most important ratings are: Global Innovation Index, Bloomberg Innovation Index, Global Talent Competitiveness Index, European Innovation Scoreboard.

According to the Global Innovation Index in 2021, Ukraine ranks 49th among 132 countries in the world in terms of their innovation performance

(80 indicators in 7 areas). Switzerland, Sweden and the USA lead the ranking of the leading innovator countries, while Ukraine is in 32nd place among the countries of the European region and in third place in the group of countries with income below the average, with a GDP per capita of 12710 dollars (Worldbank, 2022).

In 2021, according to the Global Innovation Index, Ukraine dropped by 4 positions compared to 2020,

and by 25 positions compared to 2015 (from 33rd to 58th place). The basis of its innovative capacity is human capital and research (44th place), as well as knowledge and technological results (33rd place). The deterioration of the condition is due to the weakening of all components of the rating, which include:

- productivity;
- patent activity;
- the efficiency of higher education, which is defined as the share of graduates of higher education institutions in the total number of graduates of educational institutions;
- production with added value or technological capabilities (added value of production in relation to GDP);
- the intensity of research and development (expenditure on R&D in relation to GDP);
- concentration of researchers (number of scientists per 1 million of the country's population);
- the penetration of high technologies or the number of high-tech enterprises (the share of innovative companies in the total number of enterprises).

According to the innovative development index of the Bloomberg Agency (Bloomberg, 2022), in 2021, Ukraine ranked 58th among the 60 studied countries, compared to 33rd in 2015 and 56th in 2020.

The Global Talent Competitiveness (Index Global Innovation Index, 2021), ranks 134 countries based on their ability to develop and attract talent across 6 components (70 indicators). Switzerland, Singapore, the USA, Denmark and Sweden are the leaders according to this indicator in 2021, Ukraine ranks 61st in the world and 35th in Europe. The improvement is observed in five of the six components of this index: according to the criterion «Market and regulatory opportunities», «Talent attraction index», «Talent development index», «Talent retention index or the ability to retain qualified personnel» and «Global knowledge». At the same time, the values of indicators according to the criterion «Employees production skills» have deteriorated.

The European Innovation Scoreboard (European Innovation Scoreboard, 2021) provides a comparative assessment of the strengths and weaknesses of the innovation systems of 27 EU member states and 10 neighboring countries, including Ukraine. According to the consolidated innovation index (34th place in 2021).

Ukraine's strengths in terms of innovation are: impact on employment and digitalization. The indicators: intellectual assets, innovative activity are developing poorly, there are no results for the innovative dimension of the indicators: innovators and innovative activity (Pysarenko T.V., Kuranda T.K., Kvasha T.K. et al., 2021).

To assess the ability of countries to implement and use modern advanced technologies, the Index of readiness for advanced/breakthrough technologies is used, which is formed from five components: implementation of information and communication technologies, personnel, research and development, use in industry and access to finance.

Ukraine has a fairly high rating for such components as the level of education of the population and research activity, the share of high technologies in industrial production, at the same time – a low rating for the level of infrastructure of information and communication technologies and the availability of private companies to loans.

Innovative technologies in the general scheme of controlling the stability of the functioning of enterprises play a dominant role in the crisis and post-crisis period. Market competition forces enterprises to look for new approaches to ensure effective functioning, in particular by increasing innovative activity. In various scientific researches and developments, innovative activity of the enterprise is considered at different levels.

Many specialists consider the following as key indicators of the efficiency of innovative activity of enterprises at the industry level:

- the number of enterprises engaged in innovative activities;
- the number of enterprises that conducted research and development;
- volume of implemented innovative products;
- the number of implemented new technological processes;
- the number of presented novelties, etc.

The following are the main intra-organizational indicators of innovative activity:

- degree of participation of the enterprise in the development of innovations;
- quality of innovative strategy;
- qualitative innovation goals;
- the level of mobilization of innovative

potential;

- speed of innovative changes;
- cost of innovations;
- the number of patents.

The insufficient level of application of innovations at domestic enterprises has a very negative effect on the performance indicators of their activity. The focus on innovative development and implementation of the results of innovative activities has a positive effect on the growth of the value of enterprises, increasing their profitability, operational efficiency and competitiveness.

Conclusions and perspectives of further research.

The profitability of any enterprise can be increased due to the implementation of the results of innovative activities. The introduction of innovations makes it possible to produce products of higher quality and less energy consumption, and the operation of the enterprise is more efficient. But it can be said that one of the main problems of introducing innovations at enterprises is the unpreparedness of management to implement them in their economic activity. Although the efficiency of their use can significantly improve the profitability of business entities.

Innovative activity is the direction of maximizing the demand for products, as a variety of forms of business organization, as a stage of the enterprise's innovative business strategy. The development and state of the innovation environment affects the level of profitability of enterprises. The introduction of innovations, the implementation of innovative activities at the enterprise allows to form such areas of profit

maximization as: product, technological, organizational and management, resource, market.

For the development and activation of innovative activities of domestic enterprises in the country, it is necessary to form and implement a system of targeted measures: development and introduction of a mechanism for granting benefits to enterprises that implement and realize the results of innovative activities; providing innovative enterprises with loans at a reduced credit rate; reduction of income taxation of enterprises that develop, implement innovations and use ecologically dangerous technologies, etc. The proposed measures will help create a favorable innovation climate, stimulate enterprises to increase their interest in the development and implementation of knowledge-intensive technologies, which in turn will lead to an increase in their profitability and competitiveness on the world market.

In the country, there is no sufficient relationship between the amount of innovation financing for industrial enterprises and their own capital, the implementation of the results of innovation activity at domestic enterprises is expedient in order to increase their profitability, to determine an innovative development strategy, to make management decisions and increase efficiency and competitiveness. The prospect of further research in this direction is the identification of the relationship between the innovative activities of enterprises and their value indicators in the sector and the development of a universal model for assessing the impact of the innovative development of the enterprise on its profitability.

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МІЖМУНІЦИПАЛЬНА СПІВПРАЦЯ ЯК КАТАЛІЗАТОР РОЗВИТКУ ТЕРИТОРІАЛЬНИХ ГРОМАД (НА ПРИКЛАДІ ТИЛІГУЛЬСЬКОГО СУБРЕГІОНУ)

Актуальність. Міжмуніципальна співпраця є актуальним інструментом розвитку громад у будь якій країні з децентралізованою територіальною адміністративною системою. Дослідження обумовлене необхідністю у реорганізації та удосконаленні взаємовідносин між громадами Тилігульського субрегіону задля вирішення проблем фінансування масштабних проєктів міжмуніципального, міжрегіонального і міжобласного значення та забезпечення сталого розвитку субрегіону.

Мета та завдання. Метою даного дослідження є розробка методичного інструментарію щодо вибору кращої форми організації співробітництва громад, належних до об'єктивно утвореного цілісного субрегіону з використанням ознак сталого розвитку, тобто в розрізі економічної, соціальної, екологічної складових. Окремими завданнями дослідження є проведення аналізу інституціонального забезпечення і сутності різних форм співробітництва територіальних громад, ідентифікація релевантних ознак, за якими визначаються спільні характеристики і передумови організації співробітництва громад; визначення найкращої форми економічного співробітництва громад і спільного використання просторово-ресурсного потенціалу, на прикладі Тилігульського субрегіону.

Матеріали та методи. Оцінка різних форм міжмуніципального співробітництва з метою пошуку найкращих варіантів організації економічної співпраці субрегіонів здійснена з використанням методів системного, логічного аналізу. Врахування досвіду кращих практик організації економічного співробітництва територіально-господарських систем в країнах ЄС здійснено з використанням засобів бенчмаркінгового аналізу. Узагальнення та співставлення даних про перспективи співпраці громад Тилігульського субрегіону, визначення очікуваної активності та результативності такої співпраці здійснено з використанням методів статистичного аналізу.

Результати. У статті розглянуто сучасний стан міжмуніципального співробітництва в Україні та в Причорноморському регіоні. Також визначені основні фактори, що створюють передумови для успішної міжмуніципальної співпраці територіальних громад Тилігульського субрегіону. Оскільки при здійсненні міжмуніципального партнерства найважливішими питаннями, які постануть перед територіальними громадами, є визначення сутності, предмету та найвдалішої форми співробітництва, було розглянуто кожну із п'яти форм міжмуніципальної співпраці у розрізі зацікавлених у співпраці громад і визначено їх позитивні та

негативні сторони. На основі проведеного дослідження запропоновані перспективи подальшого розвитку співробітництва територіальних громад Тилігульського субрегіону.

Висновки. Результатом даного дослідження є визначення найбільш перспективного варіанту співпраці територіальних громад Тилігульського субрегіону, що базується на утворенні спільного органу управління, а саме Відділу стратегічної проєктної діяльності та інвестицій територіальних громад Тилігульського субрегіону. Реалізація запропонованого сценарію вирішить проблему фінансування масштабних проєктів міжмуніципального, міжрегіонального і міжобласного значення, а розглянуті у статті можливості запропонованого формату співпраці, в результаті, дозволять забезпечити сталий розвиток субрегіону.

Ключові слова: міжмуніципальне співробітництво, територіальна громада, адміністративно-територіальний устрій, місцеве самоврядування, державна політика.

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INTERMUNICIPAL COOPERATION AS A CATALYST FOR THE DEVELOPMENT OF TERRITORIAL COMMUNITIES (ON THE EXAMPLE OF TILIGUL SUBREGION)

Topicality. Intermunicipal cooperation is a relevant tool for community development in any country with a decentralized territorial administrative system. The study is motivated by the need to reorganize and improve relations between the communities of the Tyligul subregion in order to solve the problems of financing large-scale projects of intermunicipal and interregional importance and ensure the sustainable development of the subregion.

Aim and tasks. The purpose of this study is to develop a methodological toolkit for choosing the best form of organization of cooperation of communities belonging to an objectively formed integral subregion using the signs of sustainable development, that is, in terms of economic, social, and environmental components. Separate tasks of the research are the analysis of institutional support and the essence of various forms of cooperation of territorial communities, the identification of relevant features, which determine the common characteristics and prerequisites for the organization of cooperation of communities; determination of the best form of economic cooperation of communities and joint use of spatial and resource potential, on the example of the Tyligul subregion.

Materials and Methods. Evaluation of various forms of intermunicipal cooperation with the aim of finding the best options for organizing economic cooperation of subregions was carried out using methods of systematic, logical analysis. Taking into account the experience of the best practices of the organization of economic cooperation of territorial economic systems in the EU countries was carried out using the means of benchmarking analysis. Generalization and comparison of data on the prospects of cooperation between communities of the Tyligul subregion, determination of the expected activity and effectiveness of such cooperation was carried out using methods of statistical analysis.

Research results. The article examines the current state of inter-municipal cooperation in Ukraine and the Black

Sea region. The main factors that create prerequisites for successful inter-municipal cooperation of territorial communities of the Tyligul subregion are also defined. Since the most important issues that will be faced by territorial communities during the implementation of inter-municipal partnership are the determination of the essence, the subject and the most successful form of cooperation, each of the five forms of inter-municipal cooperation was considered and their positive and negative sides were determined. On the basis of the conducted research, prospects for the further development of cooperation between territorial communities of the Tyligul subregion are proposed.

Conclusion. *The result of this study is the determination of the most promising option for the cooperation of territorial communities of the Tyligul subregion, based on the formation of a joint management body, namely the Department of Strategic Project Activities and Investments of Territorial Communities of the Tyligul Subregion. The implementation of the proposed scenario will solve the problem of financing large-scale projects of inter-municipal and inter-regional importance, and the possibilities of the proposed format of cooperation discussed in the article will, as a result, allow to ensure the sustainable development of the subregion.*

Keywords: *inter-municipal cooperation, territorial community, administrative-territorial system, local self-government, state policy.*

Problem statement and its connection with important scientific and practical tasks.

Intermunicipal cooperation (IMC) is inherent in the decentralized territorial administrative system. The more municipalities have their own powers and rights to make management, financial and budgetary decisions, the more they need to cooperate and the more they can do together to ensure the sustainable development of their territories.

In a centralized state where municipalities have few powers and limited resources, there is no need for joint action. Most of the local problems will be solved by the government itself. When municipalities are endowed with a large number of competences, when they are free to organize the provision of services to citizens and perform administrative duties, there are many cases where cooperation with other municipalities can bring significant benefits.

Since the state policy of Ukraine in the field of local self-government is based on the interests of residents of territorial communities (TC) and provides for the decentralization of power - that is, the transfer of a significant part of powers, resources and responsibilities from the executive authorities to local self-government bodies (The official portal of decentralization in Ukraine), inter-municipal cooperation should be an actual tool for the development of communities. Municipalities should join forces with other municipalities if this is a way to improve their efficiency and effectiveness.

At the same time, the most important task is for central and local authorities to understand the benefits that municipalities and their citizens can receive through IMC, and how to get these benefits in a reasonable way.

Analysis of recent publications on the problem. Scientists showed interest in the topic of inter-municipal cooperation even before the start of the process of decentralization of Ukraine. Today, there is a sufficient number of scientific works

dedicated to this topic, in particular, a significant contribution to the study of the issue of community cooperation, ensuring spatial development and organizing the effective functioning of territorial and economic systems was made by: Z.O. Sirik, I.L. Parasyuk, V.S. Kravtsiv, I.Z. Storonyanska, M.I. Melnyk, I.V. Zablodska, A.I. Mokii, O.I. Nikiforuk, I.I. Kulchytskyi, B.V. Burkinsky (Burkinskyi B. V., Andreeva N.M. (Ed.), 2020), O.I. Laiko (Tkachuk A., Serhiienko O., Laiko O., Natalenko N., 2019), I.O. Lunina, Yu.M. Popova, M.M. Kononenko, M.V. Maksymchuk, T.G. Barabash, L.P. Olenkovska, V.V. Kruglov, P.M. Lyubchenko and others.

Allocation of previously unsolved parts of the general problem. Despite the presence of a large number of studies, at the moment the problems of the development of inter-municipal cooperation in Ukraine from the point of view of the applied aspect have not been fully disclosed.

Formulation of research objectives (problem statement). This work examines the possibility of inter-municipal cooperation of six communities of the Tyligul subregion, namely:

- Yuzhne TC (Odesa region, Odesa district);
- Vyzyrka TC (Odesa region, Odesa district);
- Kurisove TC (Odesa region, Bereziv district);
- Berezivska TC (Odesa region, Berezivskyi district);
- Berezanska TC (Mykolaiv region, Mykolaiv district);
- Koblevo TC (Mykolaiv region, Mykolaiv district).

Materials and Methods. The methods of systemic, logical, and structural analysis are applied to evaluate various forms of intermunicipal cooperation in order to find the most rational options for organizing economic cooperation of subregional cooperation subjects. A methodical approach to choosing the optimal form of

community cooperation based on 5 groups of factors of spatial, human, ecological development and managerial, resource-economic rationality has been developed, which is proposed for use by 6 communities of the subregion in the basin of the Tyligul estuary to ensure the coordinated development of this territorial and economic system around a common natural resource

Assessment of the suitability for implementation in the communities of Ukraine of the best practices of organizing economic cooperation of the territorial and economic systems of the EU countries was carried out using the means of benchmarking and comparative analysis. The application of the proposed methodical approach was carried out with the use of statistical analysis methods for summarizing and comparing data on the prospects of cooperation between the communities of the Tyligul subregion and determining the expected effectiveness of such cooperation.

An outline of the main results and their justification. In Ukraine, the main legislative act in the field of inter-municipal cooperation is the Law of Ukraine "On Cooperation of Territorial Communities" dated July 24, 2014 No. 1508-VII (hereinafter - the Law), which defines the organizational and legal principles of cooperation of territorial communities, principles, forms, mechanisms of such cooperation, its stimulation, financing and control.

According to the Law, the cooperation of territorial communities means relations between two or more territorial communities that are carried out on a contractual basis with the aim of ensuring the socio-economic and cultural development of territories, improving the quality of providing services to the population based on common interests and goals, effective implementation by local self-government bodies of defined by the law of powers. At the same time, the Law defines five forms of cooperation:

1) delegation of one or more tasks to one of the subjects of cooperation by other subjects of cooperation with the transfer of relevant resources to him;

2) the implementation of joint projects, which involves the coordination of the activities of cooperation subjects and their accumulation of resources for a specified period in order to jointly implement relevant measures;

3) joint financing (maintenance) by subjects of cooperation of enterprises, institutions and organizations of communal form of ownership - infrastructure objects;

4) formation by subjects of cooperation of joint communal enterprises, institutions and organizations - joint infrastructure facilities;

5) formation of a joint management body by the subjects of cooperation for the joint performance of powers defined by law.

According to the Register of Agreements on Cooperation of Territorial Communities maintained by the Ministry of Development of Communities and Territories of Ukraine, since 2014, a total of 857 agreements on cooperation have been registered in Ukraine, 4 of which have lost their validity.

At the moment, the most popular form of cooperation is the implementation of a joint project (table 1), which can be explained by the absence of the need to fulfill the requirements provided for in Articles 5-9 of the Law, that is, cooperation participants can be free of:

- formalizing the initiation of cooperation;
- conducting negotiations on the organization of cooperation;
- creating a commission for the preparation of a draft cooperation agreement;
- conducting public discussion and approval of the draft cooperation agreement.

As a result, the format of cooperation in the form of implementation of joint projects is simplest and takes much less time.

Table 1

Distribution of agreements on cooperation of territorial communities by form of cooperation

Form of cooperation	Number of IMC contracts
Delegation of tasks	105
Implementation of joint projects	532
Joint financing of infrastructure facilities	197
Formation of joint infrastructure facilities	17
Formation of a joint management body	6

Developed by the authors based on source: Ministry for Communities and Territories Development of Ukraine. <https://www.minregion.gov.ua/napryamki-diyalnosti/rozvytok-mistsevohosamovryaduvannya/reystyr/>

As a result of the analysis of the distribution of agreements on the cooperation of territorial communities by regions of Ukraine, it was established that the largest percentage of agreements falls on Vinnytsia and Poltava regions.

Donetsk, Luhansk and Kherson regions are characterized by the lowest indicators. For them, the number of cooperation agreements is less than one percent of the total number of agreements in Ukraine.

Table 2

Distribution of agreements on cooperation of territorial communities by regions of Ukraine

Regions	Number of IMC contracts	%
<i>Vinnytsya</i>	113	13,19
<i>Volyn</i>	31	3.62
<i>Dnipro</i>	37	4.32
<i>Donetsk</i>	3	0.35
<i>Zhytomyr</i>	46	5.37
<i>Zakarpattia</i>	9	1.05
<i>Zaporizhya</i>	37	4.32
<i>Ivano-Frankivsk</i>	21	2.45
<i>Kyiv</i>	18	2.10
<i>Kropyvnytskyi</i>	23	2.68
<i>Luhansk</i>	5	0.58
<i>Lviv</i>	78	9,10
<i>Mykolayiv</i>	11	1.28
<i>Odesa</i>	20	2.33
<i>Poltava</i>	121	14,12
<i>Rivne</i>	44	5.13
<i>Sumy</i>	71	8.28
<i>Ternopil</i>	15	1.75
<i>Kharkiv</i>	50	5.83
<i>Kherson</i>	5	0.58
<i>Khmelnyskiy</i>	11	1.28
<i>Cherkasy</i>	45	5.25
<i>Chernivtsi</i>	18	2.10
<i>Chernihiv</i>	25	2.92
In total	857	100.00

Developed by the authors based on source: Ministry for Communities and Territories Development of Ukraine. <https://www.minregion.gov.ua/napryamki-diyalnosti/rozvytok-mistsevoho-samovryaduvannya/reystri/>

In general, the Black Sea region of Ukraine is characterized by rather low activity regarding the conclusion of cooperation agreements. Odesa, Kherson and Mykolaiv regions account for only 35 contracts. Since the territorial communities (TCs) studied in this work belong to the Odesa and Mykolaiv regions, we will consider in more detail

the IMC agreements of these regions.

Table 1.3 shows the distribution of agreements on cooperation between territorial communities of Odesa and Mykolaiv regions, from which it can be seen that the most active community in the field of IMC is the Tatarbunary City Council of Odesa region.

Table 3

Distribution of agreements on cooperation of territorial communities of Odesa and Mykolaiv regions

The name of the territorial community	Number of IMC contracts
Odesa region	
Avangard TC	3
Zatyshanska TC	2
Zakharivska TC	1
Znamyanska TC	1
Karolina-Bugazka TC	1
Lymanska TC	3
Ovidiopol TC	1
Tatarbunary TC	7
Velikodalnytsk TC	1

Mykolaiv region	
Voznesensk TC	1
Koblevo TC	2
Mishkovo-Pohorilivska TC	1
Mostivska TC	1
Novobuzka TC	3
Olshanska TC	1
Pervomayska TC	2

Developed by the authors based on source: Ministry for Communities and Territories Development of Ukraine. <https://www.minregion.gov.ua/napryamki-diyalnosti/rozvytok-mistsevoho-samovryaduvannya/reystri/>

In the area of territorial communities of the Tyligul subregion, which is considered by us, several IMS agreements were concluded, and the subject of cooperation responsible for submitting reports on the implementation of cooperation agreements is the Kobliv village council of the Mykolaiv region.

One of the contracts was implemented in the form of implementation of joint projects, and the other participant of this contract is the Yuzhne City Council of the Odesa Region. That is, two of the six territorial communities considered in this paper already had the experience of the IMC.

For further work, it is necessary to determine the main factors that create the prerequisites for a successful IMS of the Tyligul Subregion.

Using some form of collaboration is often a clear response to the challenges that municipalities face. But it may not be easy; there may be obstacles that complicate such cooperation: political differences between municipalities; the complexity of legal procedures and forms of the IMC; lack of finance and experience. As a result, the main factors for a successful IMC can be determined:

- affinity of the main features of the spatial structure of the area;
- similar specifics of territories;
- the probability of the development of joint spheres in terms of territories;
- coherence of activities of local self-government bodies;
- consistency of interests of the population;
- existing development activities.

In order to determine the potential of inter-municipal cooperation of territorial communities of the Tyligul subregion, six fairly indicative territorial characteristics (Portal «Nature of Ukraine») were singled out, namely:

- 1) orthographic characteristics of territorial communities of Tyligul subregion;
- 2) river basins of territorial communities of the

Tyligul subregion;

3) soil fertility of territorial communities of the Tyligul subregion;

4) sunshine of territorial communities of the Tyligul subregion;

5) agroclimatic zoning of territorial communities of the Tyligul subregion;

6) ecological living conditions of the population of territorial communities of the Tyligul subregion.

As a result, it was determined that the territories around the Tyligul subregion have not identical, but similar characteristics. This means that joint projects that are related to territorial features, for example, with agriculture (fertility of the soils of TCs Tyligul subregion have an estimate of 59 to 80 points and are not very fertile or too poor, and also all territories are arid) or with development aquaculture (one river basin), have potential for all TGs.

Such indicators as the ecological living conditions of the population and the duration of sunshine should be especially noted.

Since the indicator of ecological living conditions of the population is generalized and takes into account a large number of man-made factors, this opens up significant potential for environmental projects, because all TCs are characterized by deteriorated conditions.

As for the duration of sunlight, it is an important characteristic of the radiation regime and a criterion for the resources of individual territories. Total solar radiation is the main component of the radiation balance, which is used to evaluate and calculate solar energy indicators (Rybchenko, L.S., Savchuk, S.V., 2015. That is, the affinity of the territories of TCs according to this parameter gives the green light for projects related to solar energy.

If we characterize the administrative-territorial structure of the Tyligul subregion, then the investigated TCs belong to two territorial units of the regional level (oblast), three territorial units of

the subregional level (districts) and six territorial units of the basic level (territorial communities). The administrative-territorial structure of the territories of the Tyligul subregion, as well as information on the number of settlements

(localities), area and population of each territorial community considered in this work, are presented in Figure 1.

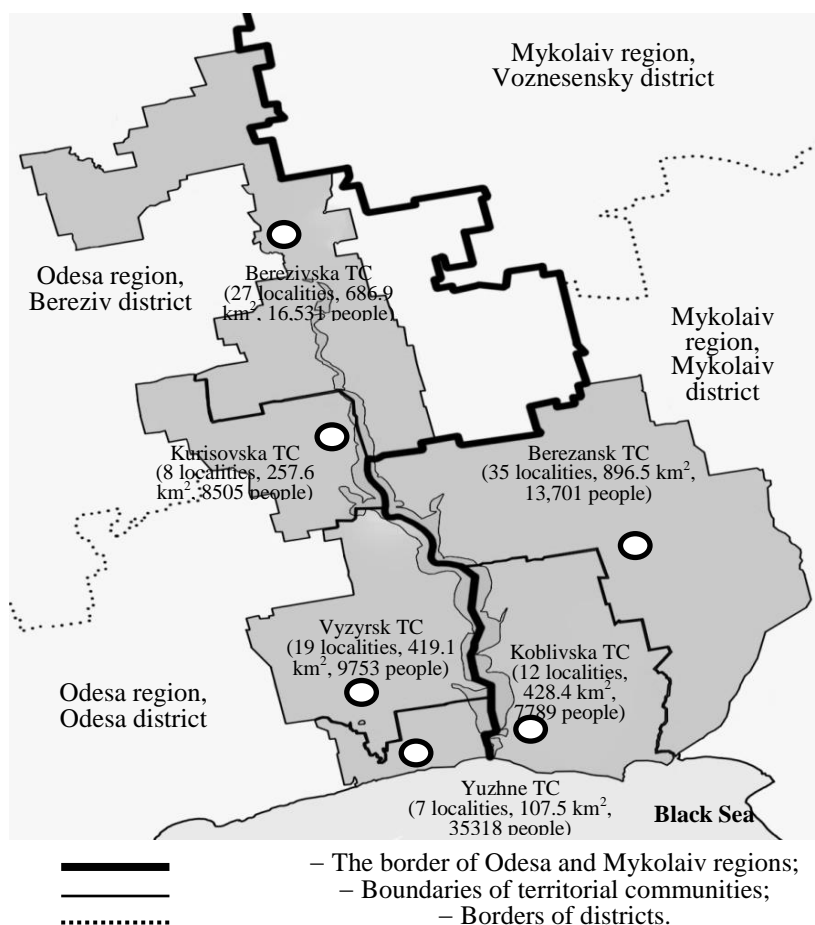


Fig. 1 - Administrative and territorial structure of the territories of the Tyligul subregion

Source: Developed by the authors

As for the probability of development of common areas in terms of territories, the main tool for the activity and organization of successful cooperation of the IMC of the Tyligul subregion is the creation of the Tyligul tourism and recreation cluster, the general purpose of which is to consolidate the efforts of partner communities located along the Tyligul subregion for the sustainable development of partner communities in the surrounding territories, by combining various types of recreation and health and tourist services, providing training for specialists and interested persons in the field of tourism, especially in the field of rural green tourism, spreading and promoting innovative methods of development of the tourism industry.

As for the existing development activities, as already mentioned above, two of the six communities of the Tyligul subregion already had the experience of the IMC, and four of the six have an existing

development strategy, two more from the TCs are currently working on creation of it.

As we can see, few TCs of the Tyligul subregion already has experience in development activities, which allows us to draw a conclusion about the interest of the studied TCs in further increasing the level of the socio-economic and ecological state of their territories.

The coherence of the activities of local self-government bodies and the coherence of the interests of the population of all TGs cannot be determined without further scientific and practical support of the process of concluding an IMC agreement and the development of a joint Development Strategy for six communities of the Tyligul subregion.

As a result of consideration of the Law of Ukraine "On Cooperation of Territorial Communities" and all forms of cooperation, a generalized scheme of the MMC was derived, which is presented in Figure 2.

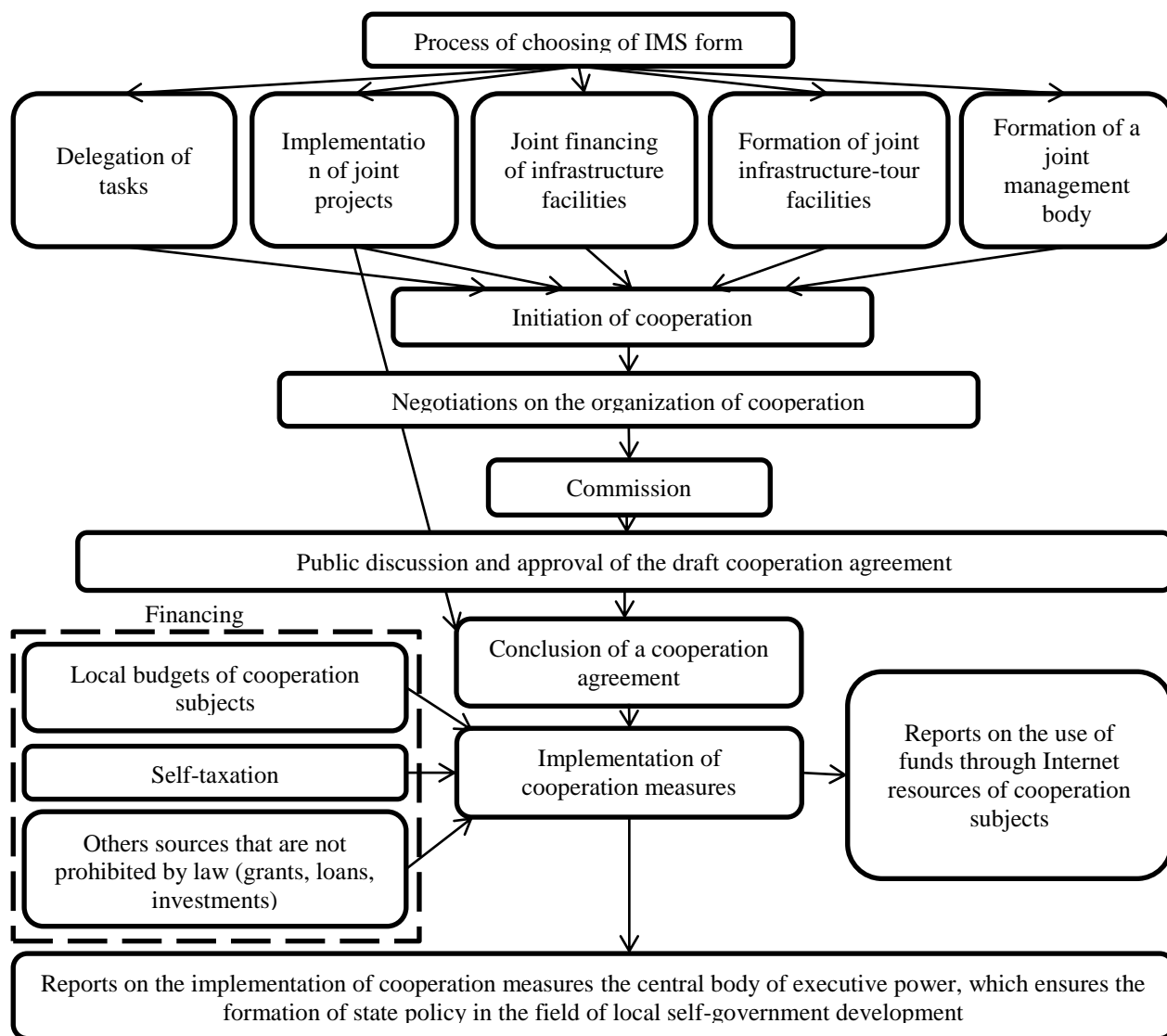


Fig. 2 – Algorithm for the organization of inter-municipal cooperation of territorial communities
 Developed by the authors based on source: Verkhovna Rada of Ukraine. Legislation of Ukraine.
<https://zakon.rada.gov.ua/laws/show/1508-18#Text>

Analyzing the scheme presented above, we can conclude that, if there is a desire to engage in the process of inter-municipal partnership, the most important issue facing territorial communities is the choice of the most successful form of such cooperation. To do this, it is necessary to consider each of the five forms of IMC in terms of communities interested in cooperation and to determine their positive and negative sides.

Cooperation in the form of delegating to one of the subjects of cooperation by other subjects of cooperation the performance of one or more tasks with the transfer of relevant resources to him can be applied in those cases when one subject of cooperation has the opportunity to provide certain services, and others cannot, but are able to delegate the relevant right and transfer the necessary resources for their provision (providing preschool education for children living in territorial

communities where there are no preschool educational institutions; activities of communal enterprises, in particular in matters of water supply, solid household waste management, landscaping, etc.) (Tolkovanov, V.V. and Zhuravel, T.V., 2016).

It can be concluded that the agreement on cooperation in the form of delegation of the performance of certain tasks is beneficial only if five of the six communities do not perform certain tasks, which is unlikely and will lead to a reduction in the number of employees who performed these tasks earlier.

Cooperation in the form of implementation of joint projects involves the coordination of the activities of the subjects of cooperation and their accumulation of resources for a certain period in order to jointly implement certain events (competitions, Olympiads, competitions, etc.) and

the implementation of IMC projects.

As already noted above, during the preparation of the draft agreement on cooperation in the form of implementation of the joint project, the requirements stipulated in Articles 5-9 of the Law of Ukraine "On Cooperation of Territorial Communities" may not be applied.

As a result, this form of cooperation for the TG of the Tyligul subregion is the simplest, but it sets limited frameworks for development.

Cooperation in the form of joint financing (maintenance) by subjects of cooperation of enterprises, institutions and organizations of communal ownership - infrastructure objects can be organized by interested territorial communities in the case when one potential subject has a certain infrastructure object, and others subjects have a need for it services on the theirs territory and have able to jointly finance (maintain) this infrastructure facility (Tolkovanov, V.V. and Zhuravel, T.V., 2016).

This scheme of cooperation is not suitable for TCs of the Tyligul subregion, because no community will reduce the employees of similar organizations, and the absence of such organizations is unlikely.

Cooperation in the form of formation by the subjects of cooperation of joint communal enterprises, institutions and organizations - joint infrastructure objects is expedient to apply in those cases when none of the potential MMC subjects has a certain infrastructure object or enterprise, and its creation is absolutely necessary and economically justified for all subjects who intend to organize this form of cooperation (Tolkovanov, V.V. and Zhuravel, T.V., 2016).

As in the case of cooperation in the form of joint financing (maintenance) of enterprises,

institutions and organizations of communal ownership, the scheme of cooperation in the form of the formation of joint communal enterprises, institutions and organizations is not suitable for TCs of the Tyligul subregion, because the absence of such organizations is unlikely. The only option for cooperation under this scheme is if the duties of the this institution will be fundamentally new.

Cooperation in the form of the formation by the subjects of cooperation of a joint management body for the joint performance of powers defined by law can be organized to create a separate unit or as part of the executive committee of the relevant council, for example, for accounting and/or legal support of the activities of several local self-government bodies (Tolkovanov, V.V. and Zhuravel, T.V., 2016).

A joint management body can be formed as a separate executive body of a village, settlement, city council of one of the subjects of cooperation or as part of the executive body of a village, settlement, city council of one of the subjects of cooperation (as a structural unit - department, management unit, project bureau, agency, etc.).

Such cooperation is the most difficult to implement, but at the same time it provides an opportunity to expand the priorities of all communities. On the basis of one of the TGs, it is possible to create such a department that will manage separate structures of all TCs. For example, a department for the development of the TCs of the Tyligul subregion, which will legally accompany the departments or organizations that are already engaged in the development of the territories of the TCs.

Table 4 shows the positive and negative aspects of all the above-mentioned schemes of inter-municipal cooperation.

