

DOI: [10.26565/2786-4995-2024-4-13](https://doi.org/10.26565/2786-4995-2024-4-13)

УДК 658.7:631.15

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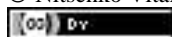
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Entropy management of logistics processes in Ukraine's agribusiness: the role of stevedoring companies under sustainable development conditions

Abstract. In today's environment, entropy management of logistics processes in agribusiness is becoming increasingly important due to the need for continuous development and changes in the external environment. Effective logistics management is critical for maintaining the sustainable development and competitiveness of agribusiness. This paper analyzes the role of stevedoring companies, which play a key role in ensuring the reliability and sustainability of supply chains. The paper also considers aspects related to the regulatory framework and the need to improve it to increase the flexibility and adaptability of stevedoring companies in crisis situations. The study was conducted using a systematic approach, which includes an analysis of economic and political conditions, as well as specific aspects of logistics processes in the agribusiness of Ukraine. The article focuses on the management of entropy processes and their impact on the efficiency of logistics operations. It highlights that the proper organization of logistics processes helps to minimize losses and increase the efficiency of supply, which is key for agribusiness in the context of constant development and change. It is shown that stevedoring companies, due to their ability to adapt to changes, have a significant impact on the efficiency of logistics operations and the economic performance of agribusiness.

The study found that effective management of entropy processes is crucial for supporting the sustainable development of agribusiness in Ukraine. It emphasizes the need to harmonize Ukrainian legislation with international standards to improve the business environment and attract foreign investors.



Thus, the study emphasizes the importance of entropy support for logistics processes in agribusiness and the role of stevedoring companies in ensuring the sustainability and competitiveness of this sector in the context of constant change and development.

Keywords: *entropy, entropy provision, sustainable development, globalization, agribusiness, stevedoring companies, logistics.*

Formulas: –; Fig.: 6; tab.: 5; bibl.: 30.

JEL Classification: Q13, Q18, L92

For citation: Nitsenko V., Mykhailenko V., Riepina I., Tepliuk M., Hanzhurenko I. Entropy management of logistics processes in Ukraine's agribusiness: the role of stevedoring companies under sustainable development conditions. *Financial and Credit Systems: Prospects for Development*. №4(15) 2024. P. 168-180. DOI: <https://doi.org/10.26565/2786-4995-2024-4-13>

Introduction. Nowadays, entropy management in the logistics processes of Ukraine's agribusiness is becoming increasingly important and relevant, especially in the context of the need for constant development and the turbulence characteristic of modern economic conditions. Moreover, it should be noted that the significance of this topic is driven by the economic and political situation concerning the stabilization of Ukraine's agricultural sector, which is one of the leading exporters of agricultural products. Effective logistics management plays a crucial role in maintaining the competitiveness and sustainable development of agribusiness. Given the significant volume of products, proper organization of logistics processes helps to minimize losses and increase supply efficiency. In the context of continuous development and changes in the external environment, stevedoring companies play an essential role in ensuring the reliability and resilience of logistics chains. Their ability to adapt to changes and manage entropy processes directly impacts the efficiency of logistics operations and, consequently, the economic performance of agribusiness. It is worth noting that modern conditions require the implementation of innovative methods and technologies in logistics processes, where the analysis of entropy management allows for identifying new approaches to optimizing logistics operations. This is particularly important under conditions of high risks and uncertainty. In the context of globalization and Ukraine's integration into global markets, compliance with international standards and improvement of logistics infrastructure become key factors for the successful functioning of agribusiness. Stevedoring companies, as important participants in the logistics chain, play a significant role in achieving these goals. Sustainable development requires attention not only to economic aspects but also to environmental compliance. Effective entropy management in logistics contributes to reducing the negative impact on the environment and improving working conditions, which, in turn, positively affects the image and reputation of agribusiness.

Therefore, the study of entropy management in logistics processes in Ukraine's agribusiness, considering the role of stevedoring companies, is a relevant and significant topic aimed at enhancing the efficiency, resilience, and competitiveness of the agricultural sector under conditions of continuous development and change.