Table 4

Positive and negative aspects of various forms of IMS

Positive aspects	Negative aspects
Delegation of individual tasks	
<ul style="list-style-type: none"> – There is no need to create a new organization; – Expansion of the staff of employees (new workplaces) to which tasks will be delegated; 	<ul style="list-style-type: none"> – Reducing the number of employees who previously performed these tasks (unless other TCs previously did not perform these functions); – Conflict of interests (work is concentrated in one TC);
Implementation of joint projects	
<ul style="list-style-type: none"> – Simplified procedure; – Clear work plan; – Equal work of all TCs; 	<ul style="list-style-type: none"> – Limited framework for development; – Funding must be available at the beginning of the project;
<ul style="list-style-type: none"> – There is no need to create a new organization; 	<ul style="list-style-type: none"> – There is no need to expand staff (no new workplaces);
Joint financing (maintenance) of enterprises, institutions and organizations of communal form of ownership	

<ul style="list-style-type: none"> – There is no need to create a new organization; – Expansion of the staff (new workplaces) that will serve a larger number of TCs; 	<ul style="list-style-type: none"> – Reduction of similar organizations of other TCs (unless there are no such organizations at all); – Conflict of interests (work is concentrated in one TC);
Formation of joint communal enterprises, institutions and organizations	
<ul style="list-style-type: none"> – Expansion of the staff of employees (new workplaces) who will work in the new organization; 	<ul style="list-style-type: none"> – There is a need to create a new organization; – Conflict of interests (work is concentrated in one TC); – Reduction of similar organizations of other TCs (unless there are no such organizations at all);
Formation of a joint management body	
<ul style="list-style-type: none"> – It is possible to support the activities of already existing organizations; – Expansion of the staff of employees (new workplaces) who will work in the new organization; – New development priorities of all TCs; 	<ul style="list-style-type: none"> – There is a need to create a new organization; – Conflict of interests (if work will be concentrated in one TC the new organization will control certain structures of all TCs);

Source: Developed by the authors

Based on the results of the evaluation of all the forms of inter-municipal cooperation discussed above, it was concluded that the most attractive and promising option for cooperation between the TCs of the Tyligul subregion is cooperation in the form of the formation of a joint management body, namely the Department of Strategic Project Activities and Investments of the TCs of the Tyligul Subregion. The activity of such a body should cover the sphere of strategic development, and the department itself should be of a coordinating, accompanying and monitoring nature, the scope of its activity should focus on attracting additional extra-budgetary resources to solve the problems of implementing development projects of TCs Tyligul subregion in the short, medium and long term, because the main problem of the implementation of most projects is the coverage of insufficiently large areas and small target groups by these projects, i.e. the unprofitability of implementation.

The generalized scenario of inter-municipal cooperation of TCs of the Tyligul subregion based on the formation of a joint management body is presented in Figure 3.

The cooperation agreement of the proposed format has no precedents, because, according to practical literature, the need to form a joint management body arises in the event of financial inability to create it only for the needs of one community or for the purpose of saving funds (U-LEAD with Europe, 2020, June; USAID.GOV, 2022).

The proposed format will unite already existing organizations and will increase the effectiveness of project implementation, since those TCs that are

already engaged in project development and the search for investments will have the opportunity to receive assistance and increase the chance of receiving the necessary funds, because projects that cover more territories have a higher grant and investment capacity, and those organizations that are less project-active will receive the results of the implementation of projects developed by other TCs of the Tyligul subregion in their own territories. At the same time, there is no need to reduce the staff of existing organizations.

Such a scenario also makes it possible to find funds for the implementation of projects at several levels, which increases the chances of communities to implement their development plans. In general, it can be stated that the implementation of the proposed scenario of inter-municipal cooperation of territorial communities of the Tyligul sub-region on the basis of the formation of a joint management body will solve the problem of financing large-scale projects of inter-municipal and inter-regional significance, and all the above-mentioned possibilities of the proposed format of cooperation will, as a result, ensure the sustainable development of the sub-region.

Community cooperation, which is conducted on the basis of existing objective prerequisites for joint participation in the division of labor, contributes to the development of horizontal networks of economic interaction of community members, contributes to the increase of cohesion (European Commission), which corresponds to European trends in ensuring the sustainable development of regions and communities for the period 2021-2027.

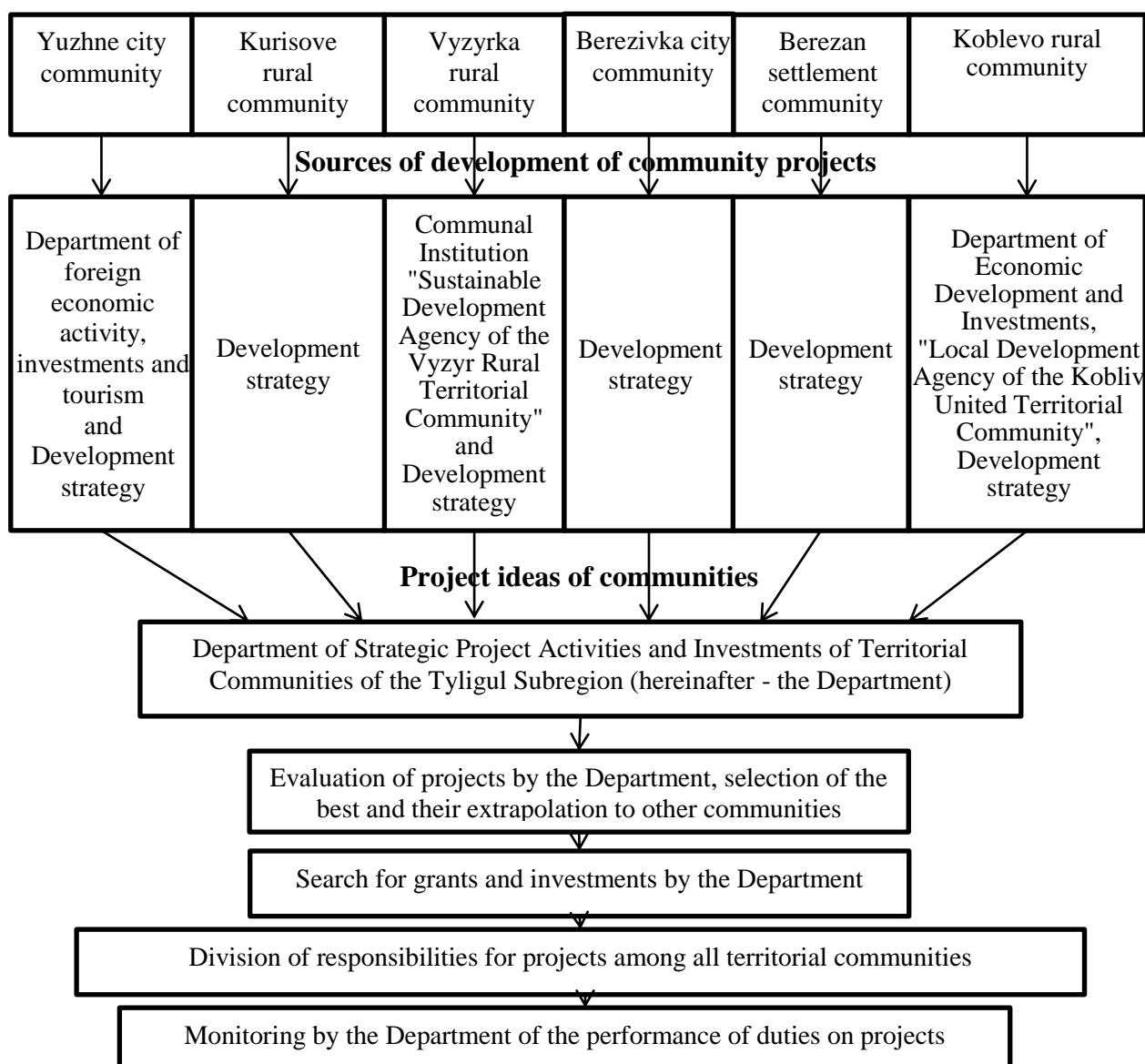


Fig. 3 - Scenario of inter-municipal cooperation of territorial communities of the Tyligul subregion based on the formation of a joint management body

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Burkinskyi B. V., Losyev M. I. (2018) Realization of sustainable development aims for industry and innovations on glocalization principles. Scientific journal Economic innovations. Vol. 20. Issue 4(69). p. 7-29.

Conclusions and perspectives of further research.

As a conclusion, it can be stated that inter-municipal partnership allows coordination of individual actions and exchange of information between territorial communities, which leads to more sustainable and integrated development, not

only economic growth.

The spreading of inter-municipal cooperation agreements confirms the statement that the management link in the system of inter-municipal interaction of communities is weak. At the same time, at the moment, no management body for the sustainable development of the subregion has been

created in the IMC of Ukraine.

To improve the IMS management system, it is proposed to conduct an economic experiment on the basis of 6 territorial communities of Odesa and Mykolaiv regions (Vyzyrska Rural Territorial Community, Yuzhne City Territorial Community, Koblivska Rural Territorial Community, Berezan Rural Territorial Community, Berezhivska City Territorial Community, Kurisovska Rural Territorial Community), which are located on the shore of the Tyligul subregion.

Further scientific research on the subject under consideration should be focused on the development of the appropriate format of inter-municipal cooperation and the formation of the order of cooperation between territorial communities of the Tyligul subregion.

Acknowledgments.

This publication was prepared within the

framework of the participation of the Vyzyrska Rural Territorial Community in the selection stage of the USAID Project HOVERLA, the main direction of which is to assist the Government of Ukraine in the promotion and implementation of decentralization reform by supporting local self-government bodies, which must become more capable, accountable to citizens and are more able to effectively provide services. The task of participation of the Vyzyr rural territorial community in this project is the organization of investment in priority projects, project ideas and initiatives that are the basis of the implementation of the Community Development Strategy until 2030, which was developed in 2021 by the creative team of the State Institution "Institute of Market and Economic&Ecological Researches Of The National Academy Of Sciences Of Ukraine".

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ЦИФРОВІ БЛАГА ТА ЦИФРОВІ ТОВАРИ

Актуальність. Процес цифровізації усіх сфер економічного життя суспільства набуває все більших масштабів. Концепція товару як основної категорії товарного виробництва також зазнала впливу цифровізації: деякі старі товари отримували цифрову форму, але і виникали зовсім нові товари, що до початку процесу цифровізації не існували взагалі. Тому дослідження цих нових явищ набуває особливої актуальності.

Мета та завдання. Обґрунтувати визначення сутності цифрових товарів з точки зору методології економічної науки. Розвинути класифікацію цифрових товарів за ознакою їхньої тривалості.

Матеріали та методи. Стаття пропонує концептуальний погляд на явище цифрових товарів, на дослідження їхньої сутності та особливостей з точки зору фундаментальної економічної науки. В роботі використовуються наукові розробки класичної та маржиналістської економічної теорії щодо визначення сутності таких понять як «товар» та «благо».

Результати. У статті пропонується розділити поняття інформації, інформаційного блага, цифрового блага та цифрового товару. Інформація – це щось, що може бути закодовано у вигляді бітового рядка. Інформаційне благо – це корисна інформація, інформація, яка має споживну вартість і форму, яка дозволяє цю інформацію споживати. Цифрове благо – це інформаційне благо, яке існує у формі бітового рядка. Цифровий товар – це цифрове благо, яке має ціну. У статті розглядаються характеристики цифрових благ, чи мають вони ті самі властивості, що й суспільні блага, і чи можна розглядати їх як такі. Цифрові блага можна розглядати як суспільні, лише якщо всі копії цифрових благ розглядаються як те саме цифрове благо, що є неправильним. У статті детально розглядаються критерії тривалості як здатність зберігати мінову вартість для класифікації цифрових товарів.

Висновки. У статті даються визначення понять інформації, інформаційного блага, цифрового блага та цифрового товару. Наводяться аргументи на користь того, що цифрові блага не є публічними благами. Визначаються відмінності цифрових товарів від цифрових благ, та пропонується класифікувати цифрові товари за критерієм тривалості.

Ключові слова: інформаційні блага, цифрові блага, цифрові товари, тривалі товари, суспільні блага, вартість.

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DIGITAL GOODS AND DIGITAL COMMODITIES

Topicality. The digitalization process of all spheres of the economic life of society is gaining a greater scope. The concept of the commodity as the main category of commodity production was also affected by digitalization: some old products gained a digital form, but new products appeared as well that did not exist at all before the start of the digitalization process. Therefore, the study of these new phenomena becomes especially relevant.

Aim and tasks. To substantiate the definition of digital commodities from the perspective of the economic science methodology. Develop a classification of digital commodities based on their durability.

Materials and Methods. The paper offers a conceptual view of the digital commodities, studying their essence and features from the fundamental economic science perspective. The paper uses scientific developments of classical and marginalist economic theory of such concepts as “commodities” and “goods”.

Research results. The paper proposes to separate information, information good, digital good, and digital commodity concepts. Information is something that can be encoded in the form of a bitstring. Information good is useful

information, information that has a use-value and a form that allows this information to be consumed. A digital good is an information good that exists in the form of a bitstring. A digital commodity is a digital good that has a price. The paper considers the characteristics of digital goods, whether they have the same properties public goods have and can be treated as such as researchers argued it. Digital goods can be treated as public goods only if all the copies of digital goods are treated as the same digital good, which is incorrect. The paper elaborates on durability criteria for classifying digital commodities as the ability to preserve an exchange-value.

Conclusion. The paper defines information, information goods, digital goods and digital commodities. Arguments are offered that digital goods are not public goods. The differences between digital goods and digital commodities are determined, and the classification of digital commodities according to the durability criterion is proposed.

Keywords: information goods, digital goods, digital commodities, durable goods, public goods, value.

Problem statement and its connection with important scientific and practical tasks. The digitalization process of both the production and consumption spheres could not fail to attract the attention of researchers (Arai, 2021; Stehn, 2003; Vernik, Purohit, & Desai, 2011). On the one hand, well-known goods have been taking new digital forms; on the other hand, new types of goods have emerged that did not exist before. In economic studies in the late 1990s and early 2000s, in connection with the spread of digitalization, significant attempts were made to theoretically and conceptually comprehend the phenomenon of new digital goods and include them in the system of economic categories. However, since then, more data has been collected about digital goods, including new phenomena in the digital world, such as cryptocurrencies, NFTs, and metaverses, which also need to be explored. At the same time, in light of these recent observations, it is only reasonable to look again at what has already been developed in the theory of digital goods from a different perspective.

Analysis of recent publications on the problem. In mainstream economic theory, the category of "commodity" was mainly replaced by the category of "good", but these concepts are not just synonyms. Furthermore, in some cases, the category of "commodity" is better suited to explain economic phenomena, for example, in cases where production and consumption are considered not in general terms but as commodity production, that is, the production of products intended for sale, and capitalist commodity production, where the sale of products must bring profit. Unlike a commodity, a good does not necessarily have to be sold on the market - the good can be, for example, public. Moreover, through the prism of public goods, most modern researchers consider goods created in digital form.

Research on digital goods as public goods was carried out by K. Arai, Y. Bakos, F. Benhamou, S. Bhattacharjee, A. Bonatti, E. Brynjolfsson, P. Chen, P. Desai, A. Ghose, A. Goldfarb, D. Goldstein, R. Gopal, M. Khouja, A. Lambrecht, R. Lewis, J. Marsden, S. Park, D. Purohit, D. Quah,

T. Rayna, R. Sankaranarayanan, C. Shapiro, J. Stehn, M. Vafopoulos, X. Varian, D. Vernick, S. Wu, S. Yao, X. Zhang, et al.

Allocation of previously unsolved parts of the general problem. In the existing research, digital goods are mostly treated as analogs of public goods in the digital world. The characteristics of digital goods are compared with the properties of public goods, such as nonrivalry, non-excludability, durability, aspatiality, etc. However, upon closer examination, the identity of digital goods and public goods does not seem well-grounded. In addition, digital commodities were seen as mostly homogeneous, and no clear classification was proposed according to defined criteria. Likewise, digital commodities were not considered separately as a different concept from digital goods.

Formulation of research objectives (problem statement). To substantiate the definition of digital commodities from the perspective of the economic science methodology. Develop a classification of digital commodities based on their durability.

Materials and Methods. The paper offers a conceptual view of the digital commodities, studying their essence and features from the fundamental economic science perspective. The paper uses scientific developments of classical and marginalist economic theory of such concepts as "commodities" and "goods".

An outline of the main results and their justification. Quah sees digital goods as something that can be encoded as a bitstring, that is, as a sequence of binary digits – zeros and ones. He mentions blueprints, chemical formulas, mathematical theorems, software, digitized music, pictures, and video games as examples of digital goods and summarizes: "Everything that can be stored in computer memory and transmitted over the Internet" (Quah, 2003).

Quah builds on an earlier study by Shapiro and Varian. They viewed information as "anything that can be digitized, encoded as a stream of bits" (Shapiro and Varian, 1999). Therefore, information goods are "baseball scores, books, databases, magazines, movies, music, stock quotes, and web

pages". The definition is the same as Quah's, but Shapiro and Varian apply it to information goods and Quah to digital goods. Indeed, there is much in common between information goods and digital goods, but they cannot be equated. Not all information good necessarily has a digital form. Not every digital good can have a non-digital form, that is, exist outside of computer systems, as many information goods can. For example, a content of a paper book can also be recorded on a digital medium. Computer code can be written on paper. However, the digital land in the metaverse cannot exist or be used outside the metaverse, outside the digital world, in non-digital form. Likewise, cryptocurrencies cannot exist outside of the digital world. What matters here is the form in which the good is used (consumed), and not the form of information transmission. A digital book and a paper book are two different goods, and they are consumed separately. The potential for encoding alone does not make an object a digital good. Potentiality, in this case, cannot be a characteristic that defines the essence of an object. An object is what it is and what it does. It is not what it can potentially be and do until that potential is realized. If there are no computers in a particular country, music in that country can potentially become a digital good only if it reaches a computer in another country. But it is not a digital good here and now in this country's society. Music that exists in computer code and can be transported, exchanged, and consumed in this form should be considered a digital good. Digital goods may have analogs outside the computer network, but they are not digital goods. Thus, the criterion of the potentiality of digital coding is suitable for defining an information good but not a digital good. Digital goods are objects that are used (consumed) in the form of a bitstring, in digital form.

There is also ambiguity in using the categories "digital good" and "digital commodity" in the studies. For example, Vafopoulos talks about an information good (which could exist in non-digital or digital form) and defines an information good as a commodity, as if all information goods are commodities: "In economics and law, an information good is generally defined as a commodity that derives its main market value from the information it contains (e.g., books). First, telecommunication technologies (e.g., radio), and later digitization enabled the detachment of information goods from the medium of transfer." (Vafopoulos, 2012). By a classical understanding, commodity implies not only the ability to satisfy a need, that is, a use-value but also an exchange-

value. At the same time, a good is defined as a useful thing, as something that can satisfy a need. Thus, good is a broader concept. It is essential to distinguish goods and commodities. In the sense that a good is a useful thing, almost anything can be a good. A good exists in any human society. A commodity is a more complex concept because it enters the sphere of consumption only through an exchange. Only after exchange can it realize its usefulness and satisfy a need. Thus, a commodity implies the existence of a division of labor and a market which are complex social relations. On the contrary, a good implies the relation of a person to a useful thing. The difference between a good and a commodity is significant in the study of digital goods and digital commodities.

Primarily, researchers consider digital goods as public goods (Quah, 2003; Rayna, 2008; Vafopoulos, 2012) and argue for this by comparing the properties of public goods and digital goods. These properties are as follows.

Nonrivalry – the use of a digital good by one agent does not in any way degrade the usefulness of the same digital good for another agent (Quah, 2003). Rayna uses a slightly different definition of nonrivalry: consumption of a good does not decrease the potential consumption of other consumers. He justifies the nonrivalry of digital goods by the fact that they can be copied without loss of quality or information and are independent of the medium. He claims that it is necessary to separate digital goods from their medium, that the medium can be rival, but this does not apply to the digital good itself (Rayna, 2008).

Non-excludability – consumption of a good cannot be limited only to those consumers who pay, free consumption of goods cannot be prevented. Quah indicates that non-excludability is ancillary to nonrivalry (Quah, 2003). However, Rayna points out the difference between digital goods and traditional public goods in terms of their non-excludability: producers of digital goods have the ability to exclude consumers. No one can be prevented from consuming a lighthouse if it has already been created. However, the producer of the digital good can prohibit downloading it. At the same time, anyone who has this digital good is a potential supplier of this digital good, and the opportunities for consumer exclusion decrease for its producer as the digital good spreads. Thus, Rayna concludes that only the first produced digital good, owned by its producer, is excludable (Rayna, 2008).

Infinite expansibility – the quantity of digital good can be made arbitrarily large arbitrarily quickly at no cost (Lambrecht et al., 2014). Infinite

expansibility, according to Quah, always generates nonrivalry (Quah, 2003). Nevertheless, Rayna argues that digital goods are not infinitely expansible because, in order to obtain a digital good from a non-producer, a consumer must know another consumer who already has a copy of the digital good, which imposes some limitations. The diffusion of digital goods among the population does not happen instantly. But as the number of consumers with digital goods grows, the possibilities for its distribution grow exponentially to the point where every consumer can potentially obtain a digital good without buying from the producer. Thus, the digital good becomes non-excludable (Rayna, 2008).

Discreteness – the number of copies of a digital good always comes in integer amounts – digital goods are indivisible. *Aspatiality* – digital goods are everywhere and nowhere at the same time. *Recombinability* – digital goods are cumulative and emergent. Digital goods that arise from the merger of antecedents have features absent from the original (parent) digital goods. According to Quah, this property distinguishes digital goods from ordinary public goods (Quah, 2003).

Full replicability – digital goods can be copied without loss of information. Rayna states that this results in two fundamental characteristics: digital goods are public and durable. Furthermore, some digital goods are experience goods, meaning that their actual value (use-value) can only be fully realized once the goods have been consumed. Such goods include music, movies, books, etc. (Rayna, 2008).

Infinite durability – digital goods are seen as not just durable goods but infinitely durable goods. Rayna argues that the medium used to store and distribute a digital good is finitely durable, but “the digital good itself is potentially infinitely durable, provided that it is transferred to a new medium before the current one fails”. He compares digital goods with non-digital information goods according to durability criteria and indicates that “most non-digital information goods rarely last for more than one or two generations, digital goods can potentially last forever” (Rayna, 2008).

Some researches go even further and call disembodiment a unique characteristic of digital goods: “digital goods are disembodied goods in the sense that they can exist without embodiment in a physical form” (Bhattacharjee, Gopal, Marsden, and Sankaranarayanan, 2011). They do not provide examples of such digital goods, but one can assume that they are talking about existence without embodiment in a non-digital form because one cannot call the digital form non-physical. It

was the development of physics that made the existence of goods on digital media possible. However, it is most certainly true that the same digitally encoded information can exist on different media. This is also true for information not digitally encoded, such as a fiction novel written on paper.

The authors note that digital goods can be changed and reproduced by consumers. And this is also true for many non-digital goods. The difference is that the means of consumption of a digital good is the means of its reproduction. No additional resources are needed, except for one universal resource: electricity. However, for some digital goods, such as software, a consumer must still have the appropriate skills (and maybe other software) to reproduce the digital good.

Therefore, most researchers consider both information goods and digital goods as synonymous concepts. In addition, information goods and digital goods were considered in isolation from the medium on which they are recorded. The emphasis was placed on the fact that, in isolation from the medium, information goods and digital goods have the same properties inherent in public goods already known to economic science. Furthermore, these products were considered primarily homogeneous and no clear classification was proposed according to defined criteria. Likewise, digital commodities were not considered separately as a different concept from digital goods.

The purpose of the study is to further elaborate on the concepts of a digital good and a digital commodity – whether they are similar to each other and to public goods, whether they have the same properties public goods have and can be treated as such.

Researchers mainly consider information goods and digital goods as what can be called ideal goods. Ideal goods exist separately from the medium. However, a good is a good if it can satisfy a particular need, that is, if it can be consumed. To be consumed, the good must have a specific form suitable for consumption. One cannot read an ideal book; one can read it from paper, an electronic reader, a mobile phone, or a computer screen. Viewing the good as an ideal good allows us to assume that each copy of the good is not a separate good, but a part of the same good. Or even assume that the good exists simultaneously in the form of each of its copies. This is not a good. This is only a use-value in isolation from its material embodiment. This is a use-value that cannot be realized because the main feature of a good, its defining characteristic, is that it must be consumed.

Information can change the medium, but information is not yet an information good. The understanding of information goods and digital goods as public goods and attributing to them the properties of public goods derives from such an idealistic view of goods.

If we consider a digital good or an information good simply as a technology for producing something, or as a recipe, an engineering blueprint, then nothing new has happened to the goods since the spread of digitalization. The cost of the invention and initial production have always been much higher than the reproduction cost of an already invented good. Before digitalization, for example, there was the technology of bicycle production, its concept, blueprint, and its utility or use-value. Nevertheless, it was not yet a bicycle. Each bicycle is a copy of another bicycle, performs the same function, and satisfies the same need. But no one says that a bicycle and its blueprint are the same good, and all copies of a bicycle are the embodiment of the same good. Similarly, all copies of a book (digital or non-digital) are not the same good, although they all share the same information. Moreover, if someone points out that there are no truly identical bicycles like identical copies of the electronic book, he can choose another example like nails and try to find differences between two factory-made same-size nails.

A copy of a good is not the same good. In the end, the identity of the two copies does not provide any ground for claiming that they are the same thing. Yes, the production of digital goods is somewhat different from the production of traditional goods. It is often possible to produce a new digital good with little effort – by copying with a few clicks on a computer. However, this does not make the copying process fundamentally different from the production process. In fact, the process of industrial production always has been about copying.

Digital or information goods are not disembodied. They cannot exist without a medium at all. Furthermore, they also cannot exist on any medium. The need of consumers for a book can be satisfied with a paper book and an electronic book, but cannot be achieved with a book with no form or embodiment.

Until now, the concepts of an information good and digital good have been used side by side because they were not clearly separated by researchers who previously dealt with this problem. Now, it is time to point out some differences in these concepts. One can agree with Shapiro and Varian that information is something

that can be encoded in the form of a bitstring. However, information good is more than that. It is useful information, information that has a use-value and a form that allows this information to be consumed (used). A digital good is an information good that exists (actually exists, not just potentially can exist) in the form of a bitstring. Therefore, a digital commodity is a digital good that has an exchange-value, has a price.

Consequently, it is worth rethinking the properties of digital goods and digital commodities and whether they correspond to the properties of public goods.

Since a digital good cannot be considered in isolation from its medium, the fact that the medium is rival means that a digital good is also rival. Each copy of a digital good must be considered a separate digital good. Reading this particular e-book on this particular screen at a particular time and place does not allow it to be read by other readers elsewhere at the same time. Software installed on a given computer is not used on other computers. Copies of it are used. Moreover, people who do not have access to computers adapted to this particular software cannot use it at all.

One of the arguments in support of the nonrivalry of digital goods is that a digital good can be copied without loss of quality or information (Rayna, 2008). As stated, a copy of a digital good should be treated as a separate digital good, even if it is a "perfect copy" (Wu & Chen, 2008), but, in reality, digital copies will not always be perfect. Errors in the copying of digital goods occur regularly. They can be associated with damage to the medium and other causes, such as radiation (Lantz, 1996; May & Woods, 1978; Ziegler & Lanford, 1979). Another argument in support of the nonrivalry of digital goods is that digital goods are not destroyed due to consumption (Quah, 2003). However, there are other goods that are not destroyed as a result of consumption, for example, money, not even in digital form. This does not make money nonrival.

Of course, there are properties of digital goods that make their reproduction and distribution easier (Bakos & Brynjolfsson, 1999) than the reproduction and distribution of many traditional goods. First, it is the fact that the means of consumption of most digital goods are also the means of their production and reproduction. Anyone who wants to consume digital goods must have a computer at home or other means that allows copying, that is, reproducing digital goods. At the same time, the assumption that copying a digital good costs nothing (Brynjolfsson & Zhang, 2006) is incorrect. There are electricity costs,

Internet connection fees (which cover the costs of servers, licenses, cables, labor, etc.), consumer equipment, and upgrades costs (Benhamou, 2015). There is also time cost, which depends on the speed of the Internet connection, the power of the computer, and the operator's skills. The skills of the computer operator acting here as a consumer are also crucial, because many digital goods are not easy to copy so that someone else can use them. Thus, the copying process is a production process. The production process, which includes copying labor, includes the object of work – the digital good being copied, and the means of labor – the computer, the Internet, electricity, and digital data carriers. Costs per unit produced may be small, but this is also true for many traditional goods that can be easily produced in large quantities.

Are digital goods excludable? Yes, if one considers each copy of the digital good separately, it is clear that they are excludable. Moreover, some authors agree that even if we consider a digital good idealistically, as information in digital form, it still differs from traditional public goods because it can be made excludable (Khouja & Park, 2008; Rayna, 2008). The excludability of digital goods allows you to continue selling digital goods (digital commodities) for a long time. In addition, the recent development of blockchain technology has made it possible to create unique digital goods that cannot be copied because the copies will differ from the original.

Thus, there are no sufficient grounds to apply the main characteristics of public goods – nonrivalry and non-excludability – to digital goods in general.

Regarding the durability of digital goods, there are two different aspects to it. The first is not strictly economic, it only considers the utility of a digital good. In this sense, durability is defined as an ability of a good to remain functional, to preserve utility or use-value. However, durability can also be considered from a strictly economic point of view – the ability to preserve an exchange-value. In this case, digital commodities must be considered.

All commodities can be divided into three groups according to the durability criterion. *Non-durable commodities* completely lose their use-value and exchange-value at the first act of consumption. What remains of these commodities after their consumption may have exchange-value, but will serve satisfying a different need than the first commodity did. Thus, it will be different commodity. Non-digital non-durable commodities lose exchange-value after the first act of

consumption because they are physically destroyed. But this does not happen to digital commodities. Digital non-durable commodities lose their exchange-value due to the fact that the information recorded on a digital medium loses its use-value. They become useless after the first act of consumption. It happens to many movies, books, musical works. Such samples of digital commodities lose consumer interest very quickly. Only a relatively small number of movies, books, musical works become "classics" and continue to be bought and consumed for years and decades.

Durable commodities are not destroyed after the first act of consumption, but lose their exchange-value gradually. These are household durable commodities, industrial equipment, buildings, etc. They can continue to be used after the first act of consumption but gradually physically wear out – lose quality characteristics, and must be replaced after some time with new ones. Durable commodities can also lose exchange-value because of moral depreciation, obsolescence due to technological progress. Since a digital commodity is a unity of information and a medium, from the point of view of obsolescence and wear and tear of digital goods, it is possible to separately consider the obsolescence of the medium – both physical and moral. The disk on which the film is stored can lose exchange-value due to the damage or become obsolete and go out of use, giving way to a newer medium – a flash drive or cloud storage. But a film, software, a book – the information itself can also become obsolete, and then the commodity that carries this information will also no longer be able to fulfill its function, satisfying the consumer's needs. This depreciation is a moral depreciation. Thus, if we consider a specific digital commodity, it can lose exchange-value due to obsolescence for three reasons: physical wear and tear of the medium, moral depreciation of the medium, and moral depreciation of information stored on the medium.

Infinite durability, as Rayna described it, also works only if you consider every copy of a good as one good - a ghost that changes shells. However, copying is not a transfer. The medium with certain information wears out and is destroyed, its copy is produced on a new medium, but it is already a new good. Thus, there is no infinity here, infinite durability is a characteristic of information that can be stored on various media, but information is not an economic category, not an economic phenomenon.

However, some commodities do not become morally obsolete. These are money, perpetual securities, crypto-assets, and other commodities

used for investment. They do not lose exchange-value due to consumption or technological progress. These commodities can be called permanent commodities. If they exist in digital form, then they are digital permanent commodities. In the digital form, money or securities exist apart from the medium because they can move between different kinds of media. When money is withdrawn from the bank or transferred from one account to another, it disappears from one place and appears in another. It is not copied. It is not produced again. This is also true for cryptocurrencies (Aste, Tasca, & Matteo, 2017).

Of course, permanent commodities are not eternal because they can still lose exchange-value when the social environment that calls them to life disappears. Money can lose exchange-value if no one wants to accept them anymore because of some disaster, stocks can lose exchange-value if the stock exchange is banned, and digital land can lose exchange-value due to the disappearance of the metauniverse in which it exists. The permanence of the commodity means its indestructibility during consumption and the absence of obsolescence due to technical progress.

Durability directly affects the commodity reproduction process. Therefore, it affects the pricing and building business processes for profiting from the production and sale of digital commodities. Non-durable goods must be constantly reproduced at full scale. Their supply consists of commodities produced yearly, for which new demand is constantly formed. Durable commodities must also be reproduced. Those digital commodities that are durable (books, music, movies, software) become obsolete physically due to the wear and tear of their media. But such commodities also become morally obsolete because new samples are constantly produced – new music, books, movies, and software. It is also a reproduction, although not of the same commodities. Nevertheless, these commodities replace those that preceded them. The earlier versions are mostly no longer used (very few such commodities become "classics" and continue to be used, and even fewer continue to exist as commodities because they are no longer distributed on a paid basis). For durable commodities, only that part that is directly the subject of reproduction participates in price formation, and those commodities that are already being consumed, strictly speaking, are no longer commodities. Permanent commodities in digital form are not destroyed, do not become obsolete, and do not

need to be reproduced. All its mass, which was produced, is partly on the market and partly in reserves, savings, ready to enter the market at any time.

Digital commodities, like traditional commodities, can be divided into consumption items and means of production. Books, movies, music, software, and video games are consumption items. However, other types of software and even some video games are means of production and can function as capital. Traditional commodities and other digital commodities are produced with the help of software. NFT-based pay-to-earn computer games are gaining popularity, allowing players to earn crypto-assets and exchange them for fiat money. In 2021, some gamers in the Philippines considered video gaming their main income source (Nunley, 2021), prompting the government to discuss the need to tax video game revenues. The development of NFT technology also revolutionizes the trading of digital property in video games (Animesh, Pinsonneault, Yang, & Oh, 2011) and metaverses (Duan et al., 2021; Park & Lee, 2017). One can create digital land, trade it and rent it (Nakavachara & Saengchote, 2022; Valeonti et al., 2021).

Conclusions and perspectives of further research. A copy of a good is not the same good, even if it is a perfect copy. Copies of digital goods may contain the same information, but this does not make them the same good. Each copy must be considered separately. It is produced, transported, and consumed separately. Digital goods are not public goods. Information is not yet an information good. Information is something that can be encoded as a bitstring. However, an information good is information that has a use-value and a form that allows this information to be used. A digital good is an information good that exists in the form of a bitstring. Furthermore, a digital commodity is a digital good with an exchange-value and price. Digital commodities can be either durable (lose exchange-value due to moral and physical depreciation of the medium or moral depreciation of information) or permanent (do not lose exchange-value due to consumption or obsolescence). This division is essential for understanding the specifics of the reproduction and pricing of digital commodities. The task of further research may be the analysis of the effects for national economy caused by the spread of the digital commodities production, especially in metauniverses, the prospects for the creation of digital production clusters, trading platforms, etc.

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ОСОБЛИВОСТІ ФУНКЦІОНУВАННЯ МОРСЬКОЇ ТА РІЧКОВОЇ ПОРТОВОЇ ІНФРАСТРУКТУРИ В СИСТЕМІ АДАПТАЦІЇ К ЗОВНІШНІМ УМОВАМ ПОЗИЦІОНУВАННЯ

Актуальність. Доцільність розробки наукових положень пов'язана з необхідністю урахування нових умов функціонування підприємств морської галузі України та їх адаптації. Також важливим є аналіз та обґрунтування параметричних особливостей позиціонування підприємств морського транспорту. Насамперед необхідно урахувати: фактори розвитку світового ринку морської торгівлі, тенденції та перспективи глобальної морської галузі, стан та конкурентне позиціонування портового бізнесу, функціонування та перспективи розвитку логістичних - мультимодальних транспортних систем.

Мета та завдання. Систематизація факторів та обґрунтування особливостей позиціонування підприємств морської та річкової інфраструктури України, уточнення нових умов розвитку транспортних підприємств в структурі регіонального транспортного ринку. Досягнення поставленої мети дослідження обумовлено необхідністю вирішення наступних завдань: аналіз та обґрунтування параметричних особливостей розвитку світового ринку морської торгівлі, умови розвитку глобального морського торговельного флоту, аналіз середовища міжнародних інвестицій та інвестиційна привабливість морської галузі України, тенденції та особливості позиціонування розвитку приватної та державної власності в структурі національного стивідорного ринку, обґрунтування стратегічного значення морської та річкової інфраструктури України в забезпеченні економічної безпеки країни та подолання продовольчої кризи в світі.

Матеріали та методи. Науковою базою досліджень стали методи аналізу та синтезу, методи математичної статистики, методи групування, методи прийняття раціональних рішень, методи дослідження операцій, а також офіційні дані статистичної інформації, дані конференції організації об'єднаних націй з торгівлі та розвитку, міністерства інфраструктури України, аналітичні матеріали державної статистики України, аналітичні дані адміністрації морських портів України.

Результати. Розглянуто тенденції та перспективи розвитку світової морської торгівлі. Представлена динаміка провізної спроможності світового торговельного флоту за 2018-2021 рік. Дана оцінка стану ринку морської торгівлі. Проаналізовано потоки прямих іноземних інвестицій та виявлені фактори які впливають на їх динаміку. Обґрунтовано стан портової інфраструктури України. Наведена динаміка вантажообігу морських торгових портів Чорноморського регіону за 2005 – 2021 рік. Проаналізовано стан та функціонування приватного та державного секторів портового бізнесу в Україні. Представлена динаміка вантажообігу приватних та державних стивідорних підприємств в Україні за 2013-2021 рік. Підкреслено важливість ролі державної власності у стивідором бізнесі в Україні з урахуванням воєнного стану. Підкреслено важливість функціонування портової та річкової інфраструктури України в забезпеченні продовольчої безпеки в світі. Проаналізовано роботу портових операторів по «Зерновій угоді».

Висновки. Систематизовано фактори ефективного функціонування транспортних підприємств. Представлена інформаційно-логістична модель, яка враховує умови адаптації підприємств морської та річкової галузі України з урахуванням воєнного стану. Враховані економічні вимоги позиціонування складових транспортної інфраструктури України з урахуванням негативного впливу зовнішнього середовища. Підкреслено вплив використання принципу цифровізації, «єдиного вікна» на ефективність позиціонування логістичних ланок доставки вантажу. Виявлено необхідність розширення акваторії портів на річки Дунаю та розвиток логістики портів Дунайського регіону для забезпечення функціональної стійкості потенціалу транспортної галузі України.

Ключові слова: світова морська торгівля, транспортна галузь, стивідорні оператори, Зернова угода, логістичні ланки доставки вантажу.

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FEATURES OF MARINE AND RIVER PORT INFRASTRUCTURE FUNCTIONING IN THE SYSTEM OF ADAPTATION TO EXTERNAL POSITIONING CONDITIONS

Topicality. The expediency of developing scientific regulations is related to the need to take into account the new operating conditions of maritime enterprises of Ukraine and their adaptation. It is also important to analyze and justify the parametric features of the positioning of maritime transport enterprises. First of all, it is necessary to take into account: factors of the development of the global maritime trade market, trends and prospects of the global maritime industry, the state and competitive positioning of the port business, the functioning and prospects of the development of logistic - multimodal transport systems.

Aim and tasks. Systematization of factors and substantiation of the peculiarities of the positioning of marine and river infrastructure enterprises of Ukraine, clarification of new conditions for the development of transport enterprises in the structure of the regional transport market. Achieving the set goal of the research is conditioned by the need to solve the following tasks: analysis and substantiation of parametric features of the development of the global maritime trade market, conditions for the development of the global maritime merchant fleet, analysis of the environment of international investments and the investment attractiveness of the maritime industry of Ukraine, trends and peculiarities of the positioning of the development of private and state property in the structure of the national stevedore market, substantiating the strategic importance of the marine and river infrastructure of Ukraine in ensuring the economic security of the country and overcoming the food crisis in the world.

Materials and methods. The scientific basis of the research was methods of analysis and synthesis, methods of mathematical statistics, methods of grouping, methods of making rational decisions, methods of operations research, as well as official data of statistical information, data of the United Nations Trade and Development Conference, the Ministry of Infrastructure of Ukraine, analytical materials of state statistics of Ukraine, analytical data of the administration of seaports of Ukraine.

Research results. The trends and prospects for the development of world maritime trade are considered. The dynamics of the shipping capacity of the world merchant fleet for 2018-2021 is presented. The assessment of the state of the maritime trade market is given. Flows of foreign direct investments were analyzed and factors affecting their dynamics were identified. The state of the port infrastructure of Ukraine is substantiated. The dynamics of the cargo turnover of sea trade ports of the Black Sea region for 2005-2021 are given. The state and functioning of the private and public sectors of port business in Ukraine are analyzed. The dynamics of cargo turnover of private and state stevedoring enterprises in Ukraine for 2013-2021 is presented. The importance of the role of state ownership in the stevedore business in Ukraine, taking into account the state of war, is emphasized. The importance of the functioning of the port and river infrastructure of Ukraine in ensuring food security in the world is emphasized. The work of port operators under the "Grain Agreement" was analyzed.

Conclusion. Factors of effective functioning of transport enterprises are systematized. The information and logistics model is presented, which takes into account the conditions of adaptation of enterprises of the maritime and river industry to Ukraine, taking into account the state of war. The economic requirements of the positioning of the components of the transport infrastructure of Ukraine are taken into account, taking into account the negative impact of the external environment. The impact of the use of the principle of digitalization, "single window" on the efficiency of the positioning of logistics links of cargo delivery is emphasized. The need to expand the water area of the ports on the Danube River and develop the logistics of the ports of the Danube region to ensure the functional stability of the potential of the transport industry of Ukraine has been revealed.

Keywords: world maritime trade, transport industry, stevedore operators, Grain Agreement, logistics links of cargo delivery.

Problem statement and its connection with important scientific and practical tasks. Globalization of production processes entails the widespread use of sea transportation. International trade, in turn, determines the needs for the development of the maritime transport industry.

Global maritime trade has been experiencing the negative impact of the pandemic for the past three years, but it should be noted that the short-term outlook remains positive. Over the past two decades, seaborne trade has grown at a compound

annual rate of 2.9 percent, which is expected to slow to 2.4 percent between 2022 and 2026, according to UNCTAD analysts.

In 2021, there will be a global economic recovery, but the impact of the pandemic has made it necessary to ensure rational risk management, as well as ensure the financial stability of maritime enterprises.

The strategy to ensure financial sustainability includes reforming the port business and global logistics, as well as the reorganization of maritime

transport and transport networks.

The data of fig. 1 reveal the nature and features of the development of individual components of the global economy. From the given data, a

significant differentiation of economic growth rates can be seen, which reflects the systemic features of the state of individual structures.

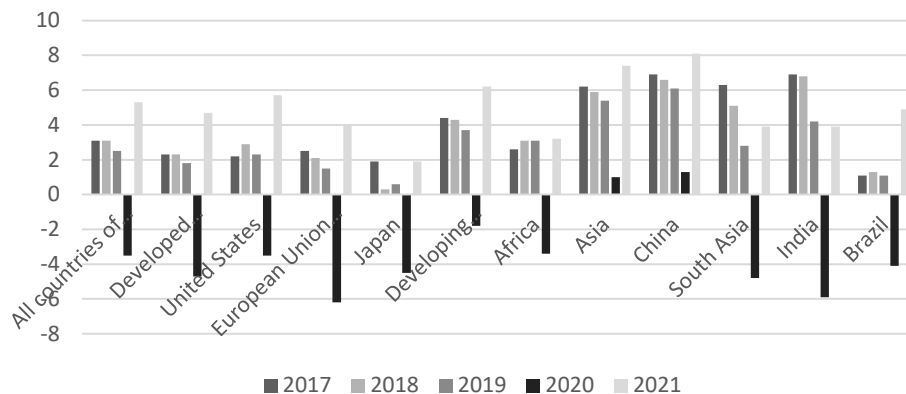


Fig. 1. World economic growth, 2019 - 2021, (annual percentage change)

Source: according to the data Trade and Development Report (2022)

As of January 2021, the carrying capacity of the global merchant fleet was 2.13 billion dwt (table 1).

Table 1.

Structure of the world fleet broken down by main types of vessels (thousands of deadweight)

	2018	2019	2020	2021
tankers	562035	567533	601163	619148
bulk carriers	818921	842438	879330	913032
vessels for the transportation of general cargo	73951	74000	76893	76754
container ships	253275	265668	274856	281784
gas carriers	64407	69078	73685	77455
chemical carriers	44457	46297	47474	48858
others (including auxiliary offshore structures)	102215	104380	103664	109500
ferries and passenger ships	6922	7097	7289	8109
all countries of the world	1926183	1976491	2064354	2134640

Source: according to the data Review of Maritime Transport (2021).

Among the delivered vessels, the main share of the world merchant fleet is accounted for by bulk carriers, and in 2021 their volume was 42.77% of the total volume of the world merchant fleet (an increase of 3.79% by 2020), oil tankers make up 29% and container ships - 13, 2%. In the conditions of the supply of vessels, owners and operators also bought more old vessels, which led to an increase in prices for this group of vessels.

The bulk fleet is the main link in the sustainable positioning of foreign economic relations. The development of the bulk fleet affects the growth of production in industries that serve the needs of merchant shipping.

High tariff rates were observed for container transportation in 2021, and this trend may threaten the recovery of the world economy in the future.

UNCTAD analysts emphasized that a 10% increase in container transportation tariffs in the US could cause a 1% reduction in industrial production.

The development of the world trade fleet determines the requirements for specialized cargo terminals of stevedoring operators and the principles of their concentration.

The objective importance of maritime enterprises determines the optimization of their positioning in the regional and global transport system. A climate of investment attractiveness is being formed around the basic trading ports, which in turn increases their functional and economic sustainability.

In 2021, global foreign direct investment flows amounted to 1.58 trillion dollars, which is 64%

more than the exceptionally low level of 2020 (Figure 2). The recovery in investment flow is associated with rapid growth in markets and

international financing, which in turn is associated with favorable financing conditions and large incentive programs for infrastructure development.

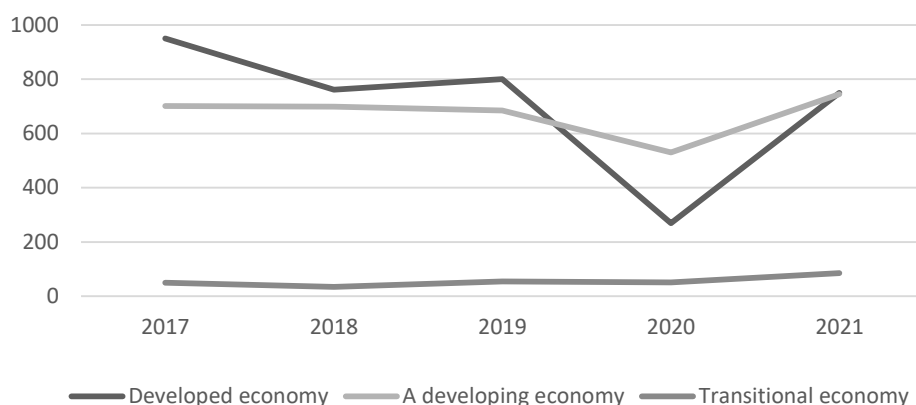


Fig. 2. The flow of foreign direct investments in the world and from economic groups, billion dollars, 2017-2021

Source: according to the data World investment report (2022)

The global environment of international investments has changed dramatically since the beginning of the war in Ukraine. Investor uncertainty and risk aversion could put significant downward pressure on global foreign direct investment in the near term.

Analysis of recent publications on the problem. In scientific studies, a lot of attention is paid to the problems of the functioning of maritime transport enterprises in the structure of the maritime trade market. The parameters of the development of maritime enterprises (Ilchenko, S. V., & Oneshko, S.V) are substantiated, the specific conditions of port business functioning are revealed (Frasyniuk T.I.).

Allocation of previously unsolved parts of the general problem. However, it should be noted that the conditions of adaptation of maritime enterprises, taking into account the negative impact of the external environment and the new conditions of operation of the port business in Ukraine, have not been fully investigated.

Formulation of research objectives (problem statement). The purpose of the article is to substantiate the parametric features of the functioning of maritime and river industry enterprises in Ukraine and clarify the new conditions for the positioning of maritime and river transport enterprises in Ukraine and their adaptation to external development conditions.

Materials and Methods. The scientific basis of the research was methods of analysis and synthesis, methods of mathematical statistics, methods of grouping, methods of making rational decisions, methods of operations research, as well as official materials of statistical information, analytical materials of the United Nations Trade

and Development Conference, the Ministry of Infrastructure of Ukraine, analytical materials of state statistics of Ukraine, analytical materials of the administration of seaports of Ukraine.

An outline of the main results and their justification. The consequences of Russia's aggression against Ukraine led to a crisis in the food, fuel and financial systems in the world. The war affected far beyond the borders of Ukraine, causing a crisis of life, rising prices, and decreasing real incomes of billions of people around the world.

It should be noted that despite the war, Ukraine remains the guarantor of food security in the world.

Sea trade ports are of strategic importance for ensuring the country's economic security. When choosing a form of ownership, it is necessary to clearly separate the functions of stability, security and commercial activity.

In fig. Figure 3 presents the dynamics of cargo turnover of sea trade ports of the countries of the Black Sea region.

In 2021, the seaport of Konstanz occupied a market share of 12.1% in the Black Sea region, one of the largest ports of Ukraine - the "Southern" seaport - 9.6%. The known advantages of the territorial location of the transport complex of Ukraine should be intensively used in two directions - both as a factor of real integration and as a significant source of foreign currency income.

Transshipment of cargo in the ports of Ukraine is mainly carried out by private stevedore companies, the share of which in 2021 was 78.5% of the total cargo turnover. The largest privately owned stevedore operators are the TIC terminal group, TransBalkTerminal and Nika-Tera (Fig. 4)

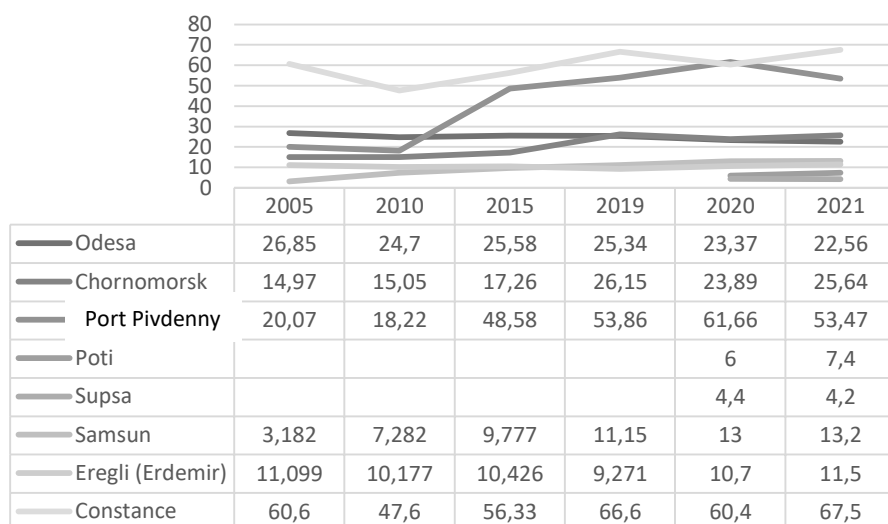


Fig. 3. Dynamics of cargo turnover of seaports of the Black Sea region 2005-2021, million tons
Source: according to the data The last peaceful year (2022)

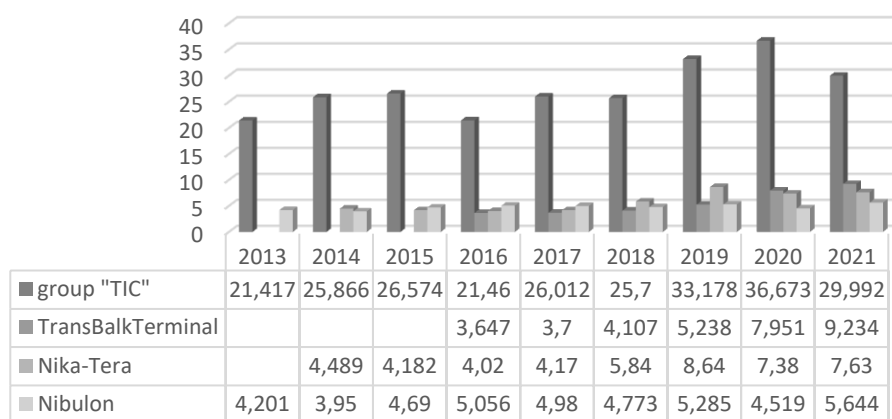


Fig. 4 Cargo turnover of private business in seaports of Ukraine, million tons
Source: according to the data magazine Ports of Ukraine (2022)

During the last period, the share of state ownership in the structure of the national stevedore market has been decreasing. In 2021, the share of

state stevedore operators in the ports of Ukraine was 21.5% (Fig. 5).

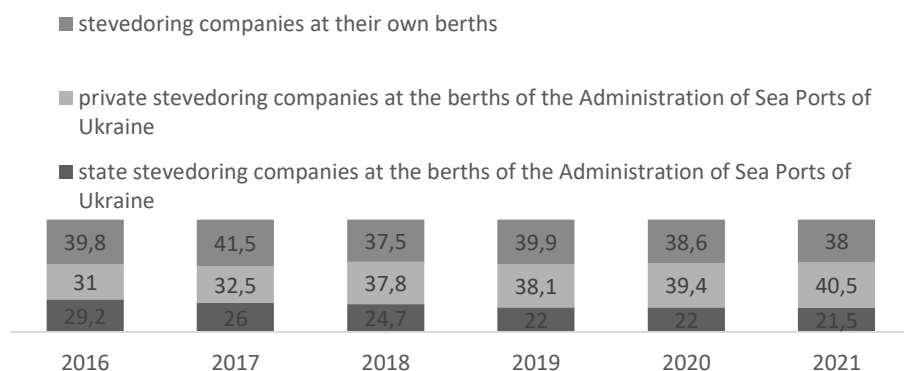


Fig. 5. Dynamics of the share of state and private terminal operators involved in cargo processing in sea trade ports of Ukraine for 2016-2021.
Source: according to the data magazine Ports of Ukraine (2022)

It is necessary to emphasize, taking into account the strategic importance of stevedoring enterprises in the economic security of Ukraine, it is necessary to find a balance between private and state ownership in the port business.

According to the results of recent years, Ukraine held the leadership within the framework of the World Food Program in the supply of food for humanitarian operations. In total, in 2021, Ukraine sent 20% of food under the UN program.

At the end of March 2022, many Ukrainian companies reoriented their logistics to the river route to Europe: goods were sent by river transport from the south of Odesa to Romania, and then the goods were transshipped onto sea vessels.

From the cob of the Danube port transshipment of grain vantage is close to 100 thousand tons per month, but it is necessary to indicate that before the war, Ukraine transported 3.5 million tons each. In May 2022, the Danube port revenues reached 1.3 million tons per month, and in June - 1.4 million tons. On 9 July 2022 after release, after the Armed Forces of Ukraine had called the Zmeiny Island, it became possible to win for the roar of ships another estuary of the Danube - the Bistre estuary.

One part of the vantagny transport streams goes through the inland land cordons, and in the other -

through the ports of Reni, Izmail and Ust-Dunaysk. Considering laws to drink and propositions of the freight rate immediately rose, which guaranteed the high income to the river fleet. Ale, as it was already planned, the estuary of Bistre sprung up, the number of the river fleet increased, and all the factors in the future will be added to the charter rate - they will go down the giblets.

"Grain Agreement" in Ukraine started on April 22, 2022 for the support of the United Nations, as a support for safe shipping for the export of grain. The export geography of the "grain initiative" commends the work of three ports in Ukraine - the commercial sea ports "Odesa", "Chornomorsk", "Pivdenny".

Prescriptions in favor of the mechanism for transferring merchant sea vessels in caravans along the back of the hardened corridors from the turnaround near Istanbul. Ukrainian grain is direct to Europe, Asia, Africa. For example, for 2 months of work " Grain Agreement " (August - September 2022) 58% of the total exported corn went to Europe, and 68% of the total wheat went to Africa and Asia.

The presence of Ukrainian grain on the world market of sea trade affects the reduction of prices. The dynamics of the price of wheat on world markets is presented in fig. 6.

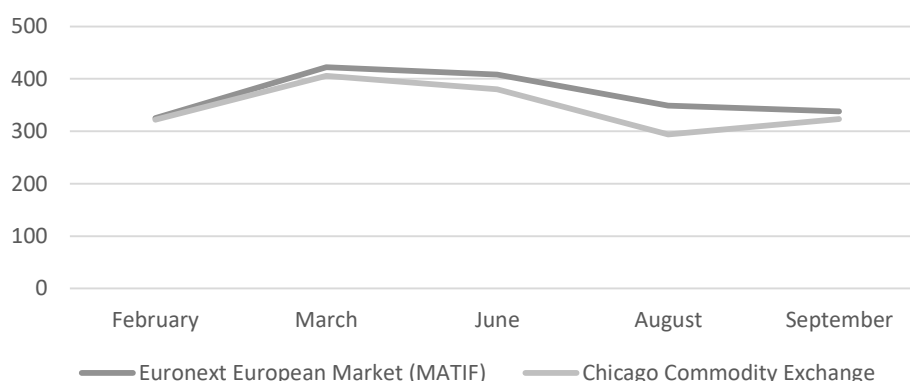


Fig. 6. Dynamics of wheat prices on global markets, dollars per ton, February - September, 2022

Source: according to the data Report by the Ministry of Infrastructure of Ukraine (2022)

Thus, the price of wheat on the European and American markets fell significantly during the period of operation of the "Grain Corridor". Food becomes more accessible to those who are one step away from a humanitarian disaster.

Russia's blocking of the "Grain Agreement" is instantly reflected in global commodity markets, causing a food crisis in the world.

Conclusions and perspectives of further research. Those port systems that use the effect of scale and invest in innovative port technologies and use the principle of "digitalization" are competitive.

Simplifying the procedures of world trade and maritime transportation involves the development of digitalization and the mechanism of automation of customs procedures, the organization of the work of maritime enterprises according to the "single window" principle. This increases the efficiency of the entire logistics chain and has a positive effect on the work of all maritime enterprises.

In fig. 7 presents an information and logistics model that reflects the conditions of adaptation of enterprises of the maritime industry of Ukraine in the structure of the regional maritime trade market.

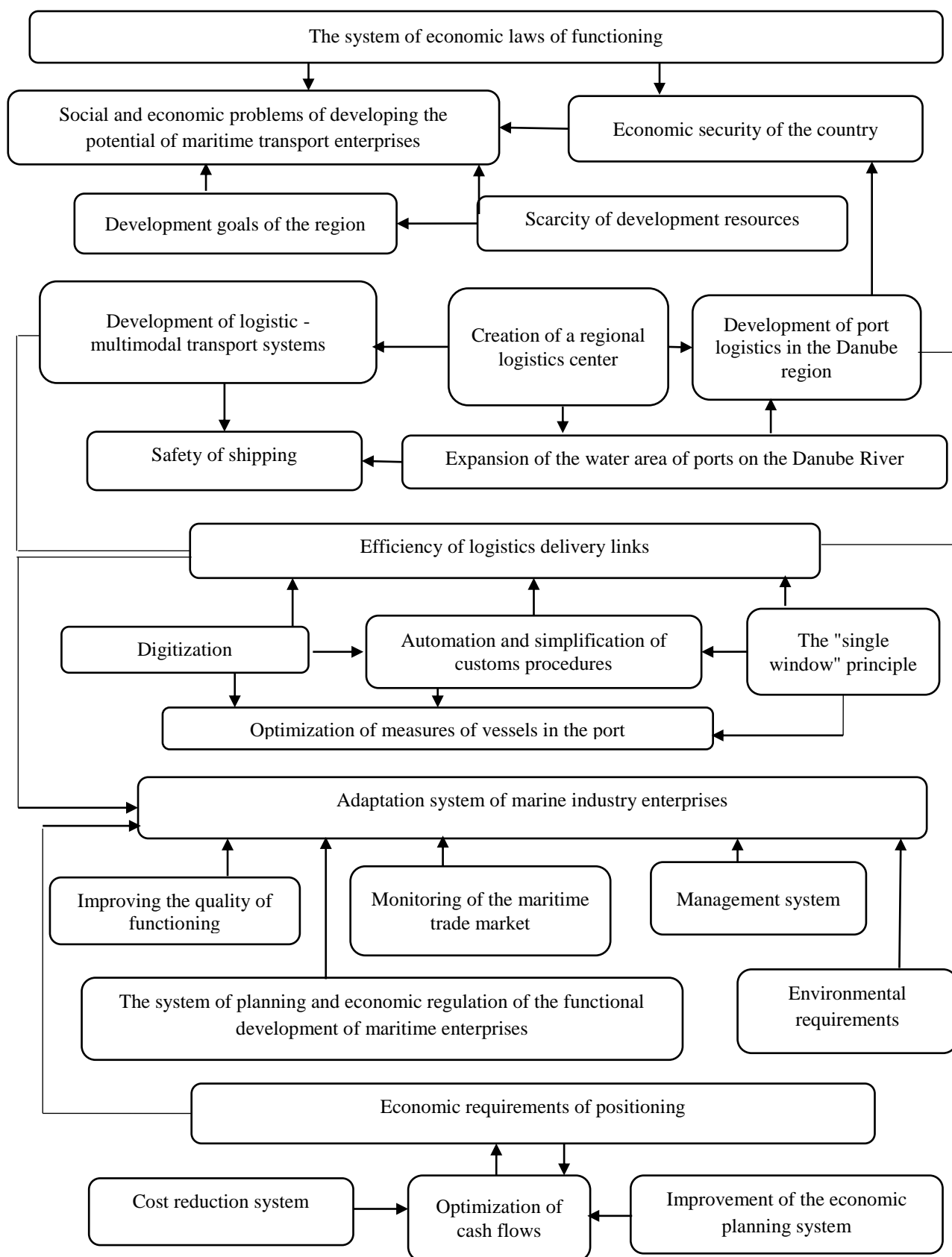


Fig. 7. Terms of adaptation of maritime enterprises of Ukraine

Source: own development

It should be emphasized that using the principle of "digitalization" means, firstly, increasing the efficiency of export, import and transit operations,

secondly, improving the management of the maritime industry, and thirdly, reducing the time and money spent by participants in the

transportation process, and it is also a mechanism that expands access and transparency of the global maritime trade market.

The effectiveness of the work of maritime enterprises in the structure of the maritime trade market depends on the efficiency of the functioning of the logistic links of cargo delivery, the monitoring mechanism of the maritime trade market, the quality management system, the improvement of the planning system and the assessment of positioning risk and effective management.

Also, an important factor in the adaptation system of maritime enterprises is the simplification of the procedures of world trade and sea transportation, which allows to reduce the time and costs of carrying out customs and other trade procedures and to introduce innovative technologies for the performance of administrative services.

The principle of digitization creates a paperless environment and all sea trade procedures are carried out online, and as the practice of recent years has shown, under the influence of the pandemic, this is one of the main conditions for the functioning of enterprises in the maritime industry.

As for the maritime and river industry in Ukraine, in recent years, thanks to the introduction of new technologies and the provision of

administrative procedures, the efficiency of logistics supply chains has increased.

The main economic requirements for the adaptation of stevedoring enterprises in the structure of the maritime trade market are: improving the quality of cargo flow processing to regional parameters of competitiveness; development of production infrastructure that ensures the functioning of enterprises in the maritime industry; solving socio-economic and environmental tasks of functioning on the basis of job creation; expansion of the export of transport services due to the development of the logistics system.

The constant need to improve the transport service of global economic ties, taking into account the rate of increase in freight turnover, is one of the main factors in the development of maritime enterprises. An important direction of such improvement is the development of logistics chains of product delivery. The basic principles of building such systems include:

- territorial optimality of transport routes according to criteria of minimization of energy intensity and environmental safety;
- absolute compliance of the technical and economic level and economic and legal status of national zones with international transport corridors.

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ТЕОРЕТИЧНІ ОСНОВИ СЕЛЕКТИВНОГО РЕГУЛЮВАННЯ СИСТЕМ ТОВАРНИХ РИНКІВ В УМОВАХ НЕСТАБІЛЬНОСТІ

Актуальність. В умовах структурних диспропорцій розвитку товарних ринків постає необхідність у впровадженні механізмів і заходів селективного регулювання вертикально суміжних товарних ринків, що дозволяють ефективно використовувати ресурсний потенціал національної економіки. В умовах нестабільності традиційні методи та інструменти регулювання економічних систем є неефективними. Непрогнозовані зміни в зовнішньому середовищі спонукають до розробки нових механізмів і заходів регулювання розвитку систем товарних ринків.

Мета та завдання. Метою статті є обґрунтування теоретичних засад селективного регулювання систем товарних ринків на основі відтворювального підходу в умовах нестабільності.

Матеріали та методи. Результати теоретичного узагальнення наукових праць і методичних підходів у сфері державного регулювання товарних ринків, що висвітлені в публікаціях фундаментального й прикладного характеру, а також статистичні дані Державної служби статистики України формують матеріальну та методичну базу дослідження. Для вирішення поставлених завдань використано такі методи системного, структурно-логічного, порівняльного, статистичного аналізу.

Результати. Удосконалено понятійно-категоріальний апарат дослідження, запропоновано концепцію селективного регулювання систем товарних ринків. Здійснено порівняльний аналіз об'єктів селективного регулювання, визначено їх відмінності за завданнями, регуляторними механізмами, ступенем впливу на систему та очікуваними ефектами. Встановлено, що регулювання «розривів» товарно-фінансових потоків чинить стабілізуючий вплив на частину ринкової системи, передбачає застосування адміністративних, організаційних, економічних, інституційних механізмів і заходів. Визначено природу та типологію «розривів» товарно-фінансових потоків у системах ринків за низкою ознак. Селективне регулювання «точок зростання» (ресурсо утворювальних секторів) чинить глибинний формуючий вплив на всю систему суміжних ринків, змінює (оптимізує) її структуру, передбачає застосування комплексних регуляторних механізмів. Визначено характерні ознаки «точок зростання», запропоновано методичний підхід до їх визначення на основі розрахунку міжсекторних балансів доданої вартості.

Висновки. На підставі емпіричних досліджень доведено, що в ринкових системах «точками зростання» є саме переробні сектори, які мають здатність ефективно реалізовувати ресурсний потенціал ринків в умовах нестабільності. Наукова новизна дослідження полягає в розробці теоретичних засад селективного регулювання систем суміжних товарних ринків, що базуються на двоєдності об'єктів цілеспрямованого регулювання («розривів» товарно-фінансових потоків і «точок зростання») за допомогою комплексних механізмів, які адаптивно поєднують різні типи регуляторних заходів. Прикладна значимість результатів дослідження визначається можливістю їх використання в якості наукового підґрунтя державними органами влади в ході розробки адаптивних механізмів селективного регулювання систем товарних ринків.

Ключові слова: система суміжних ринків, селективне регулювання, «розриви» товарно-фінансових потоків, «точки зростання», додана вартість.

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THEORETICAL BASICS OF SELECTIVE REGULATION OF COMMODITY MARKETS SYSTEMS IN CONDITIONS OF INSTABILITY

Topicality. *In the conditions of structural disproportions in the development of commodity markets, there is a need to implement mechanisms and measures of selective regulation of vertically adjacent commodity markets, which allow effective use of the resource potential of the national economy. In conditions of instability, traditional methods and tools for regulating economic systems are ineffective. Unforeseen changes in the external environment encourage the development of new mechanisms and measures to regulate the improvement of commodity market systems.*

Aim and tasks. *The purpose of the article is to substantiate the theoretical foundations of selective regulation of commodity market systems based on a reproduction approach in conditions of instability.*

Materials and Methods. *The results of the theoretical generalization of scientific works and methodological approaches in the field of state regulation of commodity markets, highlighted in publications of a fundamental and applied nature, as well as statistical data of the State Statistics Service of Ukraine form the material and methodological basis of the study. The following methods of systemic, structural-logical, comparative, and statistical analysis were used to solve the tasks.*

Research results. *The conceptual-categorical research apparatus has been improved, the concept of selective regulation of commodity market systems has been proposed. A comparative analysis of the objects of selective regulation was carried out, their differences in terms of tasks, regulatory mechanisms, degree of influence on the system and expected effects were determined.*

It has been established that the regulation of "gaps" in commodity and financial flows has a stabilizing effect on part of the market system and involves the use of administrative, organizational, economic, and institutional mechanisms and measures. The nature and typology of «gaps» in commodity and financial flows in market systems have been determined for a number of reasons. Selective regulation of «growth points» (resource-forming sectors) has a deep formative effect on the entire system of adjacent markets, changes (optimizes) its structure, and involves the use of complex regulatory mechanisms. Characteristic features of «growth points» are identified, a methodical approach to their determination based on the calculation of cross-sectoral balances of added value is proposed.

Conclusion. *On the basis of empirical studies, it has been proven that the «growth points» in market systems are precisely the processing sectors, which have the ability to effectively realize the resource potential of markets in conditions of instability. The scientific novelty of the study consists in the development of theoretical foundations of selective regulation of systems of adjacent commodity markets, based on the duality of objects of purposeful regulation («gaps» of commodity and financial flows and «growth points») with the help of complex mechanisms that adaptively combine different types of regulatory measures. The applied significance of the research results is determined by the possibility of their use as a scientific basis by state authorities during the development of adaptive mechanisms for selective regulation systems of commodity market.*

Keywords: *system of adjacent markets, selective regulation, "gaps" in commodity and financial flows, "growth points", added value.*

Problem statement and its connection with important scientific and practical tasks. In the conditions of existing disproportions in the development of national commodity markets, in particular, between production and consumption, the intersectoral distribution of added value, the raw nature of domestic exports and imports of processed goods, etc., there is a need to implement mechanisms, measures and tools of selective regulation (*hereinafter – SR*) of vertically adjacent commodity markets that allow effective use of the resource potential of the national economy. In conditions of instability, traditional methods and tools for regulating economic systems are ineffective. Unforeseen changes in the external environment encourage the development of new adaptive mechanisms and measures of SR functioning and development of systems of vertically adjacent commodity markets based on reproduction and sustainable approaches.

The research is related to the conceptual and strategic documents of Ukraine in the field of

security environment, in particular, the Concept of Ensuring National Stability dated September 27, 2021 No. 479/2021 (Concept, 2021), the National Economic Strategy of Ukraine until 2030 dated March 3, 2021 No. 179 (National Economic Strategy, 2021), the Food Security Strategy for the period until 2030 (Food Security Strategy, 2021).

Analysis of recent publications on the problem. The theoretical and methodological principles of the functioning and regulation of commodity markets were reflected in the works of O. Borodina, B. Burkinsky, V. Heits, S. Kvashi, Yu. Luzan, H. Mazur, S. Mocherny, O. Oliynyk, T. Ostashko, B. Paskhavera, V. Tochylyna, L. Khudoliy, S. Chistova, O. Shubravska and other economists. The theoretical foundations of the functioning of adjacent markets in the system of the national economy were reflected in the works of Y. Borovyk, V. Lagutin, A. Gerasimenko, R. Baak, Y. Kameke, H. Norman, D. Sheppington, H. Brunekrift, P. Ray, Zh. Tirol and other scientists. The development of the theoretical basis and

mechanisms of selective regulation of the development of commodity markets is devoted to the work of B. Burkinskyi, M. Tarakanov and other scientists of the Institute of Market and Economic&Ecological Research of the National Academy of Sciences of Ukraine (Burkynskyi, B., et.al., 2022 a; Burkynskyi, B., et.al., 2022 b).

The generalization of the set of definitions of the category "*state regulation of the economy*" made it possible to distinguish three main approaches to the interpretation of their essence. The first approach emphasizes the sphere of state activity for purposeful influence on the behavior of participants in market relations in order to ensure the priorities of economic policy (Chystov, S., et al., 2000). The second approach is reproduction, the distinguishing feature of which is the influence of the state on reproduction processes to ensure their stability. The third approach is the most common, defining the essence of the original category through a system of various measures, tools, and regulatory methods (Didkivska, L. & Holovko, L., 2008).

Allocation of previously unsolved parts of the general problem. In contrast to state regulation, the category of "*selective regulation*" is poorly researched in economic theory and is defined by scientists as a component of industrial policy, which involves the use by the state of a set of forms and methods of purposeful influence on the development of certain priority industries (or their complex) with the aim of structural restructuring of the economy (Economic encyclopedia, 2002).