Literature Review. An analysis of the literature on the management of entropy in the logistics processes of agricultural business in Ukraine and the role of stevedoring companies in the minds of steel development shows that interest in this is growing among scientists, so among practices. Research on this nutrition was carried out by scientists such as Balobanov O.O. and Palchenko A.A. [1] consider in their scientific work organizational and legal proposals for reducing the work of port operators, identifying key methods of effective management in water transport. Golubkova I.A. ta in. [2] carefully follow the trends in the development of maritime transport, and clearly identify the current trends in the development of maritime transport. In the monograph edited by Shiryayev L.V. [3] dubbed the mechanisms for ensuring financial and economic security of the ports of Ukraine. Kruk Yu.Y. [4] conduct research on the identification and implementation of adaptive management structures in stevedoring companies, proposing solutions for increasing the flexibility and efficiency of decision-making in entropic minds. The appointed authors have made a

great scientific contribution to the investigation of problems and prospects for the development of maritime transport in Ukraine. In addition, I mean the development of logistics processes in the context of warehouse processes and other innovative directions, the development of which is indicated in the work of. Chukurna O.P. [5-7] summarizes a number of important aspects, and the process of improving warehouse logistics in the context of Industry 4.0 technology is discussed, where the authors pay attention to digitalization and automation of logistics processes, which improves coordination and inventory management; At the same time, in other scientific work, the current direct innovative development of transport logistics in Ukraine has been established, as well as approaches to reducing and increasing the stability of logistics themselves. Lanzyug; The next important research and “green” approach to the formation of a modern system of environmental logistics, so the key points focus on the integration and symbiosis of environmental standards and modern development in the process of managing logistics themselves.

In addition to nutritional optimization and modeling of logistics business processes in the agricultural sector, it is highlighted in the research of Teplyuk and in. [8; 9] to demonstrate the timing of increased activity in agricultural business after the COVID-19 pandemic, the articles discuss the approaches to supporting agricultural enterprise and updating the economy, Repina I.M., Yatsenko O.M. [10] The authors focus on the behavior of agricultural traders, looking at the determinants of their strategies.. Osaulenko O. and in. [11], Krasnorutsky O.O. and in. [12] in the monograph the importance of optimization of the formation and recovery of economic potential in rural enterprises, Petrushko L. [13] the importance of steel development for the development of the domestic economy, in particular on the grain case of Ukraine. Kalashnik P. [14] conduct predictive analytics for the development of agriculture directly and the possible growth of investment income. Nitsenko V.S. [15] understand the mechanisms of development of integrated enterprise structures in the agri-food sector.

The scientific contribution to solving the researched issue has not been fully covered, which determined the purpose of this work.

Purpose, Objectives and Research Methods. *The purpose of the article* is to analyze the current state of functioning of stevedoring companies, their contribution to the export-import activities of Ukraine's economy under conditions of sustainable development.

Research Methodology. The methodology involves processing and utilizing scientific research, factual material, statistical data, and reports related to the object of study.

Research Results. Port operators (stevedoring companies) are economic entities that carry out cargo operations within or outside the ports, perform tasks related to the reception and storage of cargo, transport services, and other related business operations [16; 17]. There is an international practice of uniting port operators into associations, whose tasks include protecting their interests before shipowners, trade unions, governmental bodies, and others. Among the main functions of these associations is advocating for the tariffs of stevedoring companies' services. Associations of Ukrainian private port operators, united on a territorial basis, play an increasing role in defending their corporate interests, helping stevedoring companies adapt to external challenges, and increasing their competitiveness. This highlights the relevance of our research topic on entropy management in the logistics processes of Ukraine's agribusiness.

Both private and state stevedoring companies operate within each of Ukraine's sea ports. For example, in the "Pivdennyi" port, there is both a private company and a state port operator - the "Sea Commercial Port (SCP) Pivdennyi". State stevedoring companies, in addition to the payment for cargo transshipment, receive subsidies from the state. The status of a state company provides them with access to port fees and cargo fees. This creates inherently unequal competition conditions for private port operators in the market. A complete list of stevedoring companies of Ukrainian sea ports and the services provided by each is included in the Register of Sea Ports of Ukraine.