Limiting the scope of application of mechanisms and measures of selective regulation only to industry leaves out of the attention of scientists the agrarian, infrastructural, and consumer sectors of the markets, which can be objects of SR and become drivers of the development of certain commodity market systems. Therefore, the existing categories need to be adjusted taking into account both the peculiarities of market research and the current unstable conditions of market functioning.

Formulation of research objectives (problem statement). Purpose of the article – substantiation of the theoretical foundations of selective regulation of systems of vertically adjacent commodity markets based on a reproduction approach in conditions of instability – outlined the following tasks:

- provide a definition of the category "selective regulation of commodity market systems";
- substantiate the author's concept of selective regulation of commodity markets;

- to develop a typology of "discontinuities" of commodity and financial flows in commodity market systems;

- to substantiate the characteristic features of "growth points" of market systems and a methodical approach to their determination.

Materials and Methods. The results of the theoretical generalization of scientific works and methodological approaches in the field of state regulation of commodity markets, highlighted in publications of a fundamental and applied nature, as well as statistical data of the State Statistics Service of Ukraine form the material and methodological basis of the study. The following methods of systemic, structural-logical, comparative, and statistical analysis were used to solve the tasks.

An outline of the main results and their justification. To interpret the category "selective regulation of the development of commodity markets" we will use a *reproduction approach* that focuses attention on the influence of the state on reproduction processes in the systems of vertically adjacent commodity markets (by the stages of the technological value chain from the production of raw materials to the sale of final products and waste processing). Selectivity involves the selective (targeted) influence of the state on the objects of regulation - certain sectors ("growth points") in the market system or "gaps" in commodity and financial flows that arise both between sectors and markets, caused, first of all, by the inconsistency of economic interests of their subjects. The main goal of the state SR is to ensure the stability of the functioning of systems of vertically adjacent commodity markets and the implementation of strategic priorities for the sustainable development of the economy.

Taking into account the essence and target orientations of the SR in the market plane, the author's definition of the category "*selective regulation of the development of commodity markets*" is proposed, namely: targeted influence of the state on certain sectors ("growth points") of markets or "gaps" in commodity and financial flows to ensure reproductive development systems of vertically adjacent commodity markets and implementation of strategic priorities of sustainable development of the state and society (table 1). This definition focuses attention on the duality of regulatory objects and goals of the SR, and also, in contrast to existing interpretations (Economic encyclopedia, 2002), goes beyond industrial policy, covers not only processing, but also agrarian, distribution, consumer sectors of systems commodity markets, which makes it

possible to comprehensively investigate the set of direct and reverse relations between sectors and markets and to identify latent "gaps" in commodity and financial flows that can be objects of SR.

A distinctive feature of the author's definitions is the focus on reproductive processes that occur not in single product markets, but in systems of vertically adjacent product markets. In theory, a vertically adjacent market is a market that borders on a relevant market in the technological chain (for which commodity, geographical and time boundaries are defined) (Sappington, D., 2005;

Rey, P. & Tirole, J., 2007). It should be noted that the category "system of vertically adjacent commodity markets" correlates with the term "*food system*" used in the Food Security Strategy for the period until 2030 (Food Security Strategy, 2021). The correlation of the category used for selective regulation of the development of commodity markets with the term of strategic documents indicates their common reproductive basis, the expediency and importance of using the reproductive approach in the course of ensuring national food security.

Table 1

Categorical set of definitions of the content of the categories "selective policy" and "selective regulation of the development of commodity market systems"*

Categories	Essence (content)
<i>Selectivity</i>	1. Selectivity, the ability to select (Economic encyclopedia, 2002) 2. Purposefulness of influence on certain economic processes or sectors for the implementation of market system development priorities (<i>author</i>)
<i>Selective policy of the state (market measurement)</i>	1. Targeted selective support of individual sectors of the economy, regions, enterprises or their groups (has a vertical microeconomic character) (Chystov, S., et al., 2000; Didkivska, L. & Holovko, L., 2008) 2. Implementation of system-wide policy with the help of measures and tools of selective regulation of certain sectors or "discontinuities" of commodity and financial flows in the systems of vertically adjacent commodity markets within the geographical boundaries of the state (<i>author</i>)
<i>Selective regulation of the development of commodity markets</i>	Targeted influence of the state on certain sectors ("growth points") of markets or "discontinuities" in commodity and financial flows to ensure the reproductive development of systems of vertically adjacent commodity markets and the implementation of strategic priorities for the sustainable development of the state and society (<i>author</i>)
<i>Mechanism of selective regulation of commodity markets</i>	A system of measures and tools, forms and methods adapted to the unstable conditions of the external environment, with the help of which the state purposefully regulates reproduction processes in the systems of vertically adjacent commodity markets (<i>author</i>)

* Source: Economic encyclopedia, 2002; Chystov, S., et al. (2000). State regulation of Economy; Didkivska, L. & Holovko, L. (2008). State regulation of Economy.

The main idea of the author's *concept of selective regulation* of the development of commodity markets is that the gradual introduction of mechanisms and measures of selective regulation (including state marketing tools), purposefully oriented, on the one hand, to stimulate the production of added value of goods in resource-generating (primarily, processing) sectors of vertically adjacent commodity markets, on the other hand, to reduce (leveling) the "gaps" of commodity and financial flows between adjacent sectors and markets, will allow to ensure the stability of functioning and reproductive development of commodity markets and the national economy in general in conditions of instability.

This concept synthesizes into a single methodological plane two objects of selective regulation of the development of commodity markets: "gaps" of commodity and financial flows and resource-generating sectors (growth points) of

systems of vertically adjacent commodity markets (Fig. 1). These objects differ in nature, tasks, SR mechanisms, depth of influence on the system, and expected effects.

One of the main reasons for the loss of added value in vertically adjacent markets is the existence of a number of structural, financial, price, etc. development disproportions, which form "gaps" (intersectoral and intermarket) in commodity and financial flows in the process of their movement along the links of the technological chain. Most of such "gaps" arise on the border of inter-sectoral and inter-market redistribution of commodity and financial flows in the system of adjacent markets, which is due to the divergent economic interests of subjects of different sectors (or markets). The existence of such "gaps" in commodity markets necessitates the substantiation and implementation of selective regulation mechanisms purposefully focused on ensuring the continuity of the reproductive process and the balance of

commodity and financial flows in the system of adjacent markets.

Selective regulation of flow "gaps" involves the use of administrative, organizational, financial and economic, institutional and informational mechanisms and measures (see Fig. 1). It exerts a *stabilizing influence on part of the system of commodity markets* (as a rule, on adjacent sectors), minimizing structural, financial and other disproportions of development, restoring the

continuity of reproductive processes between sectors or markets of the system. An important expected effect of the implementation of SR measures of "discontinuities" in commodity and financial flows is the provision of expanded reproduction of resources in market sectors, coordination of financial interests of subjects of various sectors and markets of the system, more objective cross-sectoral redistribution of added value.

Directions / effects	Objects of selective regulation	
	I. "Gaps " in commodity and financial flows between sectors and markets of the system	II. Resource-generating sectors systems of adjacent markets ("growth points")
Task	Ensuring the continuity of the reproduction process, the balance of product and financial flows in the system	Optimization of the market added value of goods in the system of adjacent markets, effective use of its resource potential
Mechanisms of selective regulation	Administrative, organizational, financial and economic, informational, institutional	Institutional-economic, institutional-organizational, monitoring; complex, systematically linking several adjacent sectors or markets to achieve regulatory objectives
The degree of influence on the system	Stabilizing	Formative
Expected effects of selective exposure	Expanded reproduction of resources in sectors of commodity markets, coordination of interests of subjects of various sectors and markets of the system, more objective cross-sector redistribution of added value	Production (increasing the level of capacity utilization of processing enterprises), social (creation of new jobs), reproductive (increase in market added value), tax (increase in tax revenues and social benefits)

Fig. 1. Comparative characteristics of objects of selective regulation of the development of systems of vertically adjacent commodity markets*

*Developed by the author

The choice of SR measures and tools depends on the specifics and nature of "discontinuities" in commodity and financial flows in the systems of vertically adjacent commodity markets, which makes it necessary to typify such "discontinuities" according to a number of signs and determine their essential characteristics. The term "gap" was integrated into the market theory from the GAP analysis methodology, which studies the discrepancy between the current and desired state of the enterprise, its causes and ways of overcoming it. In the theory of GAP analysis, scientists interpret a "gap" as a discrepancy between the real (current) capabilities of the system and the desired (potential) level of efficiency of its functioning (Franklin, M., 2006). In our opinion, this definition is also inherent in the systems of adjacent commodity markets.

A "gap" in market theory can be defined as a discrepancy between the actual and optimal (normative) values of the parameters of commodity and financial flows in the system of vertically

adjacent commodity markets due to the weakening (absence) of connections and interactions between its sectors or markets, which does not provide extended reproduction resources and optimization of total added value in the market system. This definition is based on the theory of GAP analysis and the reproducible approach, focusing on the cause of "gaps" and their destructive impact on achieving the main goal of sustainable development of adjacent commodity market systems. "Discontinuities" of commodity and financial flows in market systems have a multi-component structure, which should certainly be taken into account when developing their classification.

The issue of classification of "gaps" in market theory remains understudied. In the classical theory of GAP analysis, scientists distinguish 6 categories of gaps (Franklin, M., 2006): (1) market gaps; (2) in the quality of products and services; (3) organizational; (4) business management; (5) business processes; (6)

information technologies. However, this classification of "gaps" does not reflect the essence of the problematic aspects of the reproductive and flow processes of markets. Based on the results of previous studies [23, 24], the authors developed their own classification of "gaps" of commodity and financial flows in the market dimension according to 7 characteristics (table 2).

Selective regulation of "*growth points*" (see Fig. 1) provides targeted stimulation of the production of added value of goods in resource-generating (primarily, processing) sectors of systems of vertically adjacent commodity markets for effective use of the raw material, production, labor and innovation potential of the markets. This type of SR involves the implementation of

institutional-economic, institutional-organizational and complex mechanisms that systematically connect several adjacent sectors or markets with a set of selective measures to support target groups of subjects (for example, domestic producers of seeds, durum wheat and pasta products). It is the complex mechanisms of selective regulation that are the most effective in conditions of instability, as they are able, on the one hand, to generate the greatest production, social, reproductive and tax effects in the system of adjacent markets, and on the other hand, to respond promptly to changes in the external environment and modernize the composition and vector of measures of the SR, while ensuring their efficiency and achievement of new targets.

Table 2

Classification of "gaps" of commodity and financial flows in systems vertically adjacent commodity markets*

Sign	Types of "gaps"
<i>1. By place of origin in the system of adjacent commodity markets</i>	1. Internal: 1.1. Intra-sectoral 1.2. Intersectoral 1.3. Intermarket 2. External: 2.1. Between systems of different commodity markets 2.2. Between the system of commodity markets and various stakeholders 2.3. Between the system of commodity markets and the surrounding natural environment
<i>2. By types of flow processes in the system of adjacent commodity markets</i>	1. Simple (single-threaded): 1.1. "Gaps" in the commodity flow 1.2. " Gaps " in the financial flow 1.3. " Gaps " in the information flow 2. Combined: 2.1. " Gaps " in commodity, financial and information flows 2.2. " Gaps " in commodity and financial/information flows 2.3. " Gaps " in financial and information flows
<i>3. By the depth of influence on the functioning of the market system</i>	1. Superficial (local) 2. Essential 3. Deep
<i>4. According to the causes of occurrence</i>	1. Natural 2. Artificial
<i>5. According to the ratio of supply and demand</i>	1. Intersectoral "gaps" in conditions of market equilibrium 2. Intersectoral "gaps" in conditions of excess demand over supply 3. Intersectoral "gaps" in conditions of excess supply over demand
<i>6. Beyond the geographical boundaries of systems of vertically adjacent commodity markets</i>	1. " Gaps " in the systems of local commodity markets 2. " Gaps " in the systems of regional commodity markets 3. " Gaps " in state commodity markets 4. " Gaps " in global commodity markets
<i>7. By adaptation systems of adjacent markets to measures of state regulation</i>	1. " Gaps " as a reaction of adjacent market systems to state support for the production of goods with high added value 2. " Gaps " as a reaction of adjacent market systems to state support for the export of goods with a high added value 3. " Gaps " as a reaction of adjacent market systems to the state policy of import substitution

* Source: Franklin, M. (2006). Performance Gap Analysis; Burkynskyi, B., et.al., (2020). Methodological principles of the formation of effective logistics of commodity markets.

In contrast to the regulation of flow "gaps", SR "growth points" exerts a deep *formative influence on the entire system* of vertically adjacent commodity markets, changes (optimizes) its structure, generates a powerful multiplicative effect for sustainable reproductive development of both the relevant system and related with it markets (in particular, material and technical support). This type of selective regulation is focused in the future on changing the market proportions of reproduction and transition of the system to a new quality, ensuring its sustainable development in conditions of instability.

The main task of the state is to determine the priority (resource-generating) sectors in the systems of adjacent markets, which can be objects of selective regulation. In our opinion, the main criterion for assigning a certain sector to a resource-generating sector is its indicator of sectoral added value (*hereinafter* - AV), its structure and its share in the total market AV. Therefore, the substantiation of potential "growth points" of commodity markets should be based on the results of the assessment of added value (market and sectoral), which is an internal resource of sustainable reproductive development of micro-, meso- and macroeconomic systems. The authors have developed and tested a number of methodological provisions regarding the assessment of the formation and distribution of DV in product market chains (Nikishyna, O., 2021; Zerkina, O. et.al., 2022).

The resource-generating potential of various

sectors of adjacent markets is unequal both in terms of volume and structure. To determine the most active resource-generating sectors ("growth points") in the system of adjacent markets, it is necessary to calculate intersectoral balances of the added value of goods and carry out their comparative quantitative and structural analysis. It is important to take into account not only the absolute value of the indicator, but also its resource structure (the specific weight of wages, depreciation of fixed assets, profit), the volume of sectoral tax revenues and social deductions, the dynamics of their changes, etc.

According to the results of the research (Nikishyna, O., 2021; Zerkina, O. et.al., 2022), the authors calculated the cross-sectoral balance of the main indicators of added value in the system of vertically adjacent markets of bread products of Ukraine (table 3). It was established that the largest share in the market added value and tax revenues (43,7% and 54,4%, respectively) is provided by the sector of production of short-term storage bread and bakery products, which at the same time has the lowest level of product profitability among sectors (2,7 %) and the share of profit in the structure of DV (15,6 %). The share of added value in the output of products is the highest in the raw materials sector (28,6%), which at the same time has the highest level of reproductive profitability of products (34.6%) and the lowest tax intensity of VAT (10,1%) and specific weight in market tax revenues (8,8%).

Table 3

**Intersectoral balance of the main indicators of added value
in the system of vertically adjacent grain markets of Ukraine, %***

Indicators	Sector 1: Wheat production	Sector 2: Production of flour	Sector 3: Production of SBBP**	Sector 4: Trade of SBBP**
1. The share of the sector in the market added value	23,53	12,01	43,74	20,73
2. The share of added value in production	28,57	11,62	16,88	7,41
3. Reproducible profitability of products	34,60	11,97	17,34	7,76
4. Make products profitable	11,80	3,00	2,70	4,80
5. Tax content of added value	10,11	33,08	33,54	28,61
6. Share of the sector in market tax revenues	8,8	14,7	54,4	22,0
<i>Resource structure of sectoral added value, %</i>				
1. Salary with deductions	26,56	47,51	59,53	36,6
2. Depreciation of non-current assets	27,34	27,44	24,90	1,59
3. Profit	46,09	25,06	15,57	61,81

* Source: Nikishyna, O. (2021). Diagnostics of indicators of added value and logistics costs in the market chain of grain and bread products of Ukraine; Zerkina, O. et.al. (2022). Institutional support for formation of reproductive logistics on the bread and bakery market of Ukraine. **SBBP – short-term storage bread and bakery products.

On the basis of empirical studies, structural disproportions in the formation and distribution of added value in the system of adjacent commodity markets have been determined. It was established that as the degree of processing of products in the market system "wheat – flour – bread" increases, the level of its profitability decreases with a simultaneous increase in the tax burden and tax intensity of added value. The assessment of the resource structure of the added value identified a number of disproportions that inhibit the reproductive development of the processing sectors of the markets, primarily the sector of the production of bread and short-term bakery products. This sector generates almost 44% of the market added value, has the highest share of wages (60%) and the lowest share of profit (15,6%) in the structure of the State Economy, a high level of tax intensity of added value (33,5%), which indicates the realization of social and tax function of the bread sector and the low degree of implementation of its reproduction function in the direction of ensuring the expanded reproduction of resources and profitability of socially oriented bakery enterprises (Nikishyna, O., 2021).

The calculations carried out (see Table 3) show that in the system of vertically adjacent markets for bread products, the resource-generating sector ("point of growth") is the sector of production of short-term storage bread and bakery products, which produces 44% of added value and 54% of tax revenues in the market system. An important role is also played by the flour production sector, which has a high tax intensity of the state tax (33,1%) and the share of wages in its structure (47,5%).

Therefore, it can be asserted that in the systems of vertically adjacent commodity markets, the main resource-generating sectors, i.e. "growth points", are precisely the processing sectors, which have the ability to effectively realize the resource potential of markets in conditions of instability and generate a powerful multiplier effect of sustainable reproductive development of the entire market system. The characteristic *features* of resource-generating sectors of commodity markets are as follows:

- significant or the highest specific weight of the sector in the formation of market added value;
- a significant share of the sector in market tax revenues, a high level of sectoral tax intensity of added value;
- dominance in the resource structure of the sectoral AV of the social component - wages with deductions (more than 40%);

- creation of new jobs, ensuring employment of the population;
- performance of social and environmental functions by the subjects of the sector in the market system, realization of their resource potential in the plane of sustainable development;
- the ability to activate (revive) the activities of adjacent sectors and related markets, transform the connections between them, to change the directions of internal and external commodity flows in the market system and its structure in general.

It should be noted that it is the last feature, provided there are favorable institutional and economic conditions for its implementation, that ensures the ability of resource-generating sectors to generate a multiplicative effect of sustainable reproductive development of the entire system of adjacent commodity markets. Processing sectors ("growth points") are *active sectors* that initiate transformations of commodity and financial flows, and adjacent raw material and distribution and sales sectors are *receptive sectors* that perceive these transformations and in a certain way change the parameters of flow processes, the volume and structure of commodity flows, intersectoral interactions and connections etc. At the same time, it is necessary to take into account the dynamic effects of the external environment on the process of transformation of intersectoral flow processes and connections initiated by active sectors of commodity markets.

In view of the identified characteristics and capabilities of the resource-generating sectors, it is appropriate to include the processing sectors of the three upper adjacent markets of flour milling and groats products, combined feeds and industrial goods, as well as the industrial consumption of flour for the production of bread products with high added value. The algorithm for forming links of transformations and development in the system of adjacent markets is as follows: the growth of internal grain processing and production volumes in the processing sectors of the markets will cause, on the one hand, a gradual reduction in raw material exports and reorientation of the agricultural sector to the needs of domestic processing enterprises, on the other hand, the need stimulating the export of grain and bread products with the help of selective regulation tools, including state marketing. At the same time, the activation of the processing sectors will contribute to the formation of additional demand for material and technical resources, encouraging the development of related markets for goods and services.

In general, the increase in the movement capacity of internal grain flows and export commodity flows of grain and bread products will gradually change the existing market proportions of reproduction and ensure the transition of the system of vertically adjacent markets of grain and its processing products to a new quality - from a medium to highly developed system focused on deep processing of grain. It should be noted that the task of revitalizing the processing sectors ("growth points") of commodity markets becomes especially urgent in the conditions of the post-war economic recovery, when there is a need to create additional jobs, ensure timely payments of wages and social deductions, and realize internal investment reserves by increasing volumes the created market added value and reduction of its losses in the areas of raw material export and import of goods for the production of which Ukraine has its own resource potential.

To restore and activate the activities of resource-generating sectors in the systems of adjacent commodity markets, it is advisable to combine two types of selective regulation measures:

(1) *intra-sectoral measures* involving selective influence on certain groups of market entities (or segments) within the sector;

(2) *cross-sectoral measures* of the SR, focused on the restoration and formation of long-term parity economic ties between the processing and adjacent sectors of commodity markets.

The set of these regulatory measures forms complex mechanisms of selective regulation that systematically connect active and receptive sectors with a complex of selective measures to support certain groups of subjects (or market segments), purposefully influence the parameters and direction of movement of commodity and financial flows to achieve the target benchmarks of the reproductive development of systems of vertically adjacent commodity markets.

It should be noted that the totality of SR measures as part of a complex mechanism should be focused, in particular, on overcoming structural disproportions in the formation and distribution of added value in the system of adjacent commodity markets, identified on the basis of the analysis of intersectoral balances of added value indicators. The proposed methodical approach makes it possible to determine the reproducible disproportions in the development of processing sectors ("growth points"), which must be reduced (levelled) in order to realize the opportunities and potential of these sectors in the system of adjacent markets. Therefore, it is extremely important to

take into account the defined target orientation in the course of forming the composition of measures of the complex mechanism of SR.

In the course of the study, it was established that the main objects of state selective regulation are systemic "gaps" in commodity and financial flows and resource-generating sectors of markets (see Fig. 1), which determines the need for an adaptive combination (mutual complement) of two types of SR in conditions of instability.

Conclusions and perspectives of further research. The research substantiates the theoretical foundations of selective regulation of commodity market systems based on a reproducible approach in conditions of instability. The conceptual and categorical apparatus of the study has been improved, in particular, the categories "selective state policy", "selective regulation of the development of commodity markets", which, unlike the existing ones, reflect the reproductive approach as the methodological basis of the study, focus attention on the reproductive development not of single markets, but of systems vertically adjacent product markets, have a macroeconomic dimension and cover not only industrial, but all market sectors, including agricultural, distribution and consumer.

The concept of selective regulation of the development of commodity markets is proposed. A comparative analysis of SR objects for the development of systems of vertically adjacent commodity markets was carried out, their differences in terms of tasks, regulatory mechanisms, degree of influence on the system and expected effects were determined. It was established that the SR of "gaps" in commodity and financial flows has a stabilizing effect on part of the market system (as a rule, on adjacent sectors), minimizing structural, financial, etc. development disparity, involves the application of administrative, organizational, financial and economic, institutional and informational mechanisms and measures.

Selective regulation of "growth points" (resource-generating sectors) has a profound formative effect on the entire system of vertically adjacent commodity markets, changes (optimizes) its structure, generates a multiplier effect for the development of both the relevant system and related markets. This type of selective regulation is focused in the future on changing the market proportions of reproduction and transition of the system to a new quality.

The nature and typology of "gaps" of commodity and financial flows in the systems of adjacent markets have been determined according

to a number of features, in particular: (1) place of origin in the market system; (2) types of flow processes; (3) the depth of influence on the functioning of the market system; (4) causes of occurrence; (5) the ratio of supply and demand; (6) geographical boundaries of adjacent market systems; (7) their adaptation to measures of state regulation. It has been established that in practice the most common are cross-sector and cross-market combined "gaps" of flow processes, which, as a rule, are substantial or deep.

To determine the "points" of growth in the systems of adjacent commodity markets, the calculation of intersectoral balances of added value, its structure, and the share of sectoral AV in market AV is proposed. On the basis of empirical studies, it has been proven that the resource-generating sectors in market systems are precisely the processing sectors, which have the ability to effectively realize the resource potential of markets in conditions of instability. The characteristic features of such sectors are determined, in particular: a significant share of the sector in the formation of market added value and tax revenues, the dominance of the social component (wages) in the structure of the sectoral AV, the ability to activate the activities of adjacent sectors and related markets, the transformation of relations between them, which generates a multiplicative

effect of the reproductive development of the entire market system. In order to activate "growth points", it is important to combine two types of SR measures - intersectoral and intrasectoral, the totality of which forms complex SR mechanisms that systematically connect active and receiving sectors, purposefully influence the parameters of market reproduction processes in order to achieve target guidelines for the development of commodity market systems in conditions of instability.

The scientific novelty of the study consists in the development of the theoretical foundations of selective regulation of systems of adjacent commodity markets based on a reproducible approach, based on the duality of objects of purposeful regulation ("gaps" of commodity and financial flows and "growth points") with the help of complex mechanisms that adaptively combine different types of regulatory measures. The applied significance of the research results is determined by the possibility of their use as a scientific basis by state authorities during the development of adaptive mechanisms for selective regulation of commodity market systems. Prospects for further research in this direction are the development of institutional support for SR of strategic commodity markets in conditions of instability.

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ТЕОРЕТИКО-АНАЛІТИЧНИЙ ОГЛЯД ВИЗНАЧЕННЯ «ПРОДОВОЛЬЧА БЕЗПЕКА» ТА РОЛЬ ПОРТІВ ВЕЛИКОЇ ОДЕСИ У ПОДОЛАННІ ГЛОБАЛЬНОЇ КРИЗИ

Актуальність. З початком повномасштабного вторгнення російської федерації на територію України, економічна діяльність зазнала серйозних збитків, в тому числі шкода була нанесена й сільському господарству. Що у свою чергу призводить до проблеми у сфері забезпечення державної та міжнародної продовольчої безпеки.

Мета та завдання. Метою статті є теоретичне обґрунтування визначення «продовольча безпека» та аналіз діяльності портів Великої Одеси щодо урегулювання кризового стану в питанні міжнародної продовольчої безпеки.

Матеріали та методи. В даній статті було використано емпіричні, теоретичні, аналітичні та синтезові моделі наукових досліджень. Також в роботі було використано графічний метод наукового дослідження, та метод групування.

Результати. В статті проведено аналіз наукової літератури та нормативно-правових актів теоретичного апарату терміну «продовольча безпека». Було узагальнено даний термін до єдиного поняття спираючись на сучасні події, які відбуваються в Україні. Також було проведено аналіз діяльності портів Великої Одеси («Одеса», «Чорноморськ», «Південний»), спираючись на дані за 2021 рік та актуальні показники, отримані із сучасної бази даних «Переміщення кораблів Чорноморської зернової ініціативи», терміном з 3 серпня по 19 листопада 2022 року. Під час аналізу було визначено, що із порту «Чорноморськ» та «Південний» найбільше експортується така аграрна продукція, як кукурудза (1.821 млн. тонн та 1,757 млн. тонн відповідно). Пшениця у свою чергу знаходиться на другому місці у рейтингу найпопулярніших експортованих агрокультур, але першою у порті «Одеса» - 1,261 млн. тонн. Також було складено рейтинг країн-експортерів: перше місце посіла Турція, далі Італія, Іспанія, Нідерланди, Єгипет та ін.

Висновки. Проведений аналіз сучасного стану продовольчої безпеки, особливо впливу морських портів Великої Одеси на вирішення кризової ситуації, говорить про те, що звісно спостерігається зменшення експорту зернових культур до країн Азії, Європи та Африки, але отриманий досвід в ході виконання «Зернової угоди», можна використати задля покращення управління транспортного забезпечення продовольчої безпеки України.

Ключові слова: продовольча безпека, водний транспорт, зернова ініціатива, морські порти, порти Великої Одеси.

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THEORETICAL AND ANALYTICAL REVIEW OF THE DEFINITION OF "FOOD SECURITY" AND THE ROLE OF THE PORTS OF GREATER ODESSA IN OVERCOMING THE GLOBAL CRISIS

Topicality. With the beginning of the full-scale invasion of the russian federation on the territory of Ukraine, economic activity suffered serious damage, including damage to agriculture. Which in turn leads to a problem in the sphere of ensuring state and international food security.

Aim and tasks. The purpose of the article is the theoretical substantiation of the definition of "food security" and the analysis of the activities of the ports of Great Odesa in relation to the regulation of the crisis situation in matters of international food security.

Materials and methods. Empirical, theoretical, analytical and synthesis models of scientific research were used in this article. The graphic method of scientific research and the grouping method were also used in the work.

Research results. The article analyzes the scientific literature and legal acts of the theoretical apparatus of the term "food security". This term was generalized to a single concept based on current events taking place in Ukraine. An analysis of the operation of the ports of Greater Odessa (Odesa, Chornomorsk, Pivdenny) was also carried out, based on data for 2021 and current indicators obtained from the modern database "Black Sea Grain Initiative Vessel Movements". During the analysis, it was determined that agricultural products such as corn (1.821 million tons and 1.757 million tons, respectively) are mostly exported from the ports of Chornomorsk and Pivdenny. Wheat, in turn, is in second place in the ranking of the most popular exported agricultural crops, but it is the first in the port of "Odesa" - 1.261 million tons. A rating of exporting countries was also compiled: Turkey took first place, followed by Italy, Spain, the Netherlands, Egypt, and others.

Conclusion. The conducted analysis of the current state of food security, especially the influence of the seaports of Greater Odessa on solving the crisis situation, indicates that, of course, there is a decrease in the export of grain crops to the countries of Asia, Europe and Africa, but the experience gained during the implementation of the "Grain Agreement" can be used in order to improve the transport management of food security of Ukraine.

Keywords: food security, water transport, grain initiative, sea ports, Ports of Greater Odessa.

Problem statement and its connection with important scientific and practical tasks. An important component in the livelihood of the country's population is food. After the development of the international strategy for food security, in the early 70s of the last century, by the Food and Agriculture Organization of the United Nations (FAO), the problem of food security has become a subject of constant discussion at the world level. According to FAO forecasts, the population will increase to 9.7 billion people by 2050. In order to fully provide such a number of people with food, it is necessary to increase the volume of food production by 70%. But Russia made its corrections to this issue.

Starting from February 24, 2022, the war began on the territory of Ukraine. Ukrainian ports were blocked by the Russian navy. Which automatically led to the disruption of the usual logistics routes that were responsible for the export of agricultural products, which in turn forced the increase in the prices of food products in the world and brought the countries of Africa and Asia dependent on Ukrainian agricultural products to the brink of starvation.

Analysis of recent publications on the problem. The study of the issue of food security was reflected in the works of international and domestic scientists, such as: Konueya J., Barbera E., Geets V., Shlemko V., Binko I., Hoychuka O., Kvashi S., Lysetskoho A., Khvesyka M., Zakharchenko V., Borisova O., Molina E., Golikova K., Romyka I., Kordzai N., Yehorova B., Krupka M., Mykhasyuk I., Melnyka A., Muntyana V., Basyurkinov N.

Allocation of previously unsolved parts of the general problem. At the same time, a single theoretical concept of food security, taking into account modern realities, is insufficiently reflected in the scientific literature. In the conditions of the Russian-Ukrainian war, there is a need for

additional research into the theoretical and practical components of food security.

Formulation of research objectives (problem statement). The purpose of the study is to analyze the theoretical apparatus of the term "food security", the role of the seaports of Greater Odessa ("Odesa", "Chornomorsk", "Pivdenny") in solving the crisis of international food security and the analysis of the activities of the "Grain Initiative" for the last three months.

Materials and methods. Two types of scientific research were used in the work: empirical and theoretical.

Empirical method. Observation is a systematic purposeful, specially organized perception of objects and phenomena of objective reality, which are the objects of research. As a method of scientific knowledge, observation makes it possible to obtain primary information in the form of a set of empirical statements. Empirical aggregate becomes the basis of preliminary systematization of objects of reality, making them initial objects of scientific research (Tsekhmistrova G.S., 2003).

Analysis is a method of learning that makes it possible to divide a subject into parts in order to study it in detail. Synthesis, on the contrary, is the result of combining individual parts or features of an object into a single whole.

Analysis and synthesis are interconnected, they represent the unity of opposites. Depending on the level of knowledge of the object and the depth of penetration into its essence, various types of analysis and synthesis are used.

Direct, or empirical, analysis and synthesis are used at the stage of superficial acquaintance with the object. At the same time, individual parts of the object are selected, its properties are identified, the simplest measurements are carried out, and direct data on the surface are recorded. This type of analysis and synthesis makes it possible to learn about the phenomenon, but it is not enough to

penetrate into its essence.

Reverse, or theoretical, analysis and synthesis are widely used to study the essence of the phenomenon under study. Here, analysis and synthesis operations are based on some theoretical considerations, that is, assumptions and cause-and-effect relationships of various phenomena (Tsekhmistrova G.S., 2003).

An outline of the main results and their justification. The food problem has not lost its relevance over the years. According to the statistics of the US Department of Agriculture (FAOSTAT, 2022) in 2021-2022, Ukraine ranked seventh in the world for wheat production – 33 million tons. In the first place in the EU, if we take into account the total production of wheat in all the member states of the European Union. According

to the Center for Monitoring Economic Data, the largest importers of Ukrainian wheat in 2020 were Egypt (\$5.2 billion), China (\$3.47 billion), Turkey (\$2.44 billion), Nigeria (\$2.15 billion dollars) and Indonesia (\$2.08 billion). The largest buyer of wheat from Ukraine was Egypt (OEC, 2022).

According to the report of the Global Index of Food Security, part 5, in November 2021, Ukraine ranked 58th among 113 countries. As of September 2022, it ranks 73rd in the Index. Despite Ukraine's adequate food supply, the availability score has declined due to a weak infrastructural supply chain, armed conflict, corruption and political instability. Figure 1 shows the relationship between the indicators and the ranking of the Global Food Security Index (Country report: Ukraine. Global Food Security Index 2022).

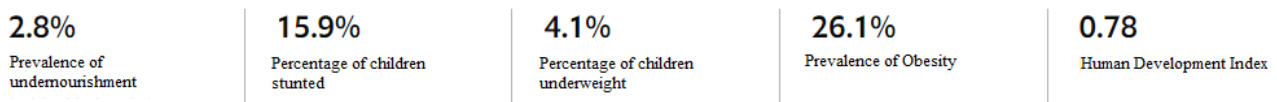


Fig. 1. Correlation between the indicators and the rating of the Global Food Security Index for Ukraine
Source: according to the Global Food Security Index

Since the beginning of the full-scale invasion of Russia on the territory of Ukraine, all ports of Ukraine have been blocked. Export of agricultural products took place with the help of railway transport, Danube ports and road transport through the checkpoints of the western border. However, this method of exporting agricultural products was unable to cover the necessary amount of grain that would solve the problem of the international food problem of countries dependent on Ukrainian exports.

As defined by FAO, the food security of the state is a well-functioning system that provides all strata of the population with food products according to accepted physiological norms due to its own production and the necessary level of import of those products for the production of which there are no internal conditions (Rome Declaration on World Food Security and Plan of

Action of the World Food Summit, 1996).

Methodological concept «food security» is derived by scientists from the concept of «economic security» (Rumyk I.I., 2020). According to the Order of the Ministry of Economic Development and Trade of Ukraine «On the approval of methodological recommendations regarding the calculation of the level of economic security of Ukraine» № 1277 from 29.10.2013, economic security is the state of food production in the country, which is able to fully satisfy the needs of every member of society in food of appropriate quality, provided that it is balanced and accessible to every member of society (Rumyk I.I., 2014).

It should be noted that in the scientific literature and legal acts, there is still no single definition for food security. Accordingly, in Table 1, various scientific reflections on the term «food security» were collected.

Table 1.

Definition of the concept of "food safety" in scientific sources

№	The authors	Definition of the term
1	2	3
1	J. Conway, E. Barber	Ensuring guaranteed access of all residents and at any time to food in the amount necessary for an active, healthy life (Conway G., 1990).
2	V. Geets	A complex concept that includes two aspects related to the purely economic process of "food security" and its importance as a necessary condition for maintaining national security in its external and internal manifestations (Geets V.M., 1999).
3	V. Shlemko	This is the level of food security of the population, which guarantees the social and political stability of society, the survival and development of the nation, the family, the individual, and sustainable economic development (Shlemko V.T., 1997).
	I. Binko	

№	The authors	Definition of the term
1	2	3
	O. Hoychuk S. Kvasha	The guaranteed ability of the state to satisfy the needs of the population in the person of each citizen with food products in the necessary volume, assortment and quality at a level that ensures the health and intellectual development of the person, based on the principles of self-sufficiency in basic basic products and their economic and physical availability, regardless of the influence of external and internal factors (Golikova K.P., 2012).
	O. Shebanin	The state's ability to provide a sufficient amount of food to maintain a healthy lifestyle for all strata of the population, regardless of their income (Golikova K.P., 2012).
	V. Zakharchenko O. Borisov E. Molina	Providing the country's population with food at the expense of internal resources, i.e. achieving such a potential of agricultural production (labor force, seeds, cultivated area, etc.) that, in a critical situation, it is possible to increase the production of food products (Zakharchenko V.I. et.al., 2005)
7	M. Krupko I. Mykhasiuk A. Melnyk	Food security is characterized as the state's ability to guarantee the food needs of the country's population under both normal and emergency conditions (Mykhasiuk I.R., et.al., 1999).
8	M. Khorunzhy	The state's ability under any circumstances to guarantee and provide the population's food needs at the level of scientifically based consumption norms and in accordance with its solvency and at the prices prevailing on the food market (Khorunzhy M.Y., 2002).
9	N. Basyurkina	According to the author, food safety is divided into important aspects: - quantitative: the degree of realization of the current need for agricultural products. - high-quality: satisfying the need for healthy, high-quality agricultural products. - socio-economic: the growth of incomes of the population, which ensures access of all population groups to food at the level of subsistence (Basyurkina N.Y., 2011).

Source: formed by the author

Based on the presented theoretical material, it is possible to generalize the concept of «food security» as the economic ability and obligation of the state to provide the population with high-quality food products, in the necessary quantity and self-sufficiency in food, under any external or internal conditions.

To solve the global problem of food security, on July 22, 2022, according to the proposals of the United Nations, the Initiative on the safe transportation of grain and food products from Ukrainian ports was signed between Ukraine, Turkey and the UN Secretary General. The first contract expires on November 19, 2022.

Food is exported from the ports of Greater

Odessa: «Odesa», «Chornomorsk» and «Pivdenny», with the help of demilitarized humanitarian corridors, in the form of a caravan with a leading ship. The capacity of the sea ports allows for the monthly shipment of 3.5 million tons of grain and oil crops.

Before the beginning of the war, the port system of Ukraine had 18 sea ports, five of which are located in the territory of the occupied Crimea. As of November 19, 2022, 11.5 million tons of agricultural products were sent from sea ports to the countries of Asia, Europe and Africa. A total of 480 ships left Ukrainian ports. Table 2 shows the dynamics of ships leaving the ports of Greater Odessa (monthly).

Table 2

The dynamics of the departure of vessels from the ports of Greater Odessa						
№	The name of the port	Number of vessels, pcs.				
		August	September	October	November	TOTAL
1	Odesa	17	58	51	17	143
2	Chornomorsk	34	77	76	23	210
3	Pivdenny	12	44	52	19	127
TOTAL AMOUNT						480

Source: generated by the author based on data from the Black Sea Grain Initiative Vessel Movements

Figure 2 shows the amount of grain shipped under the "Grain Initiative" compared to last year.

We see that in mid-October there is a gap between the grain shipped in 2021 and 2022,

almost approached the same indicators, but already in the 43rd week of 2021, the amount of exported grain increased significantly, while the indicators of 2022 remained at the same level.

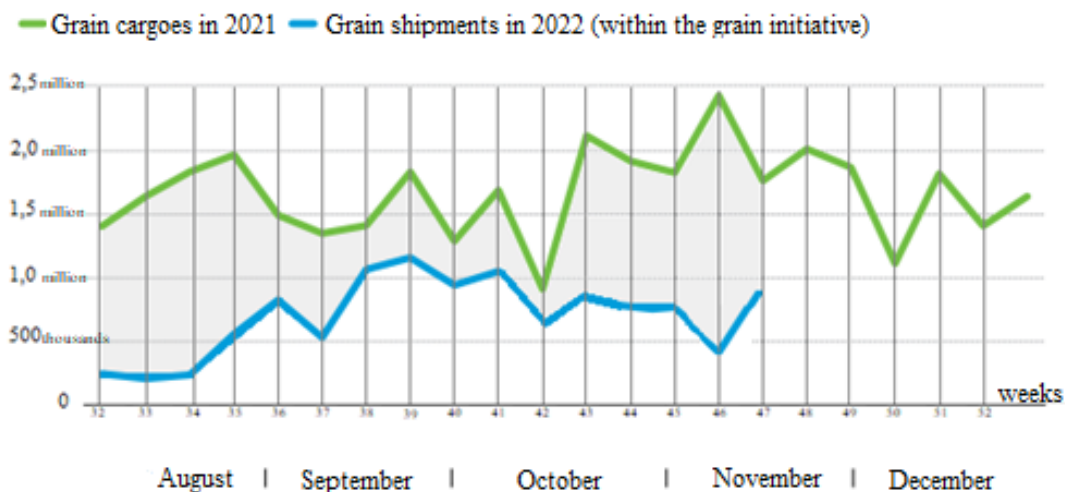


Fig. 2 Number of shipped grain cargoes

Source: generated by the author based on data from the Black Sea Grain Initiative Vessel Movements

Also, in the 46th week, a sharp decline in the export of grain crops is observed. This fact is connected with the fact that in this period of time, the Russian Federation began to interfere with the actions of expert groups inspecting cargo on ships. Also, the Russian Federation threatened to withdraw

from the «Grain Initiative» prematurely, thus the government of this country endangered the unloading of agricultural crops from the seaports of Great Odesa.

In Figure 3, the dynamics of tonnage by various types of exported products was analyzed.

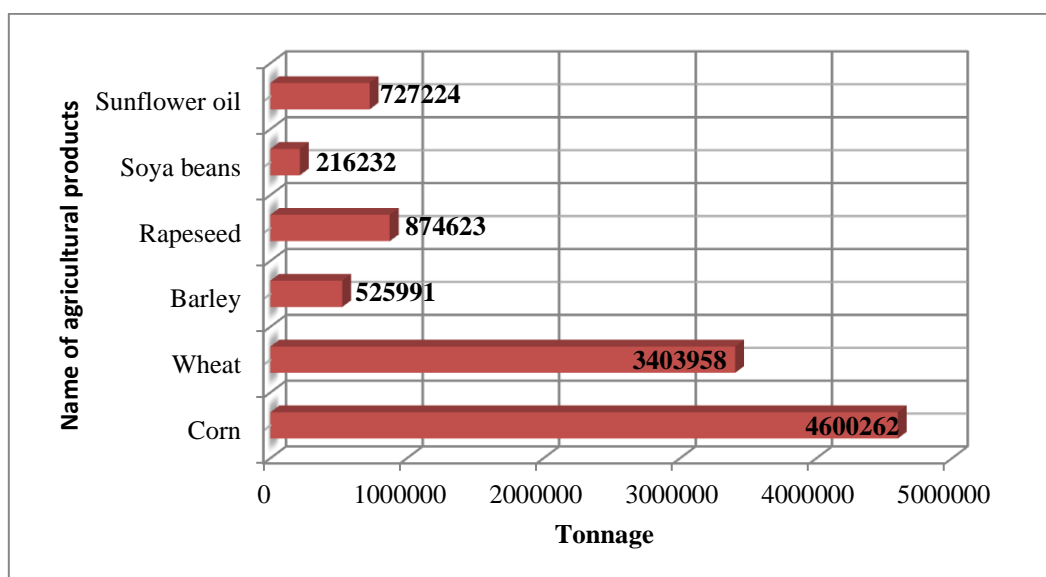


Fig 3 – Dynamics of tonnage by different types of products

Source: generated by the author based on data from the Black Sea Grain Initiative Vessel Movements

So, we can see that corn (4.6 million), wheat (3.40 million), rapeseed (874,623 thousand), barley (525,991 thousand), sunflower oil (727,224 thousand) and soybeans (216,232 thousand).

Figure 4 shows the analysis of the export of agricultural products by various types from each seaport within the framework of the «Grain Initiative» from the moment the agreement was signed until November 19, 2022.

We can see that from the ports of

«Chornomorsk» and «Pivdenny» the most agricultural products were exported, such as corn, 1.821 million tons and 1.757 million tons, respectively, from the port of «Odesa» only 1.021 million tons of corn were exported.

The maximum amount of wheat, in the amount of 1.261 million tons, was exported from the port «Odesa», the minimum amount - 920.897 thousand tons from the port «Pivdenny».

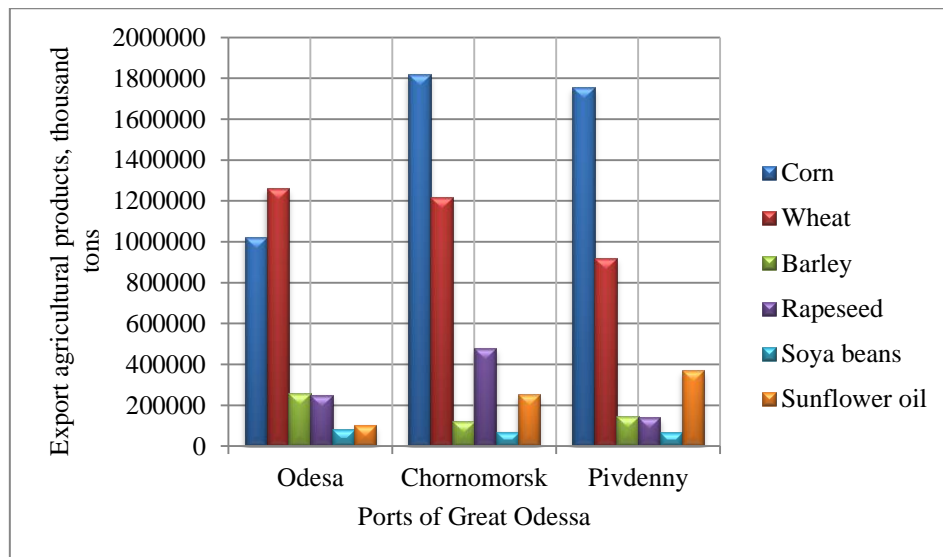


Fig. 4 Export of agricultural products by various types within the framework of the «Grain Initiative»
Source: generated by the author based on data from the Black Sea Grain Initiative Vessel Movements

Indicators of the Odesa port, which correspond to such agricultural crops as sunflower oil and soybeans, was exported in the amount of 1.031 million tons and 811.0 thousand tons, respectively. In general, sunflower oil was exported the most through the "South" sea port with a mark of 369,490 thousand tons.

Summarizing the indicators obtained during the "Grain Initiative" from August to November 19, 2022 with the general indicators of 2021, we get the following:

- «Chornomorsk» port exported 14.6 million tons of grain crops in 2021, and 5.334 million tons

in 2022;

- the port of «Odesa» for 2021 demonstrated indicators in the amount of 5.8 million tons, in the same year only 3.0 million tons;

- «Pivdenny» port exported 9.7 million tons of grain crops in 2021, and during the «Grain Initiative» - 3.74 million tons.

Next, the largest exporters of Ukrainian agricultural products within the framework of the «Grain Agreement» were analyzed.

Figure 5 shows the dynamics of the departure of the largest number of vessels from the seaports of Great Odessa.

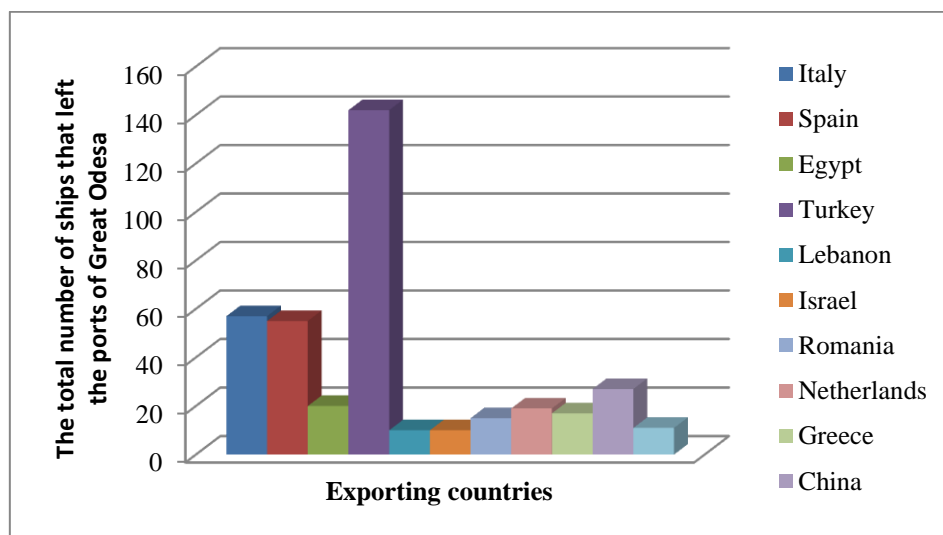


Fig. 5 Dynamics of the total number of ships leaving the ports of Greater Odessa
Source: generated by the author based on data from the Black Sea Grain Initiative Vessel Movements

In this figure, only those exporting countries were highlighted, the value of which was more

than 10 ships. Among the countries whose value was less than 10 ships, the following were found:

Tunisia - 9; India - 8; Libya - 8; Germany - 7; Algeria - 7; Republic of Korea - 6; Belgium - 5; Bangladesh - 5; Ethiopia - 5; Bulgaria - 4; Yemen - 4; Afghanistan - 3; Great Britain - 3; Oman - 3; Indonesia - 3; Iran - 2; Djibouti - 2; Vietnam - 2; Kenya - 2; Portugal - 2; Jordan - 1; Georgia - 1; Sudan - 1; Pakistan - 1; Somalia - 1; Iraq - 1;

Malaysia - 1; Morocco - 1.

Figure 5 shows that the largest exporter of Ukrainian agricultural products, as of November 19, 2022, was Turkey (142 ships), followed by Italy (57 ships), and Spain (55 ships).

Next, we will analyze each country by exported agricultural products (table. 3).

Table 3

Analysis of shipped agricultural products according to the largest exporting country, thousand tons

Name	Corn	Wheat	Barley	Rapeseed	Soya beans	Sunflower oil	Sunflower seed
Turkey	484,935	520,749	53,600	13,000	74,136	150,496	10,855
Italy	610,304	269,808	0	0	60,300	49,135	5,600
Spain	940,491	783,968	253,267	0	11,000	24,159	26,750
Egypt	248,681	144,900	0	0	30,000	3,100	0
Netherlands	426,178	0	0	217,610	26,786	16,200	18,500
Greece	88,514	33,906	8,685	0	0	0	0
China	1048,611	0	89,194	0	0	99,500	0
Romania	178,085	9,111	0	13,200	0	29,000	0
France	0	0	0	52,100	0	9,000	43,169

Analyzing the data taken from Table 3, one can clearly say that the country has such agrarian products for the win. So, among the largest exporters of corn and wheat, the camp on the 19th leaf fall of 2022 is Spain (940.491 thousand tons; 783.968 thousand tons), Italy (610.304 thousand tons; 269.808 thousand tons), Turkey (484.93 thousand tons). tons; 520.749 thousand tons) Although China is the first in the rating of the country-exporter in itself corn (1048.611 thousand tons) in that hour, if the indicators of wheat are zero.

So, we can expect a trend to purchase repack from France and Romania (52,100 thousand tons and 13,200 thousand tons per case). France buys Sonyashnikov's oil most of all from its line (43.169 thousand tons), and the axis of Sonyashnikov's oil - a total of 9 thousand. tons.

Turkey buys the most sunflower oil (150,496 thousand tons). Greece does not buy sunflower oil at all, but exported corn (88,514 thousand tons), wheat (33,906 thousand tons) and barley (8,685 thousand tons).

Regarding soybeans, countries such as Greece, China, Romania and France did not export this crop at all as of November 19, 2022. But Turkey became the most active country that exported 74,136 thousand tons of soybeans.

So, we clearly see that the conduct of military operations in the maritime spaces of the Ukrainian

territory significantly affects the export of agricultural crops, which in turn, of course, cannot help but affect the international state of food security. Only during the initiative's operation, due to the inhibition of the aggressor country, Ukraine under-exported about three million tons of food - this is the annual amount of consumption for 10 million people.

Conclusions and perspectives of further research. Based on the conducted research, the following conclusions can be drawn:

1. The «Grains Agreement» will make it possible not only to provide countries dependent on agricultural products with a sufficient amount of food, to reduce world food prices and to reduce the risk of a problem with global food security, but also to free up space in warehouses for a new harvest, which has a positive impact on the Ukrainian economy.

2. This study depends on the further course of military operations, so it is necessary to carefully monitor the processes that affect the intensive export of grain crops through the sea ports of Ukraine.

3. The term "Grain initiative" was extended for another 120 days. The Ministry of Infrastructure of Ukraine submitted a request to include the Mykolaiv seaport in the export of agricultural products. Therefore, it is advisable to continue the analysis of the activity of sea ports.

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ЕКОНОМІКА ТА ПЕРЕДОВІ МЕТОДИ РОЗРАХУНКУ У ФІНАНСОВОМУ ІНЖИНІРИНГУ

Актуальність. У статті визначено місце та реалізацію завдань фінансового інжинірингу. В останні роки на тлі активного використання торгово-фінансових інструментів ускладнення грошово-кредитних відносин між підприємствами та фінансовими установами та широке поширення комп'ютерних технологій посилюють актуальність теми.

Мета та завдання. Основною метою статті є визначення можливості нецільового використання фінансових інструментів, що відображають систему управління ризиками, які є елементом фінансового інжинірингу, що розглядається як засіб досягнення конкурентоспроможності та стратегічної переваги організацій.

Результати. У сучасному світі процеси прийняття управлінських рішень стають все більш складними, при цьому необхідно враховувати все більше факторів, які впливають на фінансові результати підприємства. Від осіб, які приймають рішення, вимагається використання математичних навичок у плануванні фінансових операцій, знання основ комп'ютерного моделювання. Сьогодні жодна велика фінансова установа світу, в тому числі центральні банки, не може працювати без комп'ютерних математичних моделей сучасної фінансової науки. З цієї точки зору актуальним є новий напрям у підготовці фахівців – фінансовий інжиніринг.

Матеріали та методи. Під час проведення дослідження було вивчено джерела, пов'язані з фінансовим інжинірингом, проаналізовано статті, що стосуються складності грошових відносин між підприємствами та фінансовими установами та широкого поширення комп'ютерних технологій. Під час дослідження використовувалися методи контент-аналізу, індукції, дедукції та порівняльного аналізу.

Висновки. Висновок дослідження полягає в тому, що використання інноваційних фінансових технологій або запозичення та використання у нас передових фінансових інструментів вимагає якісно нової організації співпраці, яка неможлива в умовах застосування санкцій. Кінцевим результатом є використання інноваційних фінансових технологій, організація професійного об'єднання економістів і фінансистів країни, створення та розвиток саморегульованих організацій, формування співтовариства висококваліфікованих спеціалістів та розвиток Система управління якістю освітніх послуг необхідна для розвитку машинобудування в Азербайджані.

Ключові слова: фінансовий інжиніринг, компетенції, фінансові операції, система підготовки спеціалістів

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ECONOMICS AND ADVANCED CALCULATION METHODS OF FINANCIAL ENGINEERING

Topicality. The article defines the place and implementation of the tasks of financial engineering. In recent years, against the background of the active use of trade and financial instruments, the complexity of monetary relations between enterprises and financial institutions and the wide spread of computer technologies increase the relevance of the topic.

Aim and tasks. The main purpose of the article is to determine the possibility of misuse of financial instruments reflecting the system of risk management, which is an element of financial engineering, which is considered as a means of achieving the competitiveness and strategic advantage of organizations.

Research results. In the modern world, the processes of making managerial decisions are becoming more and more complex, while it is necessary to take into account an increasing number of factors that affect the financial results of an enterprise. Decision-makers are required to use mathematical skills in the design of financial transactions, knowledge of the basics of computer modeling. Today, not a single major financial institution in the world, including central banks, can work without computer mathematical models of modern financial science. From this point of view, a new direction in the training of specialists is relevant - financial engineering.

Materials and methods. While conducting the research, sources related to financial engineering were examined, articles related to the complexity of monetary relations between enterprises and financial institutions and the wide spread of computer technologies were analyzed. Content analysis, induction, deduction, and comparative analysis methods were used during the research.

Conclusion. The conclusion of the study is that the use of innovative financial technologies or the borrowing and use of advanced financial instruments from us requires a qualitatively new arrangement of cooperation, which is not possible under implementing sanctions. The final result is that the use of innovative financial technologies, the organization of the professional association of economists and financiers of the country, the creation and development of self-regulating organizations, the formation of a community of highly qualified specialists and the development of the quality management system of educational services are necessary for the development of machine building in Azerbaijan.

Keywords: financial engineering, competencies, financial operations, specialist training system

Introduction

The financial activity of any economic entity is multifaceted and is a set of interrelated areas, the priority direction of which in the strategic perspective is the design, modeling and implementation of various financial products that

provide the best final financial result and economic sustainability of the organization and development. Financial institutions, including commercial banks, carry out certain operations to attract and place financial resources using various financial products and instruments, taking into account the current

financial market conditions (credit, stock, currency, etc.). Financial instruments are means of investment, acquisition and distribution of capital (share value), means of payment and credit. A financial instrument is a contract that gives rise to different types of financial liabilities in respect of the assets of one entity to another at the same time, i.e. their choice ultimately affects the assets and liabilities of organizations. Financial products act as a special financial service when implemented through certain mechanisms of interaction between financial market participants. The term "financial engineering" (financial engineering) is used today by researchers and economists in a variety of economic situations, as it is a young and developing field of knowledge. Inaccuracies in the definition and use of the term are a kind of problem in determining the "rules of the game" that are the same for all participants. Of course, it is very difficult to find a simple and understandable definition that takes into account all points of view.

Problem statement and its connection with important scientific and practical tasks.

Financial management has become a necessity for the changing and developing markets with technology day by day. There are four basic functions for a business to take part in a successful and profitable process. These functions are accounting, production, marketing and financial management. These concepts, which are important to each other, are of vital importance for the business. But the most important of them is financial management, which we also focus on. Because without the right resource and capital management, companies cannot continue their existence. Investments in human capital are very important for the economy of Azerbaijan to ensure the operation of advanced technologies, to maintain productivity and competitiveness. By adapting financial engineering training to the needs of the labor market, providing opportunities for continuous learning and using skills development to promote innovation and future growth, a resource base can be created to develop innovative financial operations. It can also help expand employment in other sectors through empowerment.

Materials and methods. While conducting the research, sources related to financial engineering were examined, articles related to the complexity of monetary relations between enterprises and financial institutions and the wide spread of computer technologies were analyzed. Content analysis, induction, deduction, and comparative analysis methods were used during the research.

Analysis of recent publications on the problem. The primary functions of businesses in making new investments or achieving success while continuing their current activities; production, marketing, accounting and finance management. Failure in any of these basic functions causes the business to experience difficult days. The most important of these factors is undoubtedly finance and financial management. It is not possible to talk about production, marketing and accounting in a business without financial resources. Therefore, there are many articles and researches written in this field. Of course, since it is not practical to cite all of these research papers, more articles that are closely related to the topic have been addressed.

Allocation of previously unsolved parts of the general problem. A large number of studies have been conducted on the relevant topic. However, since each author's research focuses on the analysis of a specific object or subject, it would certainly be absurd to expect from these works to explore the field as a whole. Since my research work is also related to financial engineering in Azerbaijan, I would like to specifically emphasize that an important point in this topic has not yet been investigated. Capital markets in the country are still in their infancy. There is a structure dominated by public securities. In this regard, serious reform efforts are needed. However, none of the studies written on this subject have explained in which direction serious reform efforts should be carried out.

An outline of the main results and their justification. From the point of view of financial markets, the term "financial engineering" is used to describe the scientific analysis of data obtained in the financial market and the use of methods and tools to predict future cash flows. The knowledge gained during the training was focused on the use of various derivative securities and other methods of controlling financial risks taken by the company in its commercial activities. Thus, trained professionals receive, analyze and use financial information, using a combination of derivatives and other securities, manage cash flows, participate in strategy development and minimize the company's financial losses in adverse situations. In addition, ongoing research and best practices in finance are leading to a significant improvement in the understanding of how new financial risk management technologies will be used. Most of the information is unstructured, which means that the information is free, not processed, not presented in a form convenient for analysis, and not ready for

use in typical business programs.

The main prerequisites are:

1. The need for financial innovation, which is the first step towards the formation of the concept of financial engineering, which includes the invention of new risk management tools. Companies plan for their future through the development of capital markets, as well as access to a variety of instruments and financing mechanisms. The ability to plan a financial strategy requires the formation of a team of professionals with the knowledge, skills and abilities to model financial transactions.

2. The variety of investment instruments available in the financial markets, in addition to increasing market liquidity, provides additional financing by attracting new investors and creating new opportunities for investing existing capital. Maintaining statistics and analyzing the main trends in changes in prices for investment instruments can be carried out with the participation of future specialists who have been trained under the program.

3. The development of risk management tools made it possible to redistribute financial risks in accordance with the risk appetite of investors. Identifying the needs of investors, their tendency to risk and possible financial losses is something that can be done within the framework of cooperation between an institution and a higher education institution.

4. Opportunities for arbitrage between markets have reduced the cost of asset management in financial markets and increased revenue. Price changes (changes in commodity prices, interest rates and exchange rates, stock and bond prices) have led to an increase in financial risk in general, which is a serious threat to the business and its very existence. The cooperation of enterprises in the field of financial engineering will allow the management of the enterprise to identify economic problems in the analysis of specific situations, to propose ways to solve them, taking into account the criteria of economic efficiency and evaluation of possible ones.

The state of financial engineering in an organization is usually determined by the level of automation, computerization and the use of special software. In organizations with a low level of automation, financial engineering, as a rule, comes down to drawing up insignificant financial plans, budgets, using simple organizational charts and algorithms for their implementation.

The processes of making managerial decisions in the modern world are becoming more complicated, while it is necessary to take into

account an increasing number of factors that affect the financial results of an enterprise. Decision makers are required to skillfully use mathematical skills in the field of designing financial operations, knowledge of the basics of computer modeling. Today, not a single major financial institution in the world, including central banks, can function without computer mathematical models of modern financial science. In this regard, a new direction in the training of specialists - financial engineering - becomes relevant.

In terms of financial markets, the term "financial engineering" is used to describe the analysis of data collected from the financial market on a scientific basis and the use of methods and tools to project future cash flows.

The knowledge gained in the course of training is aimed at the use of various derivative securities and other methods in order to control the financial risks that the company takes on in its commercial activities.

Thus, trained specialists, using combinations of derivatives and other securities, receive, analyze and use financial information, manage cash flows, participate in strategy development, minimize the company's financial losses in the event of adverse circumstances.

Higher education plays an important role in the formation of competencies in the field of financial risk management and building non-standard methods of financial calculations. A modern university is an innovative enterprise that not only trains specialists who are ready for the challenges of the new time, but it is a complex system that generates and consumes a large amount of operational information. To make a graduate more competitive, the university needs to know the needs of employers in the field of training specialists, know the software used for business analysis and decision making, participate in conferences where topical issues of risk management are discussed. It is this path that will keep educational programs and plans up to date.

The complication of economic relations has led to the fact that there is a need for complex mathematical and computational methods that are developed specifically for the analysis of financial markets and are customized for a specific user.

In general, financial innovations are the central driving force of the global financial system towards greater economic efficiency.

In addition, ongoing research in finance and best practices is leading to a significant improvement in understanding how to use new financial risk management technologies. Students and professionals who aim to work in any field of

finance must not only master advanced concepts and mathematical models, but also know how to implement these computational models in the practice of any commercial enterprise.

The place of the university in the implementation of the tasks of financial engineering is shown in Figure 1. A separate problem is the issue of choosing from a huge amount of data that can be used in the development of non-standard schemes for financial support of the enterprise and risk minimization. Network modes of providing information (primarily on the Internet) and the shift of all types of information to digital formats require the preparation of such educational programs that would take these features into account.

In a modern university, based on the results of working with an enterprise and the introduction of financial models, publication of materials on websites, database administration, distribution of its publications, methodological materials of this institution, an increase in the share of its library collections, and much more should be ensured.

Most of the information is unstructured, which means that the information is in free form, fragmented, not presented in a form convenient for analysis, not ready for use in typical business applications. Meanwhile, the future specialist should understand that in the early stages of model formation, work will have to be done.

Deal with unstructured information, while it must be borne in mind that:

1. Students studying in educational programs in the field of financial engineering should learn to simplify the process of searching, classifying, sorting the available information, as well as creating reports that are understandable to the user, stored in the files that make up the database.

2. In the context of changing operating systems and open standards in the field of data retrieval and storage, students should be prepared for the emergence of new algorithms and functions.

3. The proportion of information that organizations create and store in electronic form is growing. Access to this information, as a rule, is closed, therefore, the university must ensure the confidentiality and safety of the information received (Brandimarte, P. 2014).

In connection with the foregoing, a promising area of cooperation between a university and a commercial enterprise is cooperation in the field of information management. Such cooperation can be carried out according to the outsourcing scheme, where the enterprise transfers part of the functions to the university for a fee. The decision to cooperate with the university can be strategic,

while six specific tasks are solved:

1. The equipment of enterprises and universities acts as a single set of business intelligence computer programs;

2. Attracting new specialists from among the key employees of enterprises and members of the academic community, research centers and authorities;

3. Establishment of channels of university cooperation and the inclusion of enterprises in them;

4. Updating professional training programs to meet the needs of large and medium-sized businesses, as well as the formation of competitive personnel for the labor market;

5. Providing students with educational and methodological materials, providing students with the opportunity to gain practical experience in the industry;

6. Raising awareness in society about the need to integrate enterprises and universities.

The solution of the above tasks will contribute to the creation of more integrated financial products and services, more adapted to the peculiarities of the functioning of the enterprise under study in the industry, in connection with which they will be easier to implement and more effectively control financial risks.

There are certain prerequisites that training programs for specialists in the field of financial engineering will be in demand. Among the main prerequisites are the following:

1. The emergence of the need for financial innovation is just the first step towards the formation of the concept of financial engineering, which includes the invention of new risk management tools. Companies plan their future through the development of capital markets, as well as through the possibility of using various instruments and financing mechanisms. The ability to plan a financial strategy requires the formation of a team of specialists with knowledge, skills and abilities in the field of modeling financial transactions.

2. The variety of investment instruments available in the financial markets has increased the liquidity of the market, as well as provided additional funding by attracting new investors and providing new opportunities for those who are looking for opportunities to allocate existing capital. Maintaining statistics and analyzing the main trends in changes in prices for investment instruments can be performed with the participation of future specialists studying under the programs.

3. The development of risk management tools

made it possible to redistribute financial risks in accordance with the risk appetite of investors. To identify the needs of investors, to determine the propensity for risk and possible financial losses is a task that can be performed within the framework of cooperation between an enterprise and a higher education institution.

4. Opportunities for arbitrage transactions between markets have made it possible to reduce costs and increase the return on asset management in financial markets. The schemes of arbitrage transactions and their possible consequences can also be calculated with the participation of the teaching staff in the framework of the cooperation "enterprise - university".

5. Diversity and diversity of investment strategies not only reflects the risk appetite of investors, but also provides a wide range of tools for making investment decisions. The development of investment strategies and their implementation in the practice of a particular investor is an engineering task and may be accompanied by the preparation of training tasks (Amirbekov F. 2018: 121)

Price fluctuations (commodity prices, changes in interest rates and changes in exchange rates and prices for stocks and bonds) have led to an increase in financial risk in general, which forms the main threat to business, a threat to its existence. Cooperation between enterprises and universities, aimed at developing competencies in the field of financial engineering, will allow the company's management to identify economic problems in the analysis of specific situations, propose ways to solve them, taking into account the criteria of economic efficiency and assess possible consequences.

Thus, the complication of monetary relations between enterprises and financial organizations and the widespread use of computer technology in recent years is taking place against the background of the active use of trading and financial instruments. As a result, it became possible to develop individual financial contracts that include a wide range of cash flows. Cash flow ensures the satisfaction of investment needs and can be directed to minimize risks.

Professional training of a specialist in the field of financial engineering includes fundamental general educational and special knowledge, modern material and technical equipment, orientation towards innovation and creativity. Therefore, the training of a specialist is not a pre-programmed process. (Feibel, 2015)

To date, the development of financial engineering in the world is engaged in the

International Association for Quantitative Finance (The International Association for Quantitative Finance). The organization was founded in 1992, is a non-profit organization and develops partnerships with universities in countries with developed market economies.

The course towards financial modernization of relations between economic agents opens up new prospects for financial institutions and companies. The introduction of innovative technologies in the field of finance or the borrowing and implementation of advanced financial instruments from us requires a qualitatively new organization of cooperation. This will increase the demand for the quality of the services. Therefore, economic universities should pay increased attention to the issues of attestation of educational programs, technical equipment of premises and accreditation, international organizations. Companies that make these changes will gain significant competitive advantages.

The following factors became the necessary conditions for the accelerated development of engineering in Azerbaijan:

1. Organization of a professional community of economists and financiers;

2. Creation and development of self-regulatory organizations, the formation of a strong community of specialists and the development of a quality management system for educational services;

3. Development of scientific potential and knowledge base. The creation of a solid base for bringing new developments in the field of finance to the stage of their commercial use is not even a requirement of the future, but of today.

4. Staffing of the field of activity. Investing in human capital is critical in order to ensure the functioning of advanced technologies and to remain productive and competitive. By matching financial engineering training to labor market demand, providing opportunities for continuous learning, and leveraging skills development to drive innovation and growth in the future, a resource base for a breakthrough in innovative financial operations can be created. The Ministry of Education, employers and employees should cooperate in the development of a global training strategies. Such a strategy should include respect for the rights of workers and employers, equal opportunities for women and men (including youth), good governance, transparency and accountability. It can also contribute to the expansion of employment in other sectors through the transfer of competencies (Brandimarte, P. 2014).

Financial Engineering Career

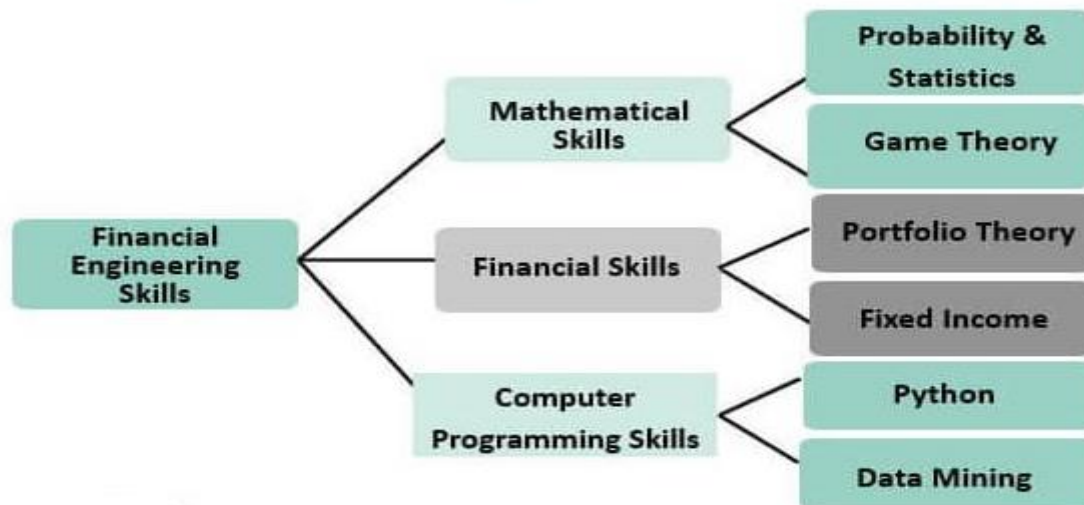


Fig. 1: Financial Engineering Career

Note <http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=edsebk&AN=516142>

Understanding the needs of the next generation is a key factor in the development of the system of university training of specialists in the field of financial engineering. The individual characteristics of the graduating department affect the success of cooperation between the university and the organization. The presence of long-term partnerships between the university and the financial and credit institution has an impact on the organizational and professional attractiveness of the university. We can say that there is a social dialogue according to the type: "employer - student - university" and according to the type "customer (financial and credit institution) - contractor (university)". Such partnerships should ensure competitive wages and safe and efficient working conditions. (Chatterjee, 2021:35-38)

Enterprises require organizational measures to introduce business

In this regard, it is required to form and implement an implementation strategy and a concept for the development of innovative financial products, namely: to develop approaches to fully taking into account the specific factors of an enterprise's activities when modeling financial products of an innovative nature in the financial engineering system. It is also necessary to determine the probability of adverse use of financial instruments, which reflects a functioning risk management system as an element of financial engineering.