The activities of stevedoring companies depend on many factors: the types of cargo handled, the types and deadweight of serviced vessels, the infrastructure used by these companies, etc. [1].

This infrastructure may include various components: warehouses, technological equipment, connections to other types of transport, auxiliary port facilities, and more. However, the defining element of the infrastructure is the berth complexes, without which the operation of stevedoring companies is impossible. Therefore, it is crucial for the port operators' activities whose ownership these berth complexes fall under: whether they belong to the Administration of Sea Ports of Ukraine (ASPU) or private stevedoring companies.

At the same time, private stevedoring companies can use both their own berths and ASPU berths on a rental basis (Table 1).

Table 1. Dynamics of Cargo Handling Volumes in Sea Ports by Stevedoring Companies of All Ownership Forms, thousand tons

Year	State Stevedoring Companies of Sea Commercial Ports	Private Stevedoring Companies at ASPU Berths	Private Stevedoring Companies at Own Berths	Total for Private Stevedoring Companies	Total for Stevedoring Companies of All Ownership Forms
2012	59 386,64	51 226,83	40 371,87	91 598,70	150 985,34
2013	53 071,94	51 616,80	43 489,29	95 106,09	148 178,03
2014	49 153,36	49 551,71	46 161,03	95 712,74	144 866,10
2015	48 981,03	50 917,43	44 747,70	95 665,13	144 646,16
2016	38 416,43	53 515,24	39 814,24	93 329,48	131 745,91
2017	34 730,22	52 509,87	45 315,25	97 825,12	132 555,34
2018	33 354,84	51 136,92	50 679,31	101 816,23	135 171,07
2019	35 214,68	60 958,15	63 828,39	124 786,54	160 001,22
2020	34 379,66	63 303,65	61 359,44	124 663,09	159 042,75
2021	32 880,50	62 095,06	58 249,87	120 344,93	153 225,43

Source: Processed by the author based on data from the Administration of Sea Ports of Ukraine [18].

Strategies for the innovative development of stevedoring companies were based on the prospects for the development of the water sector and the expected rapid expansion of port operators' activities after the end of the war waged by russian proxy units in Eastern Ukraine. During this period, stevedoring companies in the sea ports of Greater Odesa significantly improved their performance. For example, in 2020, stevedoring companies at the Pivdennyi port set a record among Ukrainian sea ports by handling 61,665 thousand tons, and the state enterprise "SCP Pivdennyi" became the most efficient state port operator in the country in terms of cargo handling volume.

At the same time, the stevedoring companies at the Mykolaiv port exceeded the performance of those in the ports of Greater Odesa in terms of grain cargo handling volumes. The exclusion of Mykolaiv port from the grain corridor in 2022 and later from temporary sea routes for commercial transports not only halted the operations of port operators but also reduced budget revenues for the Mykolaiv, as this activity was the main source of budget replenishment. Coordination of marketing efforts with port operators in other countries contributed to the expansion of transit cargo handling volumes [3]. Over a broad time, interval before the full-scale invasion of russia federation, fluctuations in cargo handling volumes by stevedoring companies of all ownership forms at berths of various ownership forms can be observed across the country (Fig. 1).

Furthermore, even during the relatively safe period before the full-scale war, the financial condition of state port operators tended to deteriorate. This is evidenced by the data in Table 2, showing that the financial condition of approximately 60% of state port operators worsened over a short period from 2017 to 2018 [3]. During the full-scale war, the process of transferring the property of state stevedoring companies into concession continues. For instance, on August 24, 2023, the property of the state stevedoring company "Ust-Dunaisky SCP" was transferred to a private owner. At the same time, the data in Table 3 indicate an increase in the volume of domestic cargo handled by private stevedoring companies at berths of all ownership forms before the full-scale war.