Thus, financial engineering can be considered as a means of achieving

competitiveness and strategic advantages of organizations implementing investment projects and having a solid cash flow from financial and investment activities. Financial engineering and risk management are relatively new approaches to cash flow management, and in the education system there are new profiles for training specialists, the development of which will allow developing the competencies of managerial specialists. Transactions and financial obligations assumed in accordance with them. (Kosowski, 2015)

The claims require the approval of the experts responsible for risk management. This approval requires the construction of complex models based on pre-selected information.

Modern methods of economic and mathematical modeling of the results of financial planning, budgeting, investment design create great opportunities for comparing various options for financing organizations, choosing the best directions for development based on an analysis of the results obtained, and eliminating possible problems. Errors in design decisions provide the necessary level of financial position.

From the point of view of functional financial management, financial engineering is well-executed management decisions, including tactical, operational operations aimed at achieving strategic financial goals, developing and implementing current, long-term financial plans, budgets, investment projects, focuses. Socio-

economic tasks, the implementation of an effective financial and economic policy of the organization.

Long-term goals of socio-economic development are the essence of the organization's strategy, play an important role in information, methodological, organizational planning for the future. They are implemented in the process of developing financial strategy and organizational policy. (Fraser, 2015)

The development of financial strategies is associated with a certain cash flow forecast, which is considered as a variant of alternative investment projects. The following indicators are of great importance for the development of long-term financial plans of the organization:

1) innovative development of the organization,

2) quality of products, goods, works, services;

Improving the quality of activities, management, financial engineering of organizations involves taking measures to ensure the necessary consumer properties, a certain rate of renewal of the assortment, product range, and the level of financial condition of the organization, quality is an urgent problem that determines the content of the strategies of a financial institution.

Thus, in recent years, the complication of monetary relations between enterprises and financial institutions and the widespread use of computer technology is taking place against the background of the active use of trade and financial instruments. As a result, it became possible to prepare individual financial contracts covering a wide range of cash flows. Cash flows meet investment needs and can be used to minimize risks. Professional training of a specialist in the field of financial engineering includes fundamental general educational and special knowledge, modern logistics, focus on innovation and creativity. Today, the International Association for Quantitative Finance is dedicated to the development of financial engineering in the world. This organization was founded in 1992 is a non-profit organization and develops partnerships. The course towards financial modernization of relations between economic entities in Azerbaijan opens up new prospects for local financial institutions and companies.

Conclusions and perspectives of further researches. For the development of mechanical

engineering in Azerbaijan, the following factors are necessary: The use of innovative financial technologies or the borrowing and use of advanced financial instruments from us requires a qualitatively new organization of cooperation. For the development of the engineering system in Azerbaijan, the following factors are necessary:

1. Organization of the professional community of economists and financiers of the country;

2. Creation and development of self-regulatory organizations, formation of a community of highly qualified specialists and development of a quality management system for educational services;

3. Development of scientific potential and knowledge base. Creating a solid foundation for bringing new developments in the field of finance to the stage of commercial use is the requirement of today.

4. Staffing of the field of activity. Investments in human capital are very important for the Azerbaijani economy to ensure the operation of advanced technologies, maintain productivity and competitiveness. By tailoring financial engineering training to the needs of the labor market, providing sustainable learning opportunities, and using skills development to drive innovation and future growth, a resource base can be created to advance innovative financial operations. (Delice, 2012, p.96) It can also help expand employment in other sectors through devolution.

In general, financial innovations are the central driving force of the global financial system, aimed at increasing the economic efficiency of a new financial instrument. In this regard, the development of innovative financial products requires the formation and implementation of an implementation strategy and concept, i.e., the development of scientific approaches that allow to fully take into account the specific factors of an enterprise when modeling innovative financial products. It is also necessary to determine the likelihood of misuse of financial instruments that reflect the risk management system, which is an element of financial engineering. Thus, financial engineering can be considered as a means of achieving competitiveness and strategic advantage of organizations

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СТРУКТУРНІ ЗРУШЕННЯ СУСПІЛЬНО-ВИРОБНИЧИХ ВІДНОСИН В УМОВАХ ЦИФРОВІЗАЦІЇ

Актуальність. Бурхливий розвиток цифрових технологій свідчить про настання нового етапу промислової революції, який змінює зміст праці й життя людини. Масштабне впровадження таких технологій створює сприятливі передумови для загальних процесів автоматизації та роботизації виробництва. Ціком законотірним є очікування фундаментальних змін в економіці від прийдешньої цифрової революції, адже поява електронних продуктивних сил неминуче змінить характер і зміст суспільних виробничих відносин.

Мета та завдання. Дослідити динаміку структурних зрушень суспільно виробничих відносин в умовах цифровізації та проаналізувати особливості процесу заміни засобів виробництва більш наукоємними технологіями.

Матеріали та методи. Результати аналізу і теоретичного узагальнення розробок, наукових підходів до здійснення структурних змін у суспільно-виробничих відносинах, що висвітлені в публікаціях фундаментального, аналітичного та практичного характеру, а також офіційні статистичні дані, аналітичні матеріали Кабінету міністрів України, Центру економічного розвитку, звіти McKinsey&Company, UNIDO та Robo Advisor Statistics формують матеріальну та методичну базу дослідження. Дослідження структурних зрушень суспільно- виробничих відносин в умовах цифровізації здійснено з використанням методів наукового абстрагування та аналізу.

Результати. Дослідження теоретико-концептуальних засад та структурних зрушень у відтворенні засобів виробництва в умовах цифровізації можна розділити на декілька підходів, а саме: структурно-секторальний, процесний, техніко-технологічний, віртуально-інформаційний та глобалізаційний. У сучасному світі цифрові інформаційні технології набувають все більшого розвитку та застосування, виступаючи ключовими факторами формування глобального економічного середовища. Сектор цифрової економіки динамічно зростає, збільшується чисельність користувачів та процесів. Таким чином, інформаційні та цифрові технології стають потужним надсучасним двигуном у всіх сферах соціально-економічного життя суспільства, а провідні світові компанії визначають процеси цифровізації та інформатизації рушійною силою сучасного інноваційного розвитку, зростання конкурентоспроможності економіки, якості життя населення та суспільного прогресу. Активний розвиток цифрових інформаційних технологій пов'язаний, перш за все, із пошуком економічними суб'єктами нових джерел, засобів, які забезпечували б стабільне та тривале економічного зростання. Особливістю процесів цифровізації, як драйверів економічного розвитку, є те, що вони впливають на економічну систему через видозміну процесів виробництва, обігу, розподілу і споживання та забезпечують їхню динамічну взаємодію. Сьогодні світова цифрова мережа є не лише новим способом, інструментарієм ведення бізнесу та технологією – це якісно нова форма економічних відносин, що функціонує інтегровано, не відокремлено, трансформуює всі інші традиційні сектори і сфери економічної діяльності та формує принципово нове міжнародне економічне середовище.

Висновки. Економічний розвиток безпосередньо пов'язаний з економічними структурами та змінами, які відбуваються в них. Економічна система складається з окремих галузей, відомств, виробництв, підприємств, має певну структуру виробничих ресурсів і зовнішньої торгівлі, просторове розміщення та регулюється економічними правилами й нормами. Нові інформаційні технології виходять за рамки простої цифровізації, оскільки вони змінюють інституційну структуру економіки та всі функціональні зв'язки як на макро-, так і на макрорівнях. 5G, штучний інтелект, Інтернет речей, великі дані (Big Data), блокчейн визначають напрямки розвитку ринку інформаційних послуг, оскільки на їх основі розвиваються електронна торгівля, електронний

банкінг, електронна освіта, електронні медичні послуги, електронний консалтинг, електронна реклама та багато іншого. Відмовляючись від паперових процесів та цифровізуючи складові елементи своєї роботи, суб'єкти господарювання зможуть зменшити кількість кроків, раніше необхідних для функціонування, поліпшити терміни виконання робіт, значно підвищити ефективність своєї діяльності та, в кінцевому підсумку, знизити експлуатаційні витрати. Цифровізація економіки допоможе суспільству створити надійне цифрове середовище, оптимізувати та масштабувати операції, зробити їх послідовними та безпечними. За рахунок цифровізації стає можливим прискорено розвивати інновації, підтримувати стартапи, навчати всіх бажаючих основам програмування, впроваджувати цифрові технології у галузі економіки. Реалізація всіх вищеперелічених умов дозволить підвищити продуктивність функціонування всієї економічної системи держави та отримати додаткові конкурентні переваги у глобалізованому цифровому світі.

Ключові слова: структурні зрушення, суспільно-виробничі відносини, продуктивні сили, цифровізація, цифрові засоби виробництва.

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STRUCTURAL SHIFTS IN SOCIAL AND INDUSTRIAL RELATIONS IN THE CONDITIONS OF DIGITALIZATION

Topicality. The rapid development of digital technologies indicates the onset of a new stage of the industrial revolution, which changes the content of labor and human life. The large-scale introduction of such technologies creates favorable conditions for the general processes of automation and robotization of production. It is quite natural to expect fundamental changes in the economy from the coming digital revolution, because the emergence of electronic productive forces will inevitably change the nature and content of social production relations.

Aim and tasks. Explore the dynamics of structural shifts in social and production relations in the context of digitalization and analyze the features of the process of replacing the means of production with more high-tech technologies.

Materials and Methods. The results of the analysis and theoretical generalization of developments, scientific approaches to the implementation of structural changes in social-industrial relations, which are covered in publications of a fundamental, analytical and practical nature, as well as official statistical data, analytical materials of the Cabinet of Ministers of Ukraine, the Center for Economic Development, McKinsey&Company, UNIDO reports and Robo Advisor Statistics form the material and methodical basis of the research. The study of structural changes in social and industrial relations in the conditions of digitalization was carried out using the methods of scientific abstraction and analysis.

Research results. Studies of theoretical and conceptual foundations and structural shifts in the reproduction of means of production in the conditions of digitalization can be divided into several approaches, namely: structural-sectoral, process, technical-technological, virtual-informational and globalization. In the modern world, digital information technologies are gaining more and more development and application, acting as key factors in the formation of the global economic environment. The sector of the digital economy is growing dynamically, the number of users and processes is increasing. Thus, information and digital technologies are becoming a powerful modern engine in all spheres of social and economic life of society, and the world's leading companies define the processes of digitization and informatization as the driving force of modern innovative development, the growth of the competitiveness of the economy, the quality of life of the population, and social progress. The active development of digital information technologies is connected, first of all, with the search by economic entities for new sources and means that would ensure stable and long-term economic growth. A feature of digitization processes as drivers of

economic development is that they affect the economic system through changes in the processes of production, circulation, distribution, and consumption and ensure their dynamic interaction. Today, the global digital network is not only a new way of doing business and technology, it is a qualitatively new form of economic relations that functions in an integrated manner, not in isolation, transforming all other traditional sectors and spheres of economic activity, forming a fundamentally new international economic environment.

Conclusion. *Economic development is directly related to economic structures and the changes taking place in them. The economic system consists of separate industries, departments, industries, enterprises, has a certain structure of production resources and foreign trade, spatial distribution and is regulated by economic rules and regulations. New information technologies go beyond simple digitalization, as they change the institutional structure of the economy and all functional relationships both at the macro and micro levels. 5G, artificial intelligence, the Internet of Things, Big Data, blockchain determine the direction of development of the information services market, as e-commerce, e-banking, e-education, e-medical services, e-consulting, e-advertising and much more develop on their basis. By moving away from paper-based processes and digitizing the building blocks of their work, businesses can reduce the number of steps previously required to operate, improve turnaround times, significantly increase their efficiency and, ultimately, reduce costs. The digitalization of the economy will help society create a reliable digital environment, optimize and scale operations, make them consistent and secure. Due to digitalization, it becomes possible to accelerate innovation, support start-ups, teach everyone the basics of programming, and introduce digital technologies into the economy. The implementation of all of the above conditions will improve the performance of the entire economic system of the state and gain additional competitive advantages in the global digital world.*

Keywords: *structural shifts, social and industrial relations, productive forces, digitalization, digital capital goods.*

Problem statement and its connection with important scientific and practical tasks. The economy of developed countries is increasingly defined as industrial, and the current stage of its development is characterized as a new industrialization, which is associated with the processes of significant and radical changes in the productive forces that have accelerated in the last decade. Among the features that characterize the development of productive forces, the main one is a radical change in technology. Such a change requires first significant resources invested in basic and applied science, and then huge investments in new fixed capital. Producers, economies and countries that have time to prepare for future changes in the dynamics and structure of aggregate demand win in the competition.

Analysis of recent publications on the problem. Starting with the works of the classics – A. Smith and D. Ricardo, the problems of the dependence of the development of certain types of economic activity and economic growth have always been at the center of the interests of economic science. Attempts to explain the transformation of economic and social structures were made by foreign scientists: D. Bell, J.K. Galbraith, P. Drucker, K. Clark, S. Kuznets, M. Porat, W. Rostow, A. Toffler, A. Turren. Among Ukrainian researchers, the following are involved in the analysis of structural changes in the economy: T. Artemova, S. Belaya, A. Galchinsky, V. Geyets, N. Glavatskaya, N. Grazhevskaya, A. Gritsenko, S. Erokhin, M. Zveryakov, V. Kolomoitsev, Yu. Makogon, T. Orekhova, Yu. Pavlenko, Yu. Pakhomov, I. Puzanova, V. Sidenko, M. Skripnichenko, A. Filippenko, L. Shinkaruk, A. Shnyrkova, S. Yakubovsky and

others.

Allocation of previously unsolved parts of the general problem. Digital information technologies today are becoming increasingly developed and used, acting as key factors in the formation of the global economic environment. The digital economy sector is growing dynamically, the number of users and processes is increasing. Thus, information and digital technologies are becoming a powerful modern engine in all spheres of the socio-economic life of society, and the world's leading companies determine the processes of digitalization and informatization as the driving force behind modern innovative development, the growth of the competitiveness of the economy, the quality of life of the population and social progress. Therefore, it is necessary to explore this qualitatively new form of economic relations, which transforms traditional sectors and spheres of economic activity.

Formulation of research objectives (problem statement). Explore the dynamics of structural shifts in social and production relations in the context of digitalization and analyze the features of the process of replacing the means of production with more high-tech technologies.

Materials and Methods. The results of the analysis and theoretical generalization of developments, scientific approaches to the implementation of structural changes in social-industrial relations, which are covered in publications of a fundamental, analytical and practical nature, as well as official statistical data, analytical materials of the Cabinet of Ministers of Ukraine, the Center for Economic Development, McKinsey&Company, UNIDO reports and Robo Advisor Statistics form the material and

methodical basis of the research. The study of structural changes in social and industrial relations in the conditions of digitalization was carried out using the methods of scientific abstraction and analysis.

An outline of the main results and their justification. The structure of the economy of any country is constantly evolving and modifying, adapting to objective factors and being subject to the regulatory influence of the state. All this happens in the process of accumulation of appropriate changes, which are natural and objective in nature, but manifest themselves in different ways, given their uneven dynamics and disproportionate accumulation. The development process is based on the discrepancy between changes in the structure of needs and interests of economic entities and changes in the location, technology of use and distribution of economic resources. This gives rise to uneven dynamics of the ratio of quantitative indicators of the elements of the structure. In the conditions of the modern economy, these irregularities are especially intensified and create conditions for its unpredictable development. Structural changes are recognized by economic theory in two ways: as a stimulus for economic development and accelerated growth, on the one hand, and as a consequence of development and growth, on the other. Structural changes as a consequence of development are expressed through the rise of modern sectors of the economy. Their high productivity entails an increase in the overall level of productivity of society. Industries that are the bearers of technological progress and the basis of future transformations become elements that make it possible to meet the needs and aspirations of society to raise the level of consumption standards and implement social changes (Peleh, O., 2018).

Economic development is directly related to economic structures and the changes that take place in them. The economic structure is understood as the location of the main elements of the economy and the proportions that have developed between them. The economic system consists of separate industries, departments, industries, enterprises, has a certain structure of production resources and foreign trade, spatial distribution and is regulated by economic rules and regulations. That is, within a specific system, in particular, economic, structural changes mean changes in the cause-and-effect relationships between the elements of the system. Structural changes are associated with unequal rates of changes in individual elements and changes in the relationships between them, which ultimately

entails a transformation in the structure of the system as a whole (Shinkaruk, L. et. al., 2015).

The study of theoretical and conceptual foundations and structural shifts in the reproduction of means of production in the context of digitalization can be divided into several approaches.

The first approach includes an approach according to which the digitalization of the economy is viewed from the standpoint of the growth of sectors of the digital economy and the implementation of global structural transformations in the primary sector of agriculture, the secondary sector of industrial production and the tertiary sector of services. This approach can be defined as a *structural-sectoral approach*. It is based on the implementation of significant structural transformations in the economic systems of the country as a result of the digitalization of the primary and secondary sectors of the economy and the growth of the share of the tertiary sector, which fundamentally changes the economic systems and the nature of industrial relations and, as a result of fundamental structural changes, the efficiency of production processes and the functioning of the economy increases. For example, within the framework of the machine stage of the development of productive forces, new technologies were gradually mastered: from the first industrial technologies to modern highly industrial ones.

As you know, today science identifies six technological modes. Completion of the process of industrialization, scientists associate with the full development of the fourth technological order. The next, V and VI modes are characterized by the transition to a fundamentally new technique and technology, and these are bio-, nano- and IT technologies. Under the influence of new technological changes, there is a fundamental change in the structure of highly developed national economies (Zveryakov, M., 2022).

Using the latest technologies, digitalization is changing the picture of competition and blurring the existing boundaries of economic sectors. Qualitatively new digital elements of the productive forces and new socio-economic relations change the structure of social reproduction, increase the space and limits of the economy. The growth of labor activity in the creative sphere means that the production of knowledge, that is, science, becomes an integral part of social reproduction. In other words, in addition to the two traditional divisions of social reproduction (the production of investment goods and consumer goods), a third division appears –

the production of knowledge. Thus, in developed countries, the modern economy is a mixed market economy. Its technical basis is heterogeneous, the predominance of the industrial segment is combined with digital technologies.

Within the framework of the second approach, the processes of informatization of the economy are considered as changes in economic and production relations, where instead of directly personal management of processes, management is carried out and built on the basis of the development of information and digital platforms and operators and the formation of algorithms for relations such as M2M machine-machine, and, accordingly, a new one is formed. type of relationship where a person can act as a direct subject of the process. This approach can be classified as a *process approach* to changing social and production relations based on new digital platforms and processes (Rudenko, M., 2018).

The key achievements of Industry 4.0 are the results of scientific and technological progress in the field of innovative and digital economy. These developments imply full automation and optimization of production as a condition for the economic development of the countries of the world. It is possible to single out the basic technologies, the implementation of which is the basis for the development of Industry 4.0: the Internet of Things, digital platforms, digital ecosystem and Big Data (Sosnovska, O. & Vakofyan, V., 2022).

Well-known research companies predict the rapid development of artificial intelligence technologies. Of great importance is the use of artificial intelligence for the development of future military potential, the formation of strategic priorities in the development of weapons and political decision-making for the countries of the world. Artificial intelligence tools are widely used in all areas of business (Yanenkova, I., 2022).

The production of innovative products requires significant improvements associated with additional marketing research on the priorities of

the target audience at the global level, the need for business planning. In this case, the digital innovation hub acts as a platform for the formation of synergistic cross-sectoral partnerships that lay the foundation for the development of innovative business. Today, in the developed countries of the world, there are a number of positive practices for the functioning of digital innovation hubs that stimulate innovative development at the business level, national economies, regional and global levels (Dyba, M. & Gernego, Y., 2021).

You can also highlight the following benefits of strengthening digitalization by strengthening digital platforms for economic and business development:

- Digital transformations are the basis for the growth of labor productivity, which creates the basis for an annual GDP growth of at least 4%;
- The spread of diversified digital platforms forms the basis for the transformation of key sectors of the economy and business areas;
- The development of digital infrastructure creates the potential for growth in the total volume of innovative investments, in particular, it is predicted to increase the volume of investments in digital transformation projects up to 15-20 billion dollars. over the next 10 years (Center of Economic Recovery, 2021).

In addition, in the industrial sector, an important long-term trend due to the digital revolution is the accelerated development of cyber-physical production systems, and, above all, the industrial Internet of things (IIoT). According to Grand View Research, in 2020 the volume of the global IIoT market exceeded \$200 billion. At the same time, it is expected that in the period 2021-2028 its compound annual growth rate will be an impressive 22.8% (Grand View Research, 2021).

Another important trend associated with digitalization is the acceleration of robotization of production (Fig. 1) (Vishnevsky, V., 2022). A striking example of this is modern automobile plants that have achieved a high level of autonomy.

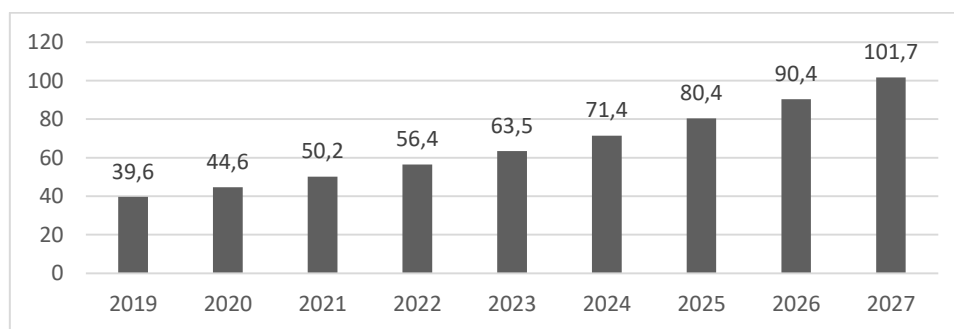


Fig. 1 Expected volumes of the world market of industrial robotics in 2019-2027, billion dollars.

Typically, the industry uses robots to perform repetitive and time-consuming tasks to save time and allow people to focus on higher-priority and creative tasks. But intelligent robotization is already developing, which makes it possible to automate complex business processes with the help of artificial intelligence. In this case, the actions of robots can be based on judgments using unstructured and non-digital data sources. We are talking about the so-called collaborative robots, designed specifically for cooperation with people in a common workspace.

Over the past 30 years, worldwide human participation in production has declined from 64% to 59% (Andryushchenko, K., et. al., 2022). According to experts, by 2040, industrial automation will lead to a reduction in jobs by about 40%, primarily due to low-paid positions in production (Deeva, N. & Deleichuk, V., 2018). Thus, the digitalization of the economy can leave millions of people in the world without work. It is assumed that by 2030 more than 60% of professions will be automated. In the future, plants and factories will be able to improve and modernize on their own, that is, without or with minimal human participation. Business processes, logistics, production cycles will be constantly optimized offline. Predictive analytics will play a significant role in this process. In these circumstances, the cost of labor ceases to play a key role in the formation of production costs, and the main factor in socio-economic development is the technological potential of the national economy.

The McKinsey Global Institute's estimates that between 400 and 800 million people could be freed up through automation and will require the creation of new jobs by 2030 around the world (Cabinet of Ministers of Ukraine, 2020). It is predicted that in 2030 there will be a demand of 8 to 9% for new types of professions that do not yet exist, 5% of professions will disappear as a result of their full automation, and 60% of professions will possibly be automated by 30%, which threatens with a corresponding reduction in the workforce. According to a study by the European Commission, about 50% of current jobs worldwide could theoretically be automated, and in the EU, 37 to 69% of jobs could be partially automated in the future. Already today, about 14% of jobs in OECD countries are automated, and another 32% of jobs will require change (European Commission, 2021).

The output of formal thinking directly to the use of things in the digital world forms such a reality as the Internet of things, which is a global network of «physical devices connected to the

Internet – «things» equipped with sensors, gauges and information transmission devices. These devices are connected by connecting to the centers of control, management and information processing» (Hrytsenko, A., 2018).

The development of all these technologies is based on Big Data. According to companies' forecasts, the use of Big Data will grow in many sectors of the economy, in particular in transportation and logistics, telecommunications trade, financial companies, and industries with the Industry 4.0 development trend (Pizhuk O., 2019). The emergence of new approaches to information processing, in this case, the spread of the Big Data concept and the use of modern digital technologies led to the formation of a global electronic environment, opened up new approaches to organizing and doing business, and opened up new opportunities in various areas of socio-economic activity. The use of Big data is not only a tool for optimal planning and information, it is the way to shape a new future.

In Ukraine, the share of enterprises that used the Big Data method in the analysis of their activities, relative to the total number of enterprises in 2020, was 4.5%. The most active methods and tools for analyzing Big data are used by enterprises of such types of economic activity as: transport, warehousing, postal and courier activities – 5.9%; construction – 5.7%; wholesale and retail trade, repair of vehicles and motorcycles – 5%; information and telecommunications – 5% (Monitoring report, 2021).

In 2020, humanity generated 40-44 zettabytes of information, and by 2025 this number will increase 10 times. The key to the continued growth of the volume of data over the next 10 years is the so-called Big Data (Fig. 2) (Vishnevskyi, V. et. al., 2021).

According to analysts from McKinsey and Accenture, by 2025 alone the Internet of Things will annually bring the global economy from 4 to 11 trillion dollars, the industrial Internet of things – 14 trillion. USD by 2030. According to PWC forecasts, artificial intelligence will increase global GDP in 2030 by 15.7 trillion USD. Of these, 6.6 trillion dollars will be associated with an increase in labor productivity (McKinsey&Company, 2021).

The Internet of Things radically changes material production, the service sector, the relationship between the business community, the state and the population, creates the opportunity to robotize socio-economic processes based on the formation and development of cyber-physical and intelligent unmanned systems. The Internet of

Things contributes to the creation of real objects through robotic production. Virtual work laid the foundation for a new direction – the robotic Internet of things, that is, a computer network of physical objects with embedded technologies for interacting with each other in the format of transmitting and receiving specific information using sensors, barcodes, QR codes. Such an exchange of information gave impetus to the

development of machine-to-machine communication and various derivatives. Ultimately, things are automated: smart heating plants regulate the temperature, supply water to the batteries, taking into account the ambient temperature, smart curtains regulate transparency, taking into account the level of the outside world and the necessary lighting in the room.

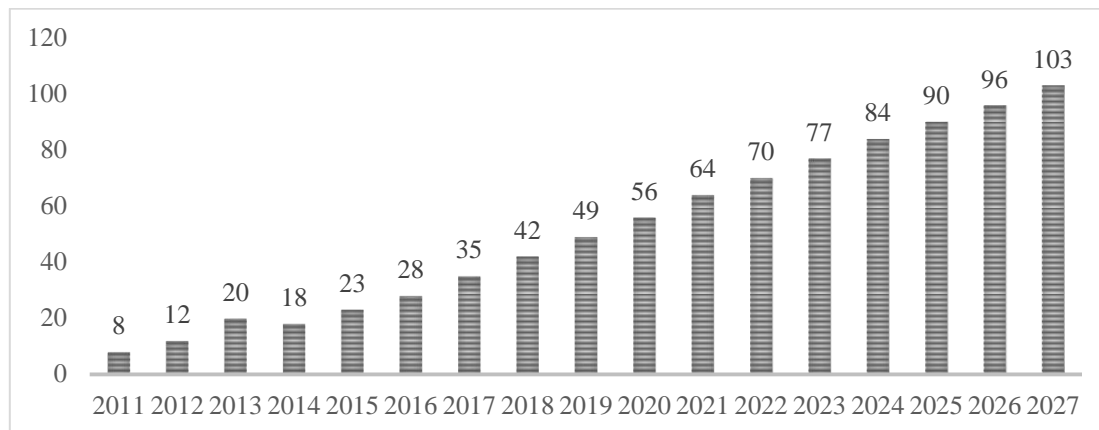


Fig. 2 Forecast of the development of the Big Data market, billion dollars.

The third approach, which can be defined as a *technical and technological approach*, considers the digital economy as the active use of technical and technological innovations, technical and technological re-equipment, software, saturation with modern digital devices, means of electronic exchange and the development of necessary communications. At the same time, according to this approach, not only technical and technological re-equipment is carried out, the replacement of means of production with more science-intensive, modern technologies and innovations, but also the development of the formation of a new cyberspace that can radically change socio-economic relations.

The intensive development of innovations in the second half of the 20th and early 21st centuries is accompanied by an acceleration in the emergence of new technology, which makes it unprofitable to operate existing, but not yet worn-out technology, given its obsolescence. Today, in developed countries, the focus on obsolescence has become almost decisive, which significantly reduces the time during which equipment must be depreciated without reaching full physical wear and tear. As real economic practice shows, in countries with developed economies, the time of full use of technological equipment is estimated on average as no more than 8–10 years. From the II half of the XX century. In highly developed countries, major depreciation reforms are regularly carried out in order to update technology (about

once every 10 years). They make it possible to reduce the depreciation period for the renewal of fixed capital. As a result of these reforms, during 1950–2013, the share of depreciation in total investment in the United States increased from 18% to 70%. Such regular depreciation reforms allowed this state to take a leading position in the world in terms of labor productivity and technical modernization of the economy (Zveryakov, M., 2018).

New technologies are used in all sectors of the economy. For example, at the end of the first decade of the 21st century, the first cryptocurrencies and blockchain appeared in the financial sector. The answer to the social and environmental challenges of the 21st century was the use of energy from renewable sources. It was at this stage that conditions were formed that promote the spread of cyber-physical production, namely the actual formation and development of Industry 4.0. This laid the foundation for the next phase of DX in the industry (accelerated adoption of technologies, in particular the use of the industrial Internet of things, big data analytics, artificial intelligence, the activation of a new generation of robots, augmented reality, etc.). In this context, it is important to distinguish between the terms "Industry 4.0" and "Fourth Industrial Revolution".

So, if Industry 4.0 concerns the introduction of new technologies in the production of material products, the Fourth Industrial Revolution

determines the impact of new technologies on the economic system as a whole (innovations in the financial sector, energy, infrastructure, social sphere) (Yurchak, O., 2019).

Thus, Industry 4.0 provides for a transition to a qualitatively new level of all processes that, according to the results of production, lead to the creation of added value. There is a leveling of boundaries between bio and digital spheres. By combining cyber-physical systems into a single network, the basis for investment in the development of digital solutions in all sectors of production is being formed.

One of the most significant trends, the scale of influence of which is now difficult to imagine, is the development of cognitive technologies. Thanks to cognitive technologies, there will be a significant reduction in labor costs for routine office work: processing standard documents, including certificates, applications, statements, reports, payment documents, declarations, contracts, etc. Thus, the main part of the workflow and almost any work related to information processing will be maximally automated. Thus, the observance of the principle of technological determinism in economic practice leads to two major consequences:

1. This is the action of the tendency to increase the technical composition of capital, which is manifested in the growing manufacturability of production. With each subsequent stage, the world is becoming more and more technologically advanced and this process continues, covering all new areas of human activity on the way to an industrial-digital society.

2. This is the formation and implementation of an innovative model of economic development for the entire market economy. It is with high innovative activity that the ability to ensure an appropriate level of competitiveness is now linked, since thanks to it, companies are able to maintain and even strengthen their positions in the market, while receiving high profits (Ukrainian, L. & Marchenko, O., 2020).

The following circumstances have contributed to the growth in the relative importance of digital technologies:

1. Extremely rapid growth in the performance of physical devices used in computers.

2. Very rapid progress of digital technologies based on the recording of information in binary code.

3. The outpacing pace of development of the Internet is a global system of interconnected computer networks that uses a special set of protocols for transferring data in digital form. The

Internet has revolutionized communications, manufacturing, trade, education, science, culture, and more.

4. Acceleration of production robotization.

Existing industrial technology, apart from technical diversity and the performance of various functions, has a certain unity. All these technical means contain three links - the engine, the transmission mechanism and the working part. The industrial three-link system of machines in all sectors of the economy performs one function: it expands the natural limits of human capabilities. But industrial technology has a limit to its development. The essence of this limit lies in the natural possibilities of a person who is an organic part of the production process (Zyablyuk, R., 2020). This boundary, in turn, establishes the boundaries of the economic relations based on it. As a result, the space for the effective use of market laws in the economy is shrinking. To overcome the boundaries of the development of industrial technology and to continue technical, as well as socio-economic progress, it is necessary to replace human functions in the production process. This is evidenced by the history of technical upheavals under capitalism.

In the new historical epoch, such were computer technology and mathematical programming. The result was the emergence of a new industry in the industry – electronics, which acted as a means of overcoming the boundaries of the development of industrial technology and its fourth control element. This new element radically changed the technical basis of the economy. Thus, the new fourth element, which emerged from the previous technical development, retains the achievement of technical progress in a transformed form, becomes an integral part of industrial technology and removes obstacles to its development. The fourth link of the new technology replaces the limited human functions, performing them instead of the worker (Zveryakov, M., 2020). Because of the transformation of the three-link system of machines into a four-link one, a technique arose, consisting of an engine, a transmission mechanism, a working part and a control and management device. Consequently, the essence of modern scientific and technological progress is a system of interconnected four-link machines. The various types of these machines – automata, industrial work and artificial intelligence – mean a revolution in the tools of labor. Such types of machines, releasing a person from the direct production process, greatly increase the functioning of the technology itself, increase its efficiency. As a

result, there is a sharp increase in labor productivity. The fourth link dramatically affects the previous three. With the advent of four-link technology, historically new material elements of productive forces are being formed – digital means of production.

The fourth approach can be defined as a *virtual information approach* based on the development of qualitatively new business models, business models and platforms that enable the development of new electronic business. According to this approach, the practical aspects of the functions of digitalization of the economy and their empirical application in today's economic conditions, the creation and operation of new electronic processes, the development of e-commerce and the development of business processes of production based on the use of an integrated economic space are noted, resulting in the creation of basic material wealth. has gone beyond the limits of material production and is carried out in the virtual information space through the virtual management of production processes and the sale of products and services.

An analysis of the information market indicates cardinal changes in its structure – the share of information goods is gradually decreasing, while the share of information services is growing faster (Kondratenko, N., 2021). Such transformations occur as a result of a decrease in the demand of business and the population for equipment with improved technical characteristics, since its additional benefits are insignificant from the point of view of most buyers. There are structural changes in the information services market according to the criterion of their purpose, which is reflected in the growth in the share of information services intended for intermediate consumption in their domestic consumption and due to the growth in the final consumption of information services compared to accumulation, which was revealed due to an increase in the share final consumption in their final domestic use.

New information technologies go beyond simple digitalization, as they change the institutional structure of the economy and all functional relationships both at the macro and macro levels. 5G, artificial intelligence, the Internet of Things, Big Data, blockchain determine the direction of development of the information services market, as e-commerce, e-banking, e-education, e-medical services, e-consulting, e-advertising and much more develop on their basis.

The virtualization of exchange operations contributes to an increase in the speed of settlements and access to trading platforms. The

trend of virtualization of the global stock market is the growing role of artificial intelligence technologies and cloud technologies. There is a growing demand for robotic advisors in making investment decisions (Shuba, O., 2022).

Assets in robot control are expected to show an annual growth rate (2022-2027) of 14.19%, resulting in a total amount of \$3.22 trillion by 2027. Average assets managed by one user in the Robo-Advisors segment in 2022 will amount to \$4.77 thousand. High assets under management in the United States (\$1164.00 billion in 2022). Now there are more than 300 robo-advisers in the world, and the share of American robo-advisers is 75% (Robo Advisor Statistics).

The transformational processes turned out to be so dynamic, and their scale and results are so significant and innovative, that today we can talk about the formation of the so-called new global dual real-virtual economic space. The virtual environment formed thanks to the Internet has specific characteristics, including those for doing business: the formation of new competitive business strategies, the reorganization of forms of joint activities and the transformation of traditional organizations and territories into more efficient network structures; lowering the level of competition and risks, information asymmetry; increasing the speed of constant global information exchange and making optimal management decisions. Within the framework of this specific reality, a global virtual market for goods, services and capital has been formed and is dynamically developing in the last decade. The concept of a virtual market is understood as an open system of regular, mainly monetary, mutually beneficial, voluntary exchange of benefits using the global information and communication network and other digital technologies in a competitive environment.

Consequently, there is an interpenetration of traditional and new virtual economies, since most of the participants in the interaction are represented and simultaneously conduct economic activities both in real and virtual spaces. Recently, most large industrial enterprises operate in the conditions of "flow" of economic activity processes from the real market to the virtual one, and vice versa. Also, on this basis, new specific market participants are formed and actively influence many processes – the so-called virtual enterprises, the main activity of which takes place in a virtual environment.

Market relations are transferred to the virtual space, when, for example, a person has worked and received wages credited to an electronic bank card, then in reality she gave the product of her labor,

and received only an entry to her account, which is not a real blessing. There was no real exchange of equivalents. But then this person comes to the shopping center and buys the necessary goods, that is, he receives a real benefit, but pays with a bank card, that is, he leaves the seller only an electronic record. Again, no real equivalent exchange takes place. Real commodity-money relations have disappeared, they are transferred to the virtual space (Pizhuk, O., 2020).

According to the fifth approach, the digitalization of the economy is defined as the process of evolution of economic, social, industrial, organizational, managerial and even public relations as a result of the development of information and digital technologies and communications. This approach can be called a *globalization approach*, since it has historical and economic roots and is based on the formation of a social development paradigm, determining the irreversibility and consistency of these processes and the global influence that has gone beyond economic relations and lies in the plane of changing social formations.

The major technological trends that characterize the digital economy (hyper connectivity, supercomputing, cloud computing, cybersecurity, and smart products) have created a world where traditional product and service boundaries no longer exist. Based on the popularity of social media, businesses have built their business networks to connect suppliers, customers, and internal systems. The result is growing global trade, which, according to SAP specialists, reaches 65 trillion USD. To this must be added the growth of the Internet to approximately 45 billion connections between devices (Chmeruk, H., et. al., 2018).

That is, the global impact of the digital economy leads to:

- Digitization and tracking. In the digital economy, analog objects generate digital signals that can be measured, monitored and analyzed for better decision making. For their effective operation, it is necessary to create a global communication system, which the Internet can serve as. The solution to this problem gave rise to the concept of the Internet, focused on the connection of devices with each other. The tremendous growth of connected devices in the world has already provided a sharp decline in the prices of microprocessors and wireless gadgets – by 80% in recent years.

- Hyperlink. Connecting assets, suppliers, workers and stakeholders through wireless communications powered by digital platforms that

have become global.

- Sharing. The digital economy operates on sharing (sharing of vehicles by commercial transport companies, interconnection of dedicated routes by airlines, radio frequencies by mobile operators, and numerous platforms like Uber, Airbnb, Avito, etc.).

- Personalization. Customers get customized products and experiences from their favorite brands, whenever and wherever they want. Increasing personalization has also been made possible by modern technology.

- Absence of intermediaries. The digital economy also allows companies to eliminate unnecessary middlemen or channels and create a more direct relationship between buyer and seller. Such a system lowers the entry barrier for players in another part of the value chain.

Digital technologies allow to reorient the boundaries of firms to more global levels. Common digital business models lead to a higher level of interaction between different participants. Such businesses tend to compete on a larger scale than traditional businesses due to low geographic boundaries and resource requirements to satisfy customers. Because search and communication costs have dropped significantly, operating costs tend to be much lower than for traditional businesses. Internet technologies have increased the level of competition, reduced entry barriers, led to more substitute products, and increased consumer power.

That is, a feature of the transition from an industrial-market to an information-network economy is the formation of a reconstructive type of economic development, where qualitative changes dominate over quantitative ones and the measure of development changes. If, for example, instead of landlines at work and at home, telephone booths on the street, etc. a smartphone appears that replaces all these things, performs other useful functions and costs less than the cost of them, then we have satisfaction of needs at a higher level with a decrease in GDP in terms of the production of these goods (Zveryakov, M., 2020).

Modern high-tech productive forces form the mechanisms of economic regulation corresponding to their content. In turn, these mechanisms, as an external form of expression of economic relations, serve as a space for the continuous evolutionary improvement of the productive forces, up to the limits of development invested in them. When the limit of their perfection is exhausted, and this is manifested in the cessation of the growth of labor productivity, forces arise that overcome this limit. Such overcoming occurs as a result of qualitative

changes in both the material and socio-economic aspects, which are elements of a complex integral system of the market economy, thereby ensuring the transition to a new social form of the economy and society. Both evolutionary and revolutionary configurations of productive forces constantly increase labor productivity, but this happens in different ways, with the introduction of different economic devices.

Evolutionary changes in the material structure of production are expressed by technical and technological structures. Identification of technological modes allows us to see significant changes in the development of not only productive forces, but also economic relations. If the first four technological modes and partly the fifth relate to the evolution of industrial technology, then partly the fifth and sixth modes can be attributed to technology that abolishes the industrial era.

The UNCTAD report defines advanced technologies as a group of new technologies that take advantage of digitalization and interoperability, which creates conditions for increasing their impact. 11 such technologies are considered: artificial intelligence, Internet of things, big data, blockchain, fifth generation mobile communications (5G), 3D printing, robotics, drones, genetic engineering, nanotechnology and solar photovoltaic systems. In the report, the countries of the world are divided into groups depending on their readiness to develop and implement advanced technologies. To assess countries' ability to equitably use, adopt and apply these technologies, the Advanced Technology Readiness Index was compiled. Based on the results of the assessment for 158 countries, each of them is identified in the group with low, below average, above average and high values of the Index.

According to the UNCTAD classification, Ukraine ranks 53rd with an indicator of 0.56 and belongs to the groups of countries where the value of the Index is above average.

In the UNIDO report, countries are divided into leaders, followers and laggards. The Technology Readiness Index is based on five pillars: ICT adoption, workforce, investment in R&D, industrial use, and access to finance (Panfilova, T., 2021). According to this ranking, Ukraine belongs to the Emerging Industrial Economics, that is, to the follower countries (UNIDO, 2021).

According to the methodology of the World Economic Forum, the analysis of the components of the Readiness for Future Production Index allows us to note the following. Of the 100 countries and economies included in the

assessment, there are 25 leading countries, 10 copycat countries, seven countries with high potential, and 58 countries "immature" (Nascent) according to the archetype. The assessment consists of two main components: the production structure or the current production baseline in the country and the production drivers or key factors allowing the country to take advantage of the Fourth Industrial Revolution to transform the production system.

So, there is a formation of digital platforms of a global nature, increasingly monopolizing the modern information space, using it both for enrichment and for political purposes. Access to these technologies and related platforms is far from equal. Platform companies are "kind of natural monopolies where the winner takes all. And they have taken over the world market, which creates obvious imbalances in the world economy and trade. Tensions in the global economy caused by platform companies will continue to cause conflicts between national antitrust authorities and platform companies, as well as between the countries in which platform companies are based and others" (Heyets, V., 2021). In turn, this exacerbates and threatens to further exacerbate inequalities both globally and nationally. Unevenness, disproportion in development between countries in the context of global platformization was intensified by migration with all the challenges and risks for both donor countries and recipient countries of migration flows. The high-tech developing sector, in which there is a relatively high level of wages, creates jobs for a clearly smaller part of the able-bodied. Most of the workers are losing their jobs, especially in those sectors where mass robotization is taking place, and can be employed in activities with lower productivity, including those where traditional technologies are preserved that are impossible and inefficient to robotize.

It is possible and necessary to develop new digital services and create new digital markets only on a global scale. All this will strengthen the processes of monopolization up to the global level and the formation of a global digital platform, which, in turn, will globally reorient society towards a "new technological center" and a "new technological periphery", where the first and key role will be played along with American Chinese companies – developers of artificial intelligence technologies.

Digitization creates digital rent, deepening inequality and socializing the problem of poverty, since as a result of processing large amounts of data, the one in whose interests they are processed

wins in advance, and the interests of the losers are neglected. Digital rent is nothing more than rent that allows you to earn income thanks to your position in the digital space.

Conclusions and perspectives of further research. Economic development is directly related to economic structures and the changes taking place in them. The economic system consists of separate industries, departments, industries, enterprises, has a certain structure of production resources and foreign trade, spatial distribution and is regulated by economic rules and regulations. The economic structure is the placement of the main elements of the economy and the proportions that have developed between them, and changes in the structure of the economy are a complex system of changes in interrelated proportions that occur under the influence of the existing technical basis, social mechanisms of production, distribution and exchange in accordance with social needs, available resources and the achieved level of labor productivity. In the conditions of the modern economy and production, the factors influencing the change in the structure of the economy are divided into three groups: socio-economic, scientific and technological and institutional. Structural changes are associated with objective interdependence, balance and proportionality of all specific factors.

New information technologies go beyond simple digitalization, as they change the institutional structure of the economy and all functional relationships both at the macro and macro levels. 5G, artificial intelligence, the Internet of things, big data, blockchain determine the direction of the information services market, as e-commerce, e-banking, e-education, e-medical services, e-consulting, e-advertising and much more develop on their basis.

Well-known research companies assume the rapid development of artificial intelligence technologies, including deep learning methods, neuromorphic computing that simulates the neural structure and operation of the human brain; adversarial machine learning methods, analytics methods known as "small data" and "wide data".

By moving away from paper-based processes and digitizing the building blocks of their work, businesses can reduce the number of steps previously required to operate, improve turnaround times, significantly increase their efficiency and, ultimately, reduce operating costs. The digitalization of the economy will help society create a reliable digital environment, optimize and scale operations, make them consistent and secure. Due to digitalization, it becomes possible to

accelerate innovation, support start-ups, teach everyone the basics of programming, and introduce digital technologies in the field of the economy. The implementation of all of the above conditions will improve the performance of the entire economic system of the state and gain additional competitive advantages in the global digital world.

Large-scale digitalization, computerization and robotization of all spheres of economic and public life in the coming decades will certainly accelerate the process of further automation of production and technological replacement of labor by capital. In fact, a new stage in the automation of machines is beginning, capable of learning and improving in the course of production activities. If, until now, automation has ousted a person from the sphere of routine physical labor, now progress in the field of machine learning and artificial intelligence will allow a large-scale displacement of a person from the sphere of mental labor, replacing representatives of routine intellectual labor, that is, mainly representatives of the middle class.

Digitization and new technologies will also affect the competitive environment in the world. As artificial intelligence and robots are introduced into manufacturing processes and services, labor costs will become less of a factor in determining a country's competitiveness, while technological competence and quality of infrastructure will become more important. Technologies such as Big Data and the Internet of Things will help optimize production processes and reduce operating costs, develop new products and services. Virtual reality will be used to expand professional skills, artificial intelligence and robotics to increase labor productivity.

The digitalization of the economy is accompanied by both a change in the nature of production or economic relations, and a change in the direct production forces and factors of production due to the implementation of breakthrough technologies, robotization, and the creation of cyber-physical structures. It is assumed that by 2030 more than 60% of professions will be automated, and plants and factories will be able to improve and modernize on their own, that is, without or with minimal human participation. Business processes, logistics, production cycles will be constantly optimized offline. In these circumstances, the cost of labor ceases to play a key role in the formation of production costs, and the main factor in socio-economic development is the technological potential of the national economy.

Qualitatively new digital elements of productive forces and new socio-economic

relations are changing the structure of social reproduction, increasing the space and boundaries of the economy. In addition to the two traditional

divisions of social reproduction (production of investment goods and consumer goods), a third division appears – the production of knowledge.

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НАПРЯМИ ВПЛИВУ ЦИФРОВИХ ТЕХНОЛОГІЙ НА СФЕРУ ПРАЦІ В КОНТЕКСТІ СВІТОВОГО ТА НАЦІОНАЛЬНОГО ВИМІРІВ

Актуальність. Цифрові технології викликають кардинальні зміни в сфері праці, яка, в свою чергу, здійснює вагомий вплив на всі сектори економіки. Від розуміння масштабу впливу досягнень технологічного прогресу на людський капітал залежатиме здатність соціо-економічних систем різних рівнів адаптуватися до неминучих змін, викликаних цифровою трансформацією. Важливо розуміти, що вплив цифрової трансформації є всеохоплюючим і безальтернативним, оскільки суб'єкти бізнесу, які впроваджуватимуть цифрові технології, перейдуть на якісно новий рівень функціонування, а платою за нездатність це зробити стане втрата конкурентоспроможності.

Мета та завдання. Метою статті є дослідження структурних зрушень в сфері праці України та деяких держав світу, що обумовлені процесами цифровізації.

Матеріали та методи. Матеріальну та методичну базу статті формують фундаментальні та прикладні дослідження провідних міжнародних організацій, зокрема, ООН, Міжнародної організації праці, Міжнародного валютного фонду, Світового банку, а також провідних зарубіжних та українських вчених. За допомогою методу абстрагування досліджено вплив цифровізації на основні складові сфери праці. За допомогою статистичного та порівняльного аналізу виявлено тенденції розвитку основних складових сфери праці під впливом цифрових технологій, за допомогою контент-аналізу ідентифіковано основні компетенції сучасного працівника. Порівняльний метод наукового дослідження дозволив співставити певні показники ринку праці України з аналогічними показниками сусідніх та передових країн Європейського Союзу.

Результати. У статті обґрунтовано, що внаслідок впровадження цифрових технологій в сфері праці виникають зміни в соціально-трудових відносинах і відтворенні робочої сили. Означено напрями впливу цифрових технологій на сферу праці та досліджено сформовані тенденції за кожним із них. На основі контент-аналізу визначено структурні зрушення в компетенціях сучасного працівника під впливом цифрових технологій.

Висновки. Цифровізація стала інструментом зміни якісних характеристик соціо-економічних процесів і явищ. За видимим благополуччям, яке вона приносить, криються величезні виклики. Нові бізнес моделі, побудовані на досягненнях цифрової революції, передбачають відмову від трудових договорів і соціального забезпечення, сталого робочого графіка, виводять трудові відносини за рамки нормативно-правової площини. Платою за вигоду окремих суб'єктів бізнесу виступить соціальна стабільність. На сьогоднішній день існує необхідність побудови механізмів справедливого перерозподілу приросту прибутків за рахунок впровадження цифрових технологій, наприклад, запровадження базового безумовного доходу, встановлення податку на використання цифрових технологій, ліцензування діяльності цифрових платформ.

Ключові слова: цифровізація економіки; професія; компетентність; компетенція; робочий час.

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DIRECTIONS OF THE INFLUENCE OF DIGITAL TECHNOLOGIES ON THE FIELD OF WORK IN THE CONTEXT OF GLOBAL AND NATIONAL DIMENSIONS

Topicality. Digital technologies cause radical changes in the field of work, which, in turn, has a significant impact on all sectors of the economy. The ability of socio-economic systems at different levels to adapt to the inevitable

changes caused by digital transformation will depend on understanding the scale of the impact of technological progress on human capital. It is important to understand that the impact of digital transformation is all-encompassing and irreplaceable, since business entities that will implement digital technologies will move to a qualitatively new level of functioning, and the price for the inability to do this will be the loss of competitiveness.

Aim and tasks. The purpose of the article is to study structural changes in the labor sphere of Ukraine and some countries of the world, which are caused by digitalization processes.

Materials and methods. The material and methodological basis of the article is formed by fundamental and applied research of leading international organizations, in particular, the UN, the International Labor Organization, the International Monetary Fund, the World Bank, as well as leading foreign and Ukrainian scientists. Using the method of abstraction, the influence of digitalization on the main components of the labor sphere was investigated. With the help of statistical and comparative analysis, trends in the development of the main components of the labor sphere under the influence of digital technologies were revealed, and with the help of content analysis, the main competencies of a modern worker were identified.

Research results. The article substantiates that as a result of the introduction of digital technologies in the field of work, there are changes in social and labor relations and reproduction of the workforce. The directions of the influence of digital technologies on the sphere of labor are identified and the trends formed in each of them are investigated. On the basis of content analysis, structural shifts in the competencies of a modern worker under the influence of digital technologies have been determined.

Conclusion. Digitization has become a tool for changing the qualitative characteristics of socio-economic processes and phenomena. Behind the apparent well-being it brings lies enormous challenges. New business models, built on the achievements of the digital revolution, provide for the rejection of labor contracts and social security, a stable work schedule, and bring labor relations outside the framework of the regulatory and legal plane. Social stability will be paid for the benefit of individual business entities. Today, there is a need to build mechanisms for the fair redistribution of income growth due to the introduction of digital technologies, for example, by introducing a basic unconditional income, establishing a tax on the use of digital technologies, licensing the activities of digital platforms.

Keywords: digitalization of the economy; profession; competence; skills; working hours.

Problem statement and its connection with important scientific and practical tasks. Over the past three decades, digital technologies have become the main driver of economic growth and objective factors of influence on all spheres of life in modern society. Despite the different nature and form of manifestation, they have many common features. So, for example, most digital technologies are scaled and integrated into all spheres of our lives, are complimentary, challenge existing hierarchical management systems. Digital technologies change not only the ways of people's communication, thinking, behavior and work, but also – generally recognized empirically confirmed theoretical developments in the field of economics. The comprehensive processes of digitization cause changes, as a result of which a dissonance between theory and practice arises and the problem of rethinking established economic and social-labor theories taking into account new externalities is actualized. The study of structural shifts in the labor market, caused by the influence of digital technologies, will contribute to the determination of the vector of movement of the main components of the labor sphere as a core sector of the economy.

Analysis of recent publications on the problem. The labor market is one of the most important links of the market economy, which, thanks to its close relationship with other markets, reflects the real state of the socio-economic environment. On the one hand, the characteristics of the labor market depend on other markets, and

on the other hand, they themselves influence them. It is constantly in the focus of attention of leading international organizations, in particular, the UN, the International Labor Organization, the International Monetary Fund, the World Bank, as well as – foreign and domestic scientists. Conceptual issues of systemic transformations of the labor market are highlighted in the works of M. Kastels, A.M. Kolot, E.M. Libanova, O.A. Hryshnova and others. Issues related to the transformation of employment, the digital labor market, non-standard forms of employment are considered in his works by N.A. Azmuk, O.O Khandiy. Non-standard forms of employment in conditions of digitization are explored in their works by such foreign and domestic scientists as: M. Koine, G. Rogers, D. Tucker, L.M. Hook, U.E. Huzar, A.A. Hotz and others.

Allocation of previously unsolved parts of the general problem. Issues related to the digitization of the economy are among the interests of leading world and Ukrainian scientists, but a generally recognized scientifically based point of view regarding the impact of digitization processes on the labor market has not yet been formulated. The issue of structural shifts in the labor market caused by digital transformation is of interest and requires detailed study, as it will allow to outline the contours of real changes under the influence of objectively acting digitalization processes.

Formulation of research objectives (problem statement). The purpose of the article is to study

structural changes in the labor market of Ukraine and some countries of the world, which are caused by digitalization processes.

Materials and methods. The material and methodological basis of the article is formed by fundamental and applied research of leading international organizations, in particular, the UN, the International Labor Organization, the International Monetary Fund, the World Bank, as well as leading foreign and Ukrainian scientists. Using the method of abstraction, the influence of digitalization on the main components of the labor sphere was investigated. With the help of statistical and comparative analysis, trends in the development of the main components of the labor sphere under the influence of digital technologies were revealed, and with the help of content analysis, the main competencies of a modern worker were identified. The comparative method

of scientific research made it possible to compare certain indicators of the labor market of Ukraine with similar indicators of neighboring and advanced countries of the European Union. Challenges and problems caused by digitalization have been identified and contours of their solution have been determined based on the study of the experience of economically developed countries of the world.

An outline of the main results and their justification. Digital technologies have a huge impact on the field of work. They change the content and features of all its components, in particular, objects, means, organization and results of work. Based on the method of abstraction, it is possible to highlight the directions and content of the impact of digital technologies on the field of work (Table 1).

Table 1

The results of the influence of digital technologies on the sphere of work

	Direction of influence	Content of impact
1	Subjects of work	acquire an electronic form
2	Labor tools	decrease in size, the transition to digital devices is carried out
3	Content of work	gets complicated
4	Population employment	is decreasing
5	Professional compound	the life cycle of existing professions is shortened; new professions are formed
6	Skills	are expanding
7	Working hours	is decreasing
8	Age structure of the workforce	the average age of employees is decreasing
9	Salary	differentiated
10	Forms of employment	new forms of non-standard employment are formed and spread

Source: developed by the author.

Undoubtedly, under the influence of digital technologies, what human work is aimed at – the subject of work – is changing. We are talking about spheres of activity in which digital technologies are introduced. In particular, in the field of production, robotics and automation contribute to the fact that the worker becomes an operator of production processes, while concentrating his attention on the information he sets and receives during production processes. For example, using additive technologies, an employee spends his working time on setting the input parameters of the production process, and then monitors the information he receives during the production process without performing physical work. Therefore, the objects of work acquire an electronic form (Kolot, A. M., 2021).

McKinsey specialists claim that the introduction of digital technologies should be accompanied by the digitization (tokenization) of

the main assets. Digitization should be understood as the description of an object or image that can be stored on electronic media. Companies that managed to digitize their business by 20% were able to increase revenues by 25% or more thanks to the construction of new business models based on digitization (Vishnevskiy, V. P., Knyazev, S. I. et.al., 2020).

The means of labor are digital devices, computers, tablets, smartphones and software. There is a tendency to decrease in the size of the means of production. A modern smartphone, the cost of which is several hundred dollars, is superior in terms of functionality to a computer created in the 70s of the last century and the cost of which was thousands of dollars.

The application of digital technologies in the production sphere contributes to the optimization of production resources, increasing the speed of production and improving the quality of products,

as a result of which labor productivity and the welfare of the population increase. The price for this improvement is the release of labor and the compression of variable capital as a consequence of the introduction of digital technologies. According to the International Organization of Robotics, in 2022 almost 4 million industrial robots can be represented in various industrial processes, and this number will grow annually by 13% (Szabó-Szentgróti, G., Végyári, B., Varga, J., 2021). The exponential growth of digital technologies makes it realistic to support the entire global production and logistics system with only a few million highly qualified professionals.

Thus, prerequisites are created for the growth of the organic structure of capital as a result of changes in its technical structure. However, at the same time as the release of medium-skilled labor performing routine operations, the demand for workers of new professions is formed and, as a result, the costs of training and improving the qualifications of workers, attracting highly qualified labor, are increasing. Thus, multidirectional processes are simultaneously operating in the labor market, one of which causes a shortage of highly qualified labor, and the other - an increase in the unemployment rate as a result of the displacement of medium-skilled labor by smart machines.

In fairness, it should be noted that it is impossible to create compensatory technical devices for a number of professions. For some low-skilled labor, it is economically impractical, and highly qualified personnel will always be in demand, as they ensure the creation, improvement,

and maintenance of high-tech fixed assets. It is generally accepted that professions that involve human-to-human contact require a high level of empathy and are practically impossible to replace (for example, the professions of a teacher, actor, hairdresser, marketer, psychologist, social worker, and others). The cost of such work will be low and it will be most widespread among women.

According to scientists' forecasts, the routine professions of cashiers, couriers, security guards, drivers, packers will disappear in the near future. However, a number of new professions will appear, among which the following are defined: futurologist, bioengineer, unmanned traffic controller, nanorobot designer, space debris cleaner, drone operator, information hygiene specialist, etc. Scientists predict that in the near future, new professions will appear and disappear faster and faster on the labor market, that is, the life cycle of professions will shorten. There is a tendency for a person to change his profession 3-4 times during his working life.

McKinsey experts predict that by 2030, from 75 to 375 million workers, or from 3 to 14% of the global workforce, will have to learn new professions (McKinsey Global Institute, 2017). At the same time, all employees must adapt to new working conditions, taking into account the need for cooperation with smart machines.

The US Bureau of Labor Statistics has made a forecast of the demand for professions in 2030, according to which the most popular professions will be those related to the use of alternative energy sources, information analysis and information security, and human health (Fig. 1).

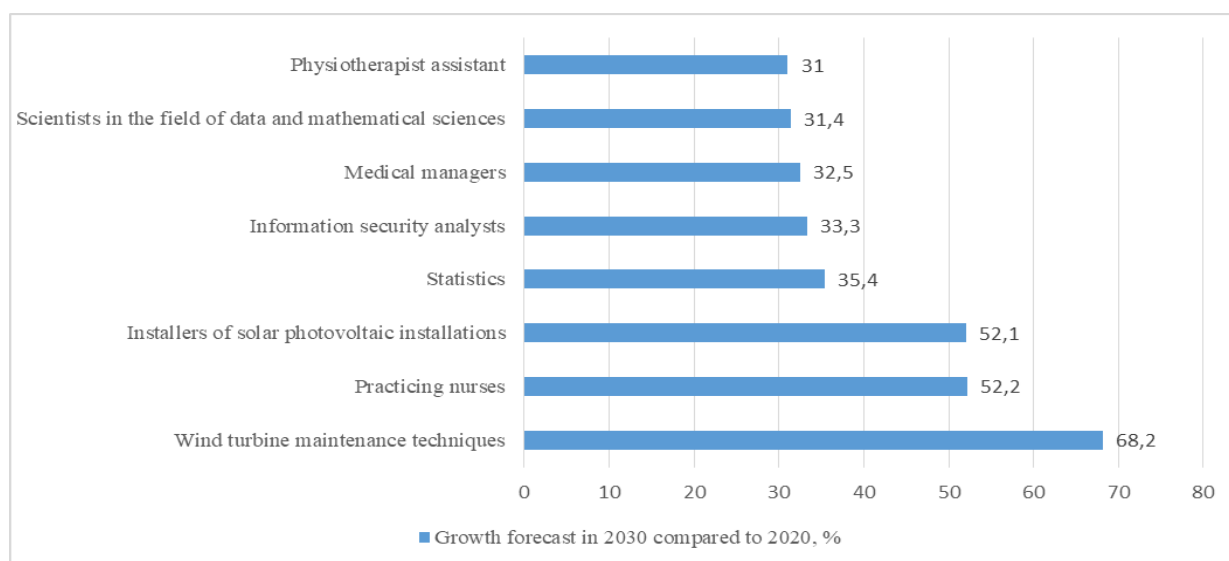


Fig. 1. Forecast of the growth of professions with the greatest growth dynamics for 2030, %

Source: compiled by the author on the basis of data (The European Foundation for the Improvement of Living and Working Conditions, 2021).

In the context of the above, it is important to note that in the field of education there is a transition from the principle of adaptability to the principle of competence. Competence is a more comprehensive characteristic compared to the concept of "professionalism", as it implies the possession not only of certain technologies (for example, accounting, cultivation of agricultural crops), but also certain non-professional characteristics. We are talking about the ability to make responsible decisions, the presence of abstract, systematic and experimental thinking, a creative approach to any matter, the ability to see it through to the end, the ability to constantly learn, think flexibly, and communicate (Kovalenko, M. A., Lomonosova, O. E., Shvorob, H. M., 2020). In addition to traditional hard skills, soft skills and digital skills are in demand on the labor market due to the complexity of the nature and content of work. In addition, these skills allow the employee

to master new types of activities, change workplaces and quickly respond to changes in the field of employment. The demand for narrow skills specific to a certain workplace is decreasing, and the demand for skills that facilitate adaptation to the uncertain conditions of the socioeconomic environment is increasing.

Closely related to the concept of "competence" is the concept of "skills", which means good knowledge of something. The concept of "competence" is more comprehensive and refers to a person, while the concept of "skills" is related to the content of the field of activity.

In the scientific literature, there is no universally recognized approach to the composition of the competencies of a modern worker, but the study of different points of view regarding the personal and professional qualities of a modern worker allows us to identify skills that are of primary importance (Table 2).

Table 2

Content analysis of the skills of a modern worker				
Supporters				
Skills	The European Commission	The World Bank	World Economic Forum	Employers
skill in the field of native language	+			
skill in the field of foreign languages	+			
mathematical, fundamental scientific and technical skills	+			
analytical thinking			+	
computer skills	+		+	
cognitive skills	+	+	+	
social and behavioral skills	+	+		
skills of initiative	+		+	
cultural skills	+			
ability to adapt		+		+
the ability to make quick decisions		+		+
the ability to argue and argue one's point of view				+
confidence		+		+

Source: compiled by the author on the basis of data (Kovalenko, M. A., Lomonosova, O. E., Shvorob, H. M. 2020; World Bank, 2019).

The analysis of modern requirements for the qualitative characteristics of the workforce allowed us to conclude that digital technologies are changing the set of skills of employees relevant for the modern labor market. The demand for skills that cannot provide work is increasing in

conditions of permanent changes in the socioeconomic environment, in particular, cognitive skills that provide the ability to adapt to changing conditions of the external environment, to quickly make decisions that are not related to the performance of routine operations. Since 2001,

the share of people working in specialties that require cognitive and social-behavioral skills, not related to the performance of routine work, has increased in developing countries from 19 to 23%, and in developed countries from 33 to 41% (World Bank, 2019). The modern worker is becoming more versatile. Combining different types of skills brings more income.

In the conditions of comprehensive digital transformation, employees of all sectors of the economy must possess digital work skills using modern means of telecommunications and software products, i.e. possess digital skills, which is recognized as one of the eight key skills for a full-fledged life and activity of EU citizens (Cabinet of Ministers of Ukraine, 2021). Workers employed in various sectors of the economy must have digital skills for working with information using modern telecommunications tools and software products. The acquisition of digital skills is a condition for effective activity in other spheres of life. The growth in demand for specialists in the field of ICT is natural. In the EU countries, the share of ICT specialists is slowly progressing and reached 4.5% of the total number of employees in 2021. It is important to note that if in 2021 the number of ICT specialists in the EU countries reached 8.9 million people, then by 2030 it is planned to increase their number to 20 million people, i.e. more than twice, and reach approximately 10% of the total number of employed. In 2021, even the countries with the highest share of ICT specialists in the number of employed persons did not reach the 10% limit - Sweden (8%) and Finland (7.4%) (European Commission, 2022).

In Ukraine, in 2020, compared to 2016, the number of people employed in the field of information and telecommunications increased by 8,500 people and reached 283,700 people. On a national scale, the specific weight of employees in the field of information and telecommunications increased by 0.09 percentage points over 5 years. In 2020 it was 1.8% of the total number of employed people aged 15–70. In terms of regions, the best dynamics according to the indicated indicator took place in the city of Kyiv (+0.35 p.p.), Kharkov (+0.31 p.p.) and Kyiv (0.29 p.p.) regions. The largest decrease in the share of people employed in the field of information and telecommunications in the total number of employed population was observed in Kirovohradsk (-0.18 p.p.), Khmelnytskyi (-0.07 p.p.), Odesa (-0.03 p.p.) and Ternopil (-0.03 percentage point) regions (State Statistics Service of Ukraine, 2021).

Focusing on the formation of a positive trend in the growth of the share of the employed population in the sphere of information and telecommunications (in 17 out of 24 regions and the city of Kiev), it is important to focus on the insufficient number of employees in this sphere, as well as in today's modern world. For comparison, in 2020 per 1000 inhabitants there were 23 individuals employed in the sphere of information and telecommunications in Germany, in France – 18 individuals, and in Ukraine – less than 6 individuals.

The all-encompassing influence of digital technologies creates limitless opportunities, while posing serious challenges and provoking irreversible changes. So, for example, a tendency to reduce working hours has formed, which is confirmed by the decrease in the average annual number of hours worked by one person over the past twelve years in a number of countries (Fig. 2).

The greatest reduction in working hours took place in Turkey (304.6 hours), Israel (203.7 hours), Japan (126 hours), Austria (109 hours), and Italy (108 hours). For most countries, the reduction was in the range from 1 to 80 hours.

In Ukraine in 2019 and 2020, the average length of weekly working hours actually worked was 39 hours, which is 1 hour less than in 2011.

In 2020, Microsoft piloted a 4-day work week in Japan, and the results were positive across the board. The labor productivity of 2,300 employees increased by 40%, energy use decreased by 23%, and paper use decreased by 59%. Employees began to go on sick leave less often, the number of days off was reduced by a quarter. As a result, 92% of employees were satisfied with the experiment and preferred the 4-day work week. This example is indicative for the whole world, since the cult of work and its strict culture has historically developed in Japan (Szabó-Szentgróti, G., Végvári, B., Varga, J., 2021). The active implementation of the 4-day working week is taking place in the countries of Scandinavia and Northern Europe. In October 2021, a wave of mass protests took place in the United States of America, involving more than 100,000 people, demanding a shorter working day.

Another serious challenge is that the younger generation, which cannot imagine life without information and communication technologies, has greater potential and opportunities for earning income than the older generation due to physiological characteristics and objective reasons. In 2001, American education expert Mark Prensky introduced the concepts of digital natives and digital immigrants into scientific circulation

(Prensky, M., 2001). The first were born during the digital revolution, the second - before the beginning of the digital age. The potential opportunities of applying modern digital

technologies and integration into the modern labor market in the generation of digital natives are much greater than in the generation of digital immigrants.

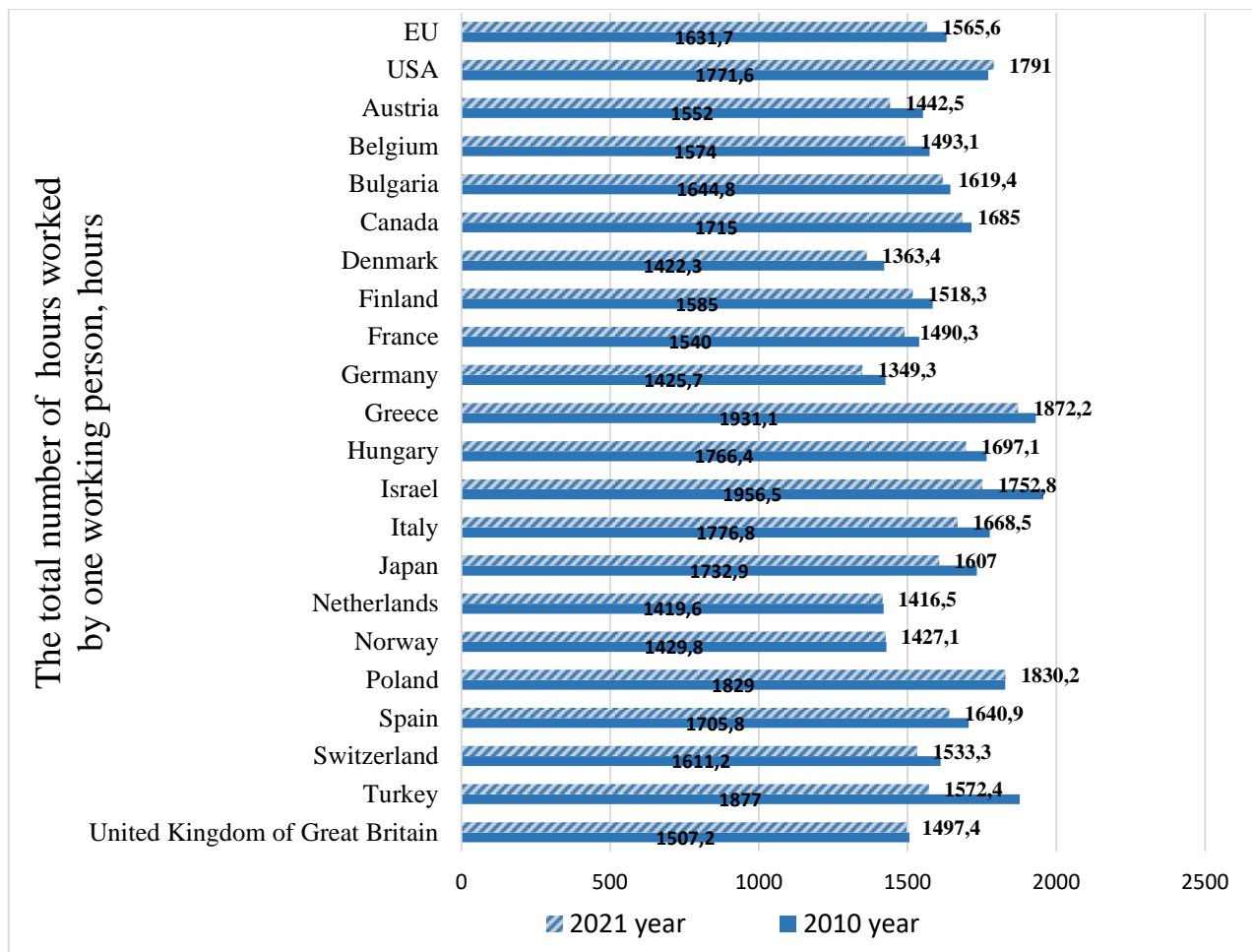


Fig. 2. Average annual number of actually worked hours in some countries of the world in 2010 and 2021, hours

Source: compiled by the author based on data from the website <https://www.oecd.org/>

Employers set potential workers requirements that are characteristic of young people, in particular, the ability to learn, the ability to quickly respond to changes, and energy. According to research company Statista, the average age of employees of the largest IT companies (Facebook, Google, Apple, etc.) is 27-35 years old. In many countries of the world, there is a tendency for it to decrease, as business structures actively develop training and internship programs for students and teenagers with their subsequent involvement in paid projects. Thus, talented schoolchildren, with the consent of their parents, can fully compete with adult programmers.