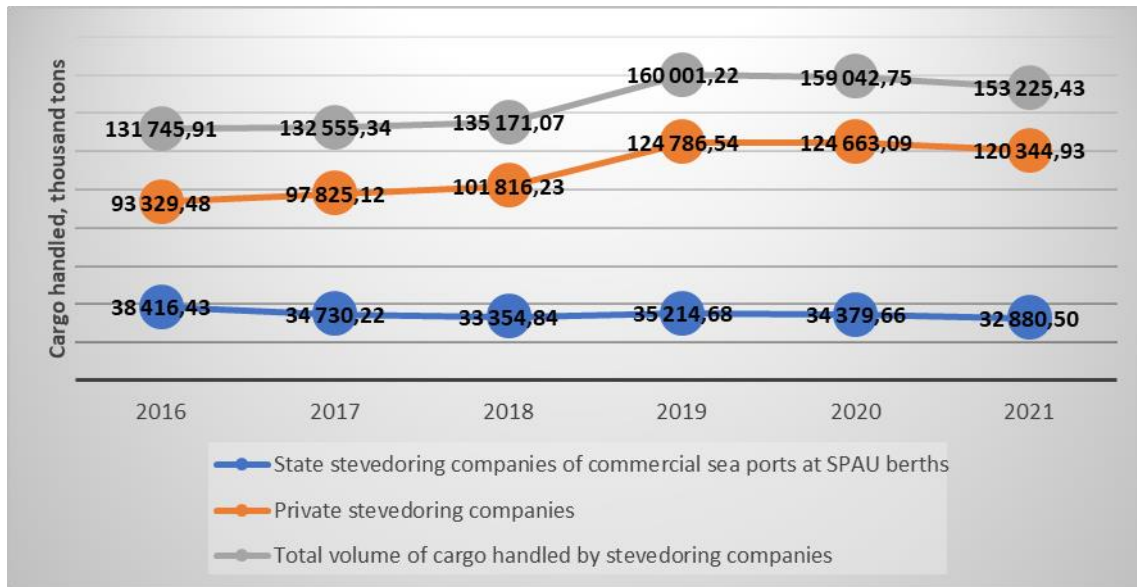


Fig. 1. Comparison of volumes of cargo handling by stevedoring companies of different ownership forms, thousand tons
Source: processed by the author based on the data of the Administration of Sea Ports of Ukraine [18].

Table 2. Assessment of the financial stability of Ukraine's state port operators before the full-scale war

State Port Operators	Years		Deviation	
	2017	2018	Absolute	Relative
Berdiansk Sea Commercial Port	0,95	0,95	0,00	0,00
Bilhorod-Dnistrovskyi Sea Commercial Port	0,88	0,80	-0,08	-9,1
Izmail Sea Commercial Port	0,84	0,88	0,04	4,8
Mariupol Sea Commercial Port	0,94	0,97	0,03	3,2
Mykolaiv Sea Commercial Port	0,96	0,94	-0,02	-2,1
Sea Commercial Port Ust-Dunaisk	0,95	0,91	-0,04	-4,2
Sea Commercial Port Chornomorsk	0,90	0,86	-0,04	-4,4
Odesa Sea Commercial Port	0,99	0,98	-0,01	-1,0
Sea Commercial Port Pivdennyi	0,75	0,76	0,01	1,3
Reni Sea Commercial Port	-	-	-	-
Kherson Sea Commercial Port	0,93	0,82	-0,11	-11,83
Stevedoring Company Olvia	1,00	0,92	-0,08	-8,00

Source: Processed by the author based on data from [3]

The data presented in Table 3 also indicate a correlation between the reduction in the volumes of domestic cargo handled by state stevedoring companies and the increase in the volumes of this type of cargo handled by private port operators. The correlation coefficient of these indicators during the period from 2016 to 2021 was -0.92368. This is especially evident when comparing the changes in cargo handling volumes by port operators in 2021. This confirms the existence of a process of displacement of state port operators from the market for handling domestic cargo in the period before the onset of the full-scale aggression.

Table 3. Dynamics of volumes of domestic cargo handled by stevedoring companies of all forms of ownership at the berths of seaports of Ukraine before the start of full-scale war

Year	Cargo handled by private stevedore companies at AMPU berths, thousand tons	The share of cargo handling for private companies at AMPU berths from the total volume of cargo handled for private companies, %	Cargo handled by private stevedore companies at their own berths, thousand tons	The share of cargo handling by private companies at their own berths from the total volume of cargo handled by private companies, %	Cargo handled by state stevedoring companies at AMPU berths, thousand tons	Total cargo handled by private stevedore companies at their own berths, thousand tons	In total, cargo was handled by stevedoring companies of all forms of ownership, thousands of tons
2016	320,65	25,32	945,51	74,68	3 971,99	1266,16	5 238,15
2017	651,7	76,34	202,02	23,66	984,37	853,72	1 838,09
2018	878,26	62,69	522,61	37,31	730,41	1400,87	2 131,28
2019	832,57	51,71	777,65	48,29	528,04	1610,22	2 138,26
2020	852,24	54,29	717,61	45,71	828,84	1569,85	2 398,69
2021	994,89	45,28	1202,42	54,72	154,78	2197,31	2 352,09

Source: processed by the author based on the data of the Administration of Sea Ports of Ukraine [18].

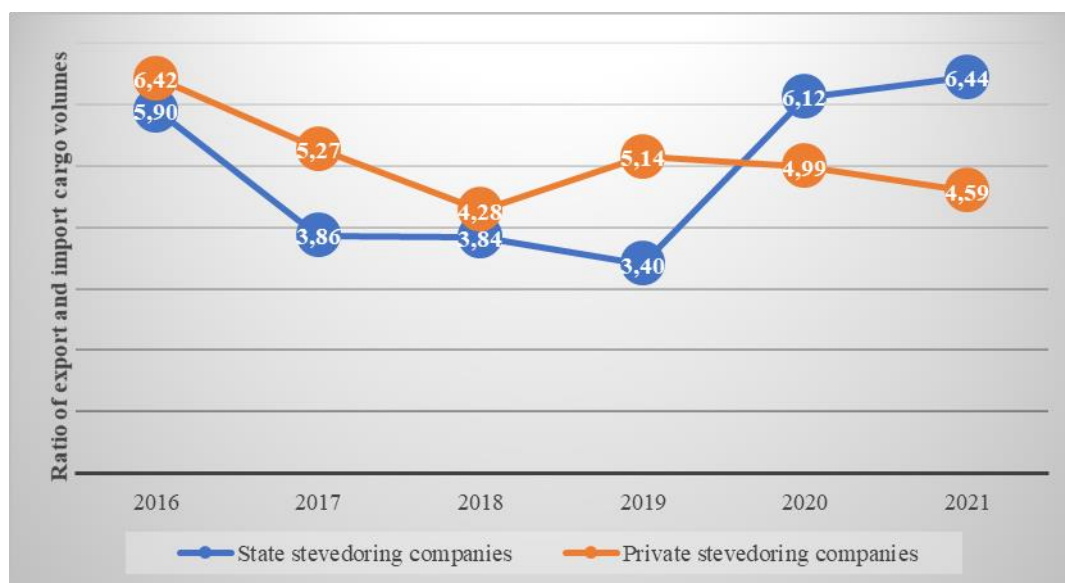


Fig. 2. Ratio of volumes of export and import cargoes for state and private port operators

Source: processed by the author based on the data of the Administration of Sea Ports of Ukraine [18].

The data presented in Fig. 2 show that from 2019 to 2021, there was a change in the ratio of export and import cargo volumes handled by both state stevedoring companies and private port operators. For instance, in 2020, port operators handled 308,099 export containers and 284,253 import containers. In 2021, they handled 311,511 export containers and 298,008 import containers. This indicates that while the volumes of export and import container handling were roughly equal before the onset of the full-scale aggression, by 2023, for every import container handled by stevedoring companies dealing with container cargo, there were three to four export containers. At the same time, the total volume of container handling in 2023 was almost three times less than in 2021. The commencement of container cargo handling by stevedoring companies in the ports of Reni and Izmail improved this indicator, but the improvement accounted for no more than 10% of the total container transshipment volume in 2023 (Fig. 3).



Fig. 3. Dynamics of cargo handling by stevedoring companies of sea and river ports of Ukraine
Source: processed by the author based on the data of the State Statistics Service of Ukraine [19].