The impact of digitalization on the level of wages in the labor market is ambiguous. From a theoretical point of view, the introduction of digital technologies determines the growth of labor

productivity. The distribution of the increase in added value between capital and labor depends on many factors. The European Center for the Development of Vocational Training (Cedefop) found that workers with advanced ICT skills require an hourly wage premium of around 3.7% compared to those with basic ICT skills. Hourly wages for those employed in jobs that do not require ICT skills are about 8% lower (The European Foundation for the Improvement of Living and Working Conditions, 2021). Thus, prerequisites are created for the polarization of society as a result of uneven income distribution.

The development of digital technologies in the conditions of turbulence and structural shifts of the national and world economies determines the rapid development of various forms of non-standard employment. In Ukraine, two new forms of non-

standard employment have become the most widespread: work based on information and communication technologies and platform work.

Summarizing the existing experience, it should be noted that as a result of the introduction of digital technologies, the general well-being of the population will definitely improve. The biggest profit from the implementation of digital technologies is received by the consumer. The price for such an improvement will be increased

stratification of society, as the creative class receives the greatest economic benefit. At the same time, large enterprises have greater opportunities to implement digital technologies compared to small and medium-sized enterprises. Digital technologies will contribute to the ruthless squeezing out of markets of those who do not master them. The generalized consequences of the influence of digital technologies on the labor market are presented in Table 3.

Table 3

The impact of digital technologies on the labor market

The impact of digital technologies on the labor market	
from the employer's point of view	
<i>positive influence</i>	<i>negative influence</i>
Reducing the time it takes to find the right workforce thanks to digital platforms	The need for a large amount of investments in connection with the need to ensure the stable operation of the Internet, telecommunications and mobile networks
The possibility of attracting highly qualified specialists from any country in the world	Shortage of digital skills of staff
Ability to reduce costs for maintaining office premises, support staff, organization of workplaces	
from the employee's point of view	
Reducing job search time thanks to digital platforms	New requirements for potential employees (the need to acquire new skills), the need for lifelong learning
Employment growth in remote labor markets	Additional costs related to the organization of the workplace
Possibility of choosing non-standard forms of employment	Limited supply of professions for middle-class workers
from the point of view of the state	
Creation of new jobs due to the emergence of new professions, as well as related to the development, implementation and maintenance of new technological solutions	Reduction of jobs as a result of automation and robotization of production operations (decrease in demand for low- and medium-skilled workers)
Growth of labor productivity	Stratification of society (further growth of income inequality) due to uneven distribution of income on labor (compared to income on capital)
Reduction of frictional unemployment	The growth of technological unemployment
Creation of conditions for continuous economic growth and growth of the population's well-being	Different opportunities for implementing digital technologies depending on the size of enterprises (large enterprises have advantages)

Source: Compiled by the author based on data from the source (Vishnevskiy, V. P., Knyazev, S. I. et al., 2020).

The complexity and ambiguity of the issue of the impact of digital technologies on the labor market is evidenced by the fact that the UN defines digitalization as one of the four dangers that threaten humanity. This danger is due to the fact that technological advances are moving faster than humanity can respond to or even understand. In addition, the latest technologies can be used to

commit crimes, incite hatred, falsify information, and interfere in private life.

Conclusions and perspectives of further research. Therefore, the digital transformation determines the multidirectional movement vectors of the components of the labor market, causes contradictory changes. A point of view generally accepted by the scientific community regarding the

nature of the impact of digital transformation processes on the labor market has not yet been formed, but it is already possible to state the fact that the payment for increasing national well-being thanks to the introduction of digital technologies is social stability. Today, there is a need to build mechanisms for the fair redistribution of income growth due to the introduction of digital

technologies, for example, by introducing a basic unconditional income, establishing a tax on the use of digital technologies, licensing the activities of digital platforms. The need to find an individual way of adapting the Ukrainian labor market in the conditions of global digital transformation is urgent.

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ІННОВАЦІЙНИЙ КОРПОРАТИВНИЙ УНІВЕРСИТЕТ ЯК СУЧАСНА ФОРМА ІНТЕГРАЦІЇ НАУКИ, ОСВІТИ І БІЗНЕСУ

Актуальність цього дослідження обумовлена низкою чинників, найважливішим з яких є воєнний стан, у якому перебуває наша країна. Сьогодні всі ресурси України спрямовані на забезпечення військових перемог як застави незалежності та суверенності нашої держави. Однак, ми вважаємо, що післявоєнне відновлення всіх сфер життя є не менш важливим. Безперечним пріоритетом у відродженні країни є економічний напрям, відновлення промислового потенціалу, посилення на цій основі конкурентоспроможності України на світовому рівні. Ці проблеми були розглянуті як пріоритетні на Конференції з відновлення України, що відбулася 4–5 липня 2022 року у м. Лугано (Швейцарія) (URC 2022). Ряд національних програм, представлених у рамках даної конференції, визначають термін їх реалізації до 2032 року і охоплюють не тільки відновлення економіки країни, її обороноздатності, а й такі напрямки як бізнес-середовище, охорона здоров'я, освіта, наука, охорона навколишнього середовища, культура, спорт. Враховуючи важливість поставлених завдань, ми вважаємо, що їхнє рішення нерозривно пов'язане з інноваційною спрямованістю розвитку цих напрямів, що базується на інтеграції науки, освіти та бізнесу.

Стратегічні орієнтири розвитку освітньої галузі України, зокрема вищої освіти, були визначені у поданому МОН України документі – Стратегії розвитку вищої освіти в Україні на 2021-2031 роки (2020). Одним із стратегічних напрямів там зазначено необхідність інтеграції науки, освіти та бізнесу для забезпечення економічного зростання в країні. Ми вважаємо, що вирішенню зазначеного завдання сприятиме застосування в Україні практики формування інноваційних корпоративних університетів.

Метою цього дослідження є визначення ролі інноваційного корпоративного університету у розвитку інтеграції науки, освіти та бізнесу.

Матеріали та методи. Основними методами дослідження обрано методи сходження від абстрактного до конкретного, а також наукової гіпотези. Здійснено теоретичне узагальнення та аналіз літератури з проблеми дослідження. Проведено порівняння та систематизація емпіричних та теоретичних знань. Статистичні та графічні методи аналізу використовувалися для аналізу офіційних даних HolonIQ, а також передового досвіду розвитку корпоративних університетів на глобальному рівні.

Результати. У роботі проаналізовано основні об'єктивні передумови виникнення корпоративних університетів, пов'язані із формуванням елементів економіки знань на глобальному рівні. Критично розглянуті визначення корпоративного університету, представлені різними вченими, на базі чого авторами пропонується трактування поняття «корпоративний університет», у якому акцент зроблено на необхідності інноваційного змісту освітнього процесу у такій установі. Розглянуто функції корпоративних університетів, основні методи їх організації. Автори приходять до висновку, що найпрогресивнішою формою, яка відповідає особливостям перехідного періоду до економіки знань, є інноваційний корпоративний університет.

Висновки. Створення інноваційного типу корпоративного університету може розглядатися як один із ефективних методів забезпечення стратегічної конкурентоспроможності компанії на основі активізації інноваційної діяльності, як пріоритетний напрямок інвестування у розвиток людського капіталу фірми.

Ключові слова: економіка знань, внутрікорпоративне навчання, бізнес-школа, корпоративний університет.

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THE INNOVATIVE CORPORATE UNIVERSITY AS A MODERN FORM OF THE INTEGRATION OF SCIENCE, EDUCATION AND BUSINESS

The **topicality** of the study is caused by a number of factors, the most important of which is the state of war in our country at present. These days all the resources of Ukraine are aimed to ensure military victories as a guarantee of the independence and sovereignty of our state. However, we suppose that the post-war reconstruction of all the life-sustaining spheres of the country is just as important. An unconditional primacy in the revival of the country is the economic direction, the restoration of industrial capacity and the increase of Ukraine's competitiveness on this basis at the global level. These problems were considered as priorities at the Conference for the Renovation of Ukraine, which took place in Lugano, Switzerland, on June 4-5, 2022 (URC 2022). A number of national programs represented within this Conference define the term of their implementation by 2032 and include not only the recovery of economy and defensibility of the country but also such directions as business environment, health-care, education, science, environmental protection, culture and sports. Due to the importance of the tasks, we suppose that their solution is inseparably connected with the innovative direction of the development of these areas, which is based on the integration of science, education and business.

The strategic guidelines for the development of Ukraine's educational sphere, higher education in particular, were determined in the document represented by the Education and Science Ministry of Ukraine - the Development Strategy for Higher Education in Ukraine for 2021-2031 (2020). The necessity of the integration of science, education and business for providing the economic growth in the country is pointed out there as one of the strategic directions. We suppose that applying the practice of forming the innovative corporate universities in Ukraine will contribute to the solution of this task.

The **aim** of the study is to define the role of the innovative corporate university in the development of the integration of science, education and business.

Materials and methods. The methods of ascending from abstract to concrete, as well as the scientific hypothesis have been chosen as the fundamental methods of the study. Theoretical generalisation and analysis of the literature on the research problem has been performed. Empirical and theoretical knowledge has been compared and systematised. Statistical and graphical techniques of analysis, as well as the advanced experience of the development of corporate universities at the global level, have been used for analysing the official data of Holon IQ.

Research results. The work analyses the main objective prerequisites for the appearance of corporate universities connected with forming the elements of knowledge economy at the global level. The definitions of the corporate university provided by various scientists are critically examined, on which basis the authors offer the interpretation of the term "corporate university", where the accent is made on the importance of innovative content of the educational process in such an institution. The functions of the corporate universities and their basic organisation methods are considered. The researchers conclude that the innovative corporate university is the most progressive form, which corresponds to the specifics of the transition period towards the knowledge economy.

Conclusion. The creation of the innovative type of a corporate university can be considered as one of the effective methods of providing the strategic competitiveness of a company on the basis of enhancing the innovative activity as a priority area of investing into the human capital development of a company.

Keywords: knowledge economy, internal corporate training, business school, corporate university.

Problem statement and its connection with important scientific and practical tasks. The current trends of economic development on a global scale are characterised by the total digitalisation, the penetration of smart technologies

in all the spheres of social life, as well as the overall manufacturing innovative orientation. This, in turn, causes, on the one hand, the continuous production of new knowledge, accelerating the transfer of the results of scientific research, and, on

the other hand, the need not only to constantly update the technological base of manufacture but also to improve the educational level of the employees and their adaptation to the new manufacturing conditions. Analysis of the current trends for higher education shows that the possibility for effective solution of the stated problem of integrating the scientific, productive and educational activities is related to the development of corporate universities and their modern form - innovative corporate universities as the most relevant to the new challenges and requirements of the formation stage of knowledge economy. Such educational institutions not only provide the intensive training of students for work on a specific manufacture and form their professional competency in accordance with the business requests but also stimulate the future employees to constant knowledge updating and lifelong learning.

Analysis of recent publications on the problem. Issues of analysing the nature of corporate universities, the specific features of their functioning and the prospects for their development in the process of forming the knowledge economy are presented in the works of the domestic and foreign scientists, such as J.Meister, E.Blass, M.Rademakers, S.Aronowitz, H.Girault, Ph.Altbach, J.Salmi, S.Kurbatov, O.Hiluha, G.Karpenko, A.Dankevich, T.Zbritska, I.Litovchenko, I.Dybach, O.Romanovskiy, O.Kalenyuk, A.Dyachenko, etc.

Allocation of previously unsolved parts of the general problem. Analysis of scientific literature on this topic as well as the practice of creation and operation of corporate universities in the world and in Ukraine showed that a number of problems associated with the development of innovative corporate universities as a modern form that promotes the integration of productive, educational and scientific activities hadn't got the full coverage in academic circles.

Formulation of research objectives (problem statement). The purpose of the study is to determine the role of the innovative corporate university in the development of integrating science, education and business.

Materials and methods. The methods of ascending from abstract to concrete, as well as the scientific hypothesis have been chosen as the fundamental methods of the study. Theoretical generalisation and analysis of the literature on the research problem has been performed. Empirical and theoretical knowledge has been compared and systematised. Statistical and graphical techniques of analysis, as well as the advanced experience of

the development of corporate universities at the global level, have been used for analysing the official data of Holon IQ.

An outline of the main results and their justification. The process of the development of industrial relationships at the present global level is characterised by the transitivity of relations, which is associated with the transformation of indirect economic ties towards the establishment of new relationships that gradually exclude commodity ties. This transitivity is based on changing the material foundation, the functions of which are performed by informational technologies, knowledge and innovations. Digital economy and knowledge economy developing on their basis are characterised by the scientific and technological progress acceleration, innovative development, increase in the share of science-intensive production and increasingly full penetration of smart technologies in all the spheres of human activity that eventually bring the economic growth.

The effect of these objective processes leads to substantial changes in the role and value of employees in the reproduction process. It forms not only the new technologies, methods of goods and services creation and ways to satisfy social needs but also the new sources of competitive advantages in business and its organisation and management forms. Staff of a company and competency and skill level of the employees become the key factors of production. The situation is so that the professional skills obtained earlier can not always provide efficient work of a company staff and the ability of the employees to quickly adapt to changes both in internal and external competitive market environment. Increasing demands for the educational level of the workers, higher level of their professional training cause the need for extra cost from the company management to develop the internal proprietary system of retraining and advanced training of the staff. Such costs, according to experts (Poruchnyk, A. M. & Suslovska, T. Ye., 2010), ensure a greater growth of labour productivity than similar expenditure in equipment renewal. Thus, the key to competitiveness of a company in today's world is to create conditions for continuous training of employees and form the need to learn. "The illiterate in the future will not be those who cannot read but those who haven't learnt how to learn" (Toffler, 1971).

The global trends associated with the objective need to raise the educational level of the population are evidenced by increased spending on education as well as the growth of the number of people, who have received higher education, in the

world. As provided by results of the research conducted by the experts of Holon IQ in association with the Demographic Centre and the Wittgenstein Centre for Demography and Global Human Capital (research collaboration of the International Institute of Applied System Analysis (Laxenburg), the Viennese Institute of Demography, the Austrian Academy of Science and the Viennese Institute of Economics and Business) by 2050 there will be 2 billion graduates

of the schools, colleges, universities and alternative higher education institutions more than nowadays, in the first place, due to the more active participation and growth of population. According to the table 1 data, increase in the sector of higher education by 2050 is projected to be 970 million people while the number of people with the primary education only will decrease by 180 million people.

Table 1.

Dynamics of the global number of population by educational level*

	1990 - 2020	2020 – 2050 (forecast)
Higher education	+ 640 mln. people	+ 970 mln. people
Secondary education	+ 1,5 mln. people	+ 1,2 mln. people
Primary education	+130 mln. people	- 180 mln. people

Compiled by the author on: HolonIQ (2021).

According to the experts of Holon IQ education is one of the world's greatest sectors, which accounts for more than 6% of GDP. Scientists consider that by 2025 total global spending of

governments, companies and consumers on education in comparison with 2000 will increase by 3,9% and reach 7,3 trillion US dollars (Fig.1).

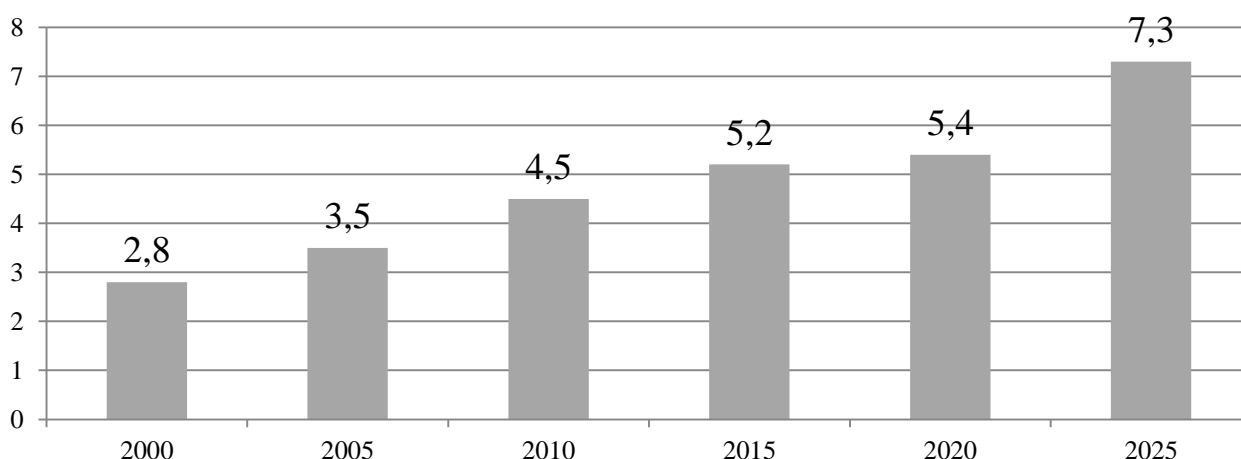


Fig .1 Total spending on education worldwide (trillion USD)*

Compiled by the author on: HolonIQ (2021).

The reviewed tendencies engulfing the world's economic space reflected in emergence of a new type of firm – learning organisation. “Appearance of learning organisations is an element of industrial society evolution” (Senge, Peter M., 2006). Such an organisation along with solving the immediate industrial tasks aims at constant self-development and formation of new competencies successfully applying innovations both in its main activity and in management and marketing in interaction with stakeholders. Thus, the company increases the amount of its intellectual capital. The founder of this concept is Peter Senge, who in his definition of self-learning organisation focuses on realization of creative potential of every staff member pointing

that it is the organisation “...where the new and comprehensive thinking patterns are nurtured, where collective free creativity is applied, where employees are constantly learning how to learn together” (Senge, Peter M., 2006). Such an organisation in its activity regarding staff applies the principle of lifelong learning, which allows to update their professional skills and competencies in accordance with the changes that take place both in the scientific environment and technological process and in unstable market situation.

Current processes of forming the information society, pointing out science as a major factor of economic growth make new demands not only for direct participants of manufacturing process but

also, to a greater extent, for professional training institutes, which must be adequate to new challenges in changing needs of today's economy. The traditional principles and methods of learning, which assumed that students gained knowledge sufficient for a lifelong occupation, corresponded to the industrial type of economics. Nowadays educational process should be transformed in the direction of forming the learners' skills to continuously improve their level of education. The realities of the modern development stage of society in the world, characterised as a process of formation of the science-intensive economy, knowledge economy, put forward new requirements for learning results, namely, the development of skills of creative approach to the solution of professional tasks, quick adaptation to changing competitive market environment, striving for constant raise of the educational level, improvement of the professional competencies. Along with that, realisation of these learning objectives increases the importance of basic knowledge and over-professional skills.

The first practice of integrating the education, science and business took place in the USA at the beginning of the XXth century. In 1914 General Motors and General Electric implemented the system of the corporate learning in the form of internal training in order to improve the professional training of their own staff. Further development of this form has led to the emergence of appropriate corporate schools with accredited training programs (Pedron, Z., 2018). A business school for sales specialists training, The School of Automobile Trades, operated in General Motors, but later on the list of specialist training had been expanded. Such business schools may be considered a prototype of the modern corporate universities.

C.Prince and G.Beaver (Prince, C. & Beaver, G., 2001) refer to General Motors Institute (now Kettering University, Flint, Michigan, USA (Kettering University)) as the first corporate university established by General Motors in 1927. This educational institution had the budget of around \$100 million and the staff of 400 regular workers. The corporate university operated in 21 countries and had 99 units. In 1956 General Electric also established a corporate university, which throughout all the years of its existence and to this day is a benchmark of the corporate university as a centre of corporate culture and innovative development providing up-to-date relevant knowledge for company employees and its partners.

Hamburger University established by

McDonald's in 1961 is also considered to be the oldest corporate university. The mission of Hamburger University is to become the centre of the organisational culture of Arcos Dorados, implementing a continuous learning process in value creating chains and turning knowledge into the real business results (Gamburger University).

Since the middle of the XXth century we can observe the process of rapid development of the corporate universities, which were established not only in the largest American companies (IBM, General Electric, McDonald's, Motorola, Coca-Cola, Procter&Gamble) but also became accepted practice in Europe. Even small companies with the staff of no more than 500 employees form their own corporate universities. "The rapidly growing number of corporate universities since the 1990s has proved that this is not just a passing fad. Corporate universities have managed to turn themselves from simple units for conducting training into the centres for transfer and exchange of knowledge, as well as innovations - both within and amongst the companies" (Rademakers, M., 2005).

In addition to the practice of setting up the corporate universities by large companies, traditional universities can also be involved in corporate training functions. An example of such effective cooperation of business and educational establishments may be the New York University and its School of continuous professional education (NYU School of Professional Studies). Around 65,000 students study at this School every year, with more than 5,000 training courses. At the School a Virtual University is created as well, which provides students from all over the world with remote educational services.

The appearance and rapid spread of the corporate universities worldwide was caused by a number of factors, analysed in scientific works of scholars, experts in this area. As prerequisites for increased attention of corporations to this form of educating the employees, the following can be distinguished:

1. Global transformations, associated with the development of information and communication technologies and digitalisation, which engulfed all the directions of society activities. These processes, thereby, reflected in increased competition, greater instability of market situation, complication of the external environment for business operation (Dealtry R., 2000).

2. Transformation processes associated with forming the "knowledge economy" and increased demands for knowledge innovation (Allen, M. 2010; Li, J. & Alagaraja, M. 2006, December).

3. The necessity to form and implement the system of continuous staff training, increase the qualification level of employees due to the production tasks complication, growth of the intellectual component in manufacturing processes, resulting in increased interest of a company in highly educated staff (Dealtry, R. 2000).

4. Striving for maximisation of amount of the company's intellectual capital in order to increase its attractiveness for potential investors (Dealtry, R. 2000).

5. Transformation of the company management principles due to the development of new business forms, mastering the business virtual space, as well as strengthening of the diversification processes of industrial activity of the corporations, their interpenetration by merging and acquisition, alliance and cluster building (Stewart, J. & McGoldrick, J., 1996).

6. Applying the practice of "lifelong employment" for the company's staff (Meister, J.C., 1998).

7. Striving for increase in the level of the corporate culture, the necessity to realise the mission and corporate values by the staff, to bring them into line with the personal goals of employee development.

8. Reduced quality of the professional learning due to the inability of state academic structures to quickly adapt to changing business needs (Blass, E., 2005; Blass, E., 2001; Guthrie, D., 2013, January 22).

9. The appearance and development of new innovative methods and technologies used in the educational process (Paton, R., Peters G., Storey J. (eds), 2005).

Scientists and education experts disagree on the definition of the term "corporate university". Thus, in a study conducted by Lee and Alagaraj (Li, J. & Alagaraja, M. 2006, December) and introduced at a conference on corporate universities hosted by the Academy of Human Resource Development (USA) seventeen definitions of a "corporate university" were analysed. The president of the Corporate University Exchange J.Meister in his definition of this concept focuses on the purpose of functioning of a corporate university as "a strategic complex aimed at the development and education of the employees, customers and providers in order to correspond to the business strategy of the organisation" (Meister, J.C.,1998). In his opinion, the purpose of organising a corporate university within a company is, first of all, their striving for a higher level of competitiveness "through developing those competencies of the employees, which comply with the business strategy of the

organisation" (Meister, J.C.,1998). Aiming at the achievement of strategic goals of a company's development, realisation by every employee of the common interests of the organisation by forming and carrying out the educational process, both at the individual level and at the entire team level, is also present in the interpretation of a corporate university introduced by M.Allen (Allen, M., 2002). R.Diltry while analysing the essential content of the "corporate university" points out that it is "a training unit strategically directed towards the development of individuals that should act as one team with the purpose of achieving the goals of the head organisation, contribute to the research and improvement of the management" (Dealtry, R., 2010). E.Blass, who introduced comparative characteristics of the corporate and traditional state universities, shares this position. He managed to find out the essential difference between them. If traditional universities strive to raise the educational level of an individual and keep democratic values for the benefit of society in general, then the corporate ones aim at realising the strategic goals of the corporations. "...Reasons for their existence range from increase of competitiveness and changes (corporate university) to providing the population with humanitarian and/or professional education" (Blass, Ed., 2001). Significant differences of the corporate and classical universities may also include the reasons of their emergence. Thus, classical universities appeared as a result of humanity's desire to learn about the world, systematise the process of gaining knowledge and transferring it to new generations. Corporate universities were formed due to the necessity of satisfying the needs of large corporations for making profit through possibilities of their innovative development, ensuring competitiveness on the basis of involving and using highly qualified personnel.

Conceptual analysis of a corporate university is also performed in scientific research of the domestic economists. Thus, T.P. Zbrytska in her definition limits herself to seeing the corporate university as an element of staff training system of all the levels of management and specialists (Zbrytska, T. P., 2013). I.V.Gvozdetska and O.A.Fomova share this position. They associate the development of corporate universities exclusively with the corporate training system, consequently limiting its functions. "An important element of the innovative corporate system from the perspective of relevance of forming the innovative perception by Ukrainian organisations is such a form of spreading knowledge as a corporate university. The corporate university is a

structure, which is the pinnacle of corporate learning and formation of the company" (Hvozdetzka, I. V. & Fomova O. A., 2010). O.M.Gapeyeva and J.M.Sulima identify the corporate university with advanced training courses. "Corporate university is essentially that what advanced training courses are... The super goal of the corporate university is to help a company fulfill its mission and achieve the goals by creating and multiplying knowledge within a company" (Hapieieva O.M. & Sulima Ye.M., 2021).

The introduced definition, in our opinion, is debatable. We consider that studying at the corporate university, unlike advanced training courses, is systematic, while the courses provide narrowly focused knowledge. Moreover, learning within the corporate university has the purpose to not only raise the qualification level of the students, teach them new competencies and skills but also to form a certain type of thinking, awareness of the need for constant knowledge updating, lifelong learning.

Summarising the presented material regarding the content on the concept of the corporate university and how various scholars define this phenomenon we can conclude that the major positions in their interpretations are related to the following points:

- the definition of the corporate university as a structural unit of the corporation, the activities of which are funded by the corporation itself;
- functioning of the corporate university only within the system of the internal staff training and in accordance with the possibility of achieving the strategic goals of the corporation;
- training is aimed at the realisation of the concept of continuous learning considering the solution of various tasks put forward by business and engulfing various target segments of the intended audience;
- quick adaptation and response to the competitive environment changes;
- focus on fulfilling a company's mission, preserving and enriching the corporate culture, raising the level of corporate standards.

It is worth mentioning that in the European countries the term "university" is quite rarely used in relation to the corporate training structure. In addition to this name "centre", "institute", "academy", "business school" may also be applied. The European companies, which use the term "university", explain it in their own way. For example, Daimler Chrysler (Germany) refers to the corporate university as "a place for knowledge and competencies exchange"; Heineken (Netherlands)

describes the corporate university as "an interlink between knowledge transfer and knowledge creation" (Holyshenkova, O., 2016).

In our opinion, the definition of the corporate university should be extended. We offer the following interpretation: the corporate university is a modern educational business model that applies innovative methods of education. This model is adequate for the current stage of the formation of knowledge economy at the global level and reflects the changes in society demands on the educational system related to the transformation of education realities in the XXIst century and realisation of the process of integrating the science, education and business.

The prerequisites for the emergence of a corporate training system in the form of universities are directly related to the implementation of certain functions that arise before companies in a strategic way and provide them with competitive advantages.

The corporate university, by implementing a company's long-term strategy and, accordingly, by coordinating the direction of the internal corporate training, fulfilling the function of teaching and training the personnel at all levels and consolidating the knowledge of the staff, thereby, determines the guidelines for the further development of a company, the structure and principles of the corporate management. Thus, the corporate university becomes the centre of the corporate culture. Besides, it should be noted that, by forming training programs in accordance with the development strategy of a company, the corporate university poses and solves the urgent technological, industrial, organisational, management and marketing problems applying innovative approach that characterises it as an innovative centre.

J.K.Meister, in the work "Corporate universities: Lessons for Building a World-Class Workforce" identifies the following functions of corporate universities:

- realisation of the strategically oriented training and development (based on the corporate competence model including participation of a corporate university in the development and adjustment of the model);
- spread of the corporate culture and values of the organisation;
- development of the culture of organisational learning and changes;
- implementation of corporate standards;
- strengthening of the employer's brand (Meister, J., 2006, March 1).

The purposes of functioning of the corporate

universities are related to the need of providing a company with highly qualified employees, whose competencies must go beyond the narrowly focused ones and ensure the possibility for the staff not only to solve common productive tasks but also, by using critical thinking and non-standard approaches, to orientate and make quick decisions under the conditions of increased global competitive confrontation. It is such companies which, according to Peter Senge, "are constantly expanding their capabilities for creating their future" (Senge, Peter M., 2006), can survive in today's environment and attain high indicators of their activity. The operation of the corporate universities assumes the orientation of educational activity towards implementation of a systemic approach to the professional training and creation of conditions for striving of the employees for constant knowledge and competencies updating and lifelong learning.

The study of the development process of corporate universities in terms of features of the educational process and the goals pursued by these educational structural units of the companies allows to identify several generations of them. The development of corporate universities is connected with the transition from traditional forms of learning and development (first generation) to organisational learning strategy of a company (second generation) and then to the application of virtual elements of the learning process (third generation). The first generation of corporate universities represents a structural unit, a department operating within a corporation, where training is limited to providing knowledge for performing certain typical tasks. The second generation is characterised by orientation of educational programs to achieve strategic goals of the company's development, and the third one considers the growth of the company's intellectual capital as the main direction of its activity. This classification of the development stages was introduced by J.Meister (Meister, J., 2006 March 1). Such scholars as J.Walton and M.Rademaker support her position as for the development stages of corporate universities. J.Walton also includes the units of internal company training in the first generation supplementing their functions with the promotion of corporate values. He associates the transition to the second generation with increased attention to the solution of strategic tasks faced by the company, and the third one, in his opinion, is based on the digitalisation of learning and increase in the range of staff development strategies (Walton, J., 2005). M.Rademaker presents a slightly different, more concise, take on the

distinction of generations of the corporate universities in accordance with their development:

- the first generation – the training department within the organisation;
- the second department – an accumulator of organisational knowledge;
- the third generation – the producer of knowledge (Rademakers, M. 2001).

In terms of defining the types of corporate universities, in accordance with the purposes of their functioning, they can be divided in those, which focus exclusively on a company staff training and those, whose activity aims at solving the innovative tasks, improving the production and creating new competitive goods and services.

Besides, different types of corporate universities can be distinguished according to the categories of learners. Thus, the majority of corporate educational institutions provide their services to the company staff exclusively. It is connected with the orientation of their activity towards the solution of the internal corporate tasks associated with raising the qualification level of their own personnel, improvement of the marketing system, the need to build and develop corporate culture and standards within the company. Along with that, the analysis of the modern trends in development of the corporate universities points to refocusing of their activities on the provision of educational services to all interested persons. In this regard they begin to compete with traditional universities.

An analysis of the practice of establishing corporate universities allows to highlight a few of the most common approaches to implementing this process.

Firstly, a corporate university can be established through the alliance with traditional universities using the professorial-teaching staff of the higher educational institution and its auditory base (for example, Sun University (Sun Microsystems Corporation) and Californian University, Daimler Chrysler University with Harvard University) or involving various consulting service companies using as well their personnel (for instance, Corporate University Enterprise, CyberU). This variant is the most widespread due to the simplicity and low cost of the method.

Secondly, a traditional university may set up its own structural unit engaged exclusively in corporate training and providing companies with consultancy services (Boston University Corporate Education Centre, now called Corporate Education Group (CEG), which was established at Boston University).

Thirdly, a company may set up its own corporate university as an independent structure.

The organisational form of corporate universities also varies. They can be a separate educational structural unit within a company, organised as a consortium (for example, Talent Alliance (corporate association of AT&T, DuPont, GTE, Johnson&Johnson) and Learn Share (General Motors, Owens Corning and 3M) (Lavrysh ,Yu.E. & Lytovchenko I.M., 2018).The corporate universities can also be formed as an association or, if licensed and accredited, have the status of a state educational institution. The simplest organisational form of a corporate university can be considered online courses, often used in large companies that have an extensive network of branches with a wide geography and a large number of staff.

Today's level of economic growth and formation of knowledge economy elements on a global scale puts new benchmarks in the development of corporate universities. Change in educational tasks and objectives, acceleration of the STP and, accordingly, increase in the pace of knowledge obsolescence, predetermined the necessity of forming innovative corporate universities.

Their distinctive feature is their close relationships with production activities aimed not only at solving the problems of current nature but also, to a greater extent, at producing and implementing innovations in accordance with achieving strategic goals of the corporation's activity. Close interconnection and interpenetration of the innovative, industrial and educational activities leads to the enrichment and development of all the listed directions. Thus, in terms of solving the production tasks not only the main areas of study are formed and corresponding training programs are developed but also the industrial problems, that the company may face in the future, are identified and analysed. The formation of strategic directions of development, in its turn, sets certain goals within the realisation of innovative activity of the company. The development and implementation of innovations makes it necessary to correct the goals and content of the educational process due to the changed requests of industrial activities. In such a way, it is resulting not only in solving the tasks of raising the qualification level of the corporate's staff and gaining new competencies by them but also in achieving a higher operating efficiency by mastering new knowledge and implementing

innovations. Therefore, the innovative corporate university becomes a direct control element of the company functioning as the most important business process.

The formation of the reviewed type of a corporate university makes it possible to integrate all the processes and resources of a company within a single project for creating a full cycle of innovation development and implementation. Training programs at such a university focus on the comprehensive solutions to the urgent problems of a company, taking into account all the specifics of the company's business processes and internal and external environment presented in a dynamic way. The practical efficiency of training the company staff in an innovative corporate university is related to the fact that in such a way a single team of specialists is formed, whose activities are aimed at achieving certain results, subject to the strategic goals of innovative activity.

The proper determination of a strategic direction of a company development as the foundation of its further prosperity is inseparably connected with providing the continuous innovative flow, in the creation and discussion of which, in our opinion, it is advisable to involve not only the leadership and specialists but also the whole staff of a company. The organisational form for achieving these goals may be an innovative corporate university as a coordinator of the generation of new knowledge, its realisation in specific projects and further commercialisation of the results of the innovation process. Thus, the priorities of the operation of this type of a corporate learning department and implementation of innovative activities of a company coincide with and are related to:

- the determination of the development strategy of a company;
- the coordination and implementation of the innovation process as a base component of the strategy;
- the provision of a company with the employees possessing a required level of knowledge and competencies for realising innovation processes.

Conclusions and perspectives of further research. The creation of the innovative type of a corporate university can be considered as one of the effective methods of providing the strategic competitiveness of a company on the basis of enhancing the innovative activity as a priority area of investing into the human capital development of a company.

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