During the studied period from 2000 to 2020, and even in the narrower period from 2007 to 2020, an increase in cargo handling volumes was observed for stevedoring companies operating in Ukraine's sea ports, particularly in 2010. However, the prolonged decline in cargo volumes handled by stevedoring companies in river ports indicated significant systemic shortcomings of river transport, which, in turn, had a decisive impact on the activities of port operators. With the onset of the full-scale war with Russia, 10 Ukrainian sea ports were blocked. The date marking the suspension of the maritime blockade can be considered August 1, 2022, when the transport ship "Razoni" with a cargo of corn was able to leave the Odesa sea port. The suspension of the maritime blockade had a significant impact on the country's economy – Ukraine's GDP grew by approximately 3% [14]. During the discussions about the conditions for opening the «grain corridor», the Ukrainian side rejected the aggressor's demands for control over the ports' operations, stating that this should be exclusively managed by Ukrainian port operators [14]. This increased the significance of Ukrainian stevedoring companies on the international level [13].

The results of the restoration of the activities of the ports of Greater Odesa are presented in Fig. 4. These indicators are relatively modest compared to the corresponding figures for 2021 (see Table 4), but their importance for the recovery of port operators' activities is significant.

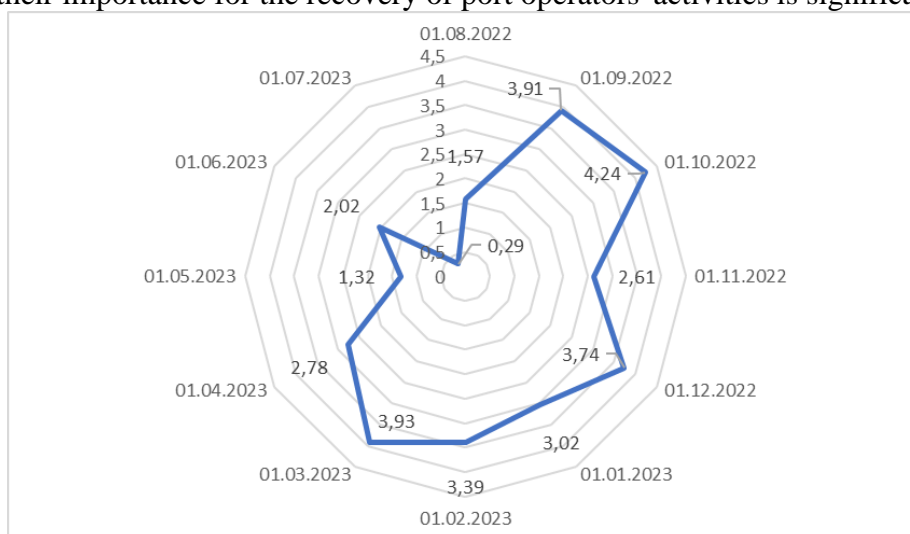


Fig. 4. Dynamics of cargo handling by stevedoring companies of the Great Odesa ports in the period from 08/1/2022 to 07/16/2023 (one hundred thousand tons)
Source: processed by the author based on the data of the Administration of Sea Ports of Ukraine [18].

The integrated data on the activities of the stevedoring companies of the seaports of Greater Odesa in 2022 are presented in Table 4. These data indicate both a smaller volume of cargo handling by the stevedoring companies of the Odesa Sea Trade Port compared to the companies of SCP «Pivdenny» and SCP «Chornomorsk», as well as a relatively narrower range of cargoes handled by the stevedoring companies of the Odesa port. This is particularly evidenced by the significant difference in the value of the handled cargoes between the stevedoring companies of SCP "Odesa" and the port operators of SCP "Chornomorsk" (see Table 4).

Table 4. Results of stevedoring companies of seaports of Great Odesa in 2022

Port name	Volume of cargo processed in 2022, million tons	Volume of cargo processed in 2021, million tons	Share of freight turnover in 2021, %	The cost of processed cargo in 2022, million UAH
SCP «Pivdenny»	15,28	53,47	28,58	670
SCP «Chornomorsk»	11,76	25,64	45,87	565,5
Odesa SCP	7,69	22,57	34,07	261,3

Source: processed by the author based on data [18].

Thus, since July 18, 2023, the work of port operators in servicing the vessels of the «grain corridor» was suspended due to the massive air attacks of the aggressor on the sea ports of Odesa and Chornomorsk. More than two hundred objects of the port infrastructure were damaged, workers of stevedoring companies were killed. But the very next month, thanks to the start of operation of the sea corridor, temporary sea routes for trade transport were restored (Fig. 5) and, accordingly, stevedore activity in the ports of Great Odesa was restored.

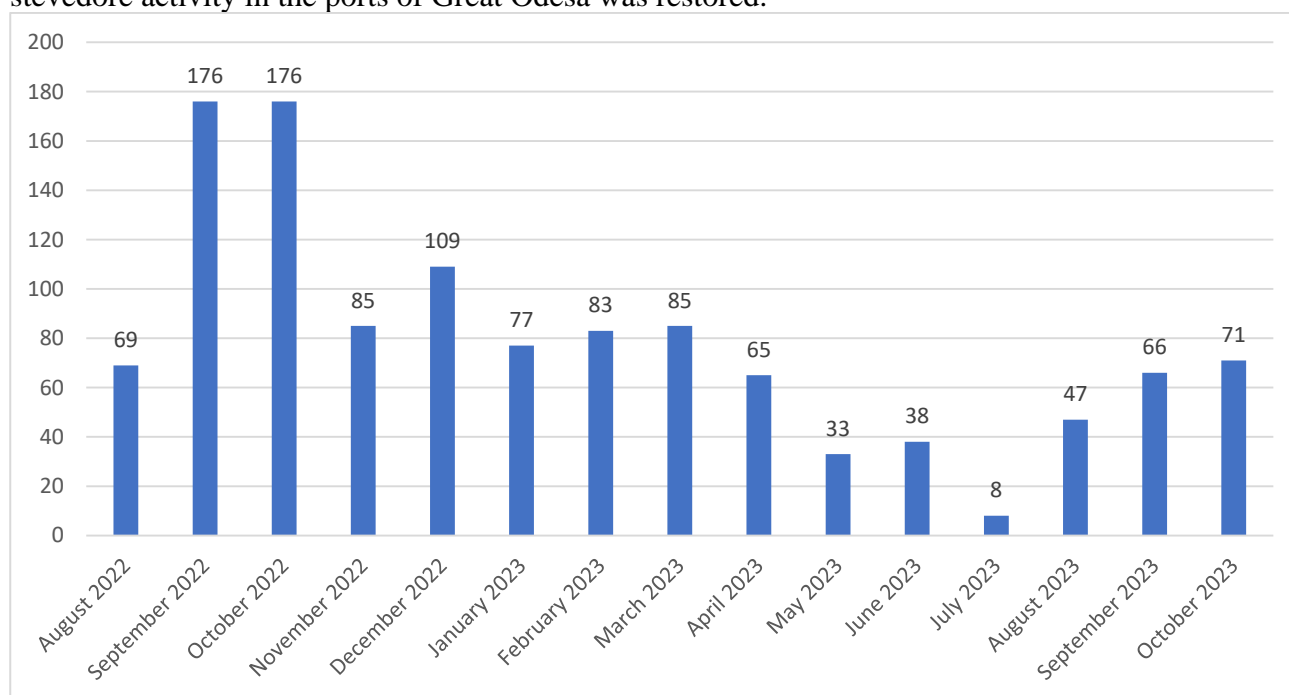


Fig. 5. Number of vessels loaded/unloaded by stevedoring companies in sea ports, unit

Source: processed by the author based on data [18].

This is evidenced by the data shown in Figure 6.

Specifically, Fig. 6 indicates a trend towards increasing volumes of non-grain cargo handling in the ports of Greater Odesa, signaling the beginning of the recovery of full-scale operations by the stevedoring companies of the seaports. It should be noted that the stevedoring companies serving the grain terminals of Greater Odesa's ports, despite the lifting of maritime blockades, are currently operating at no more than 40% of their capacity for handling bulk cargo.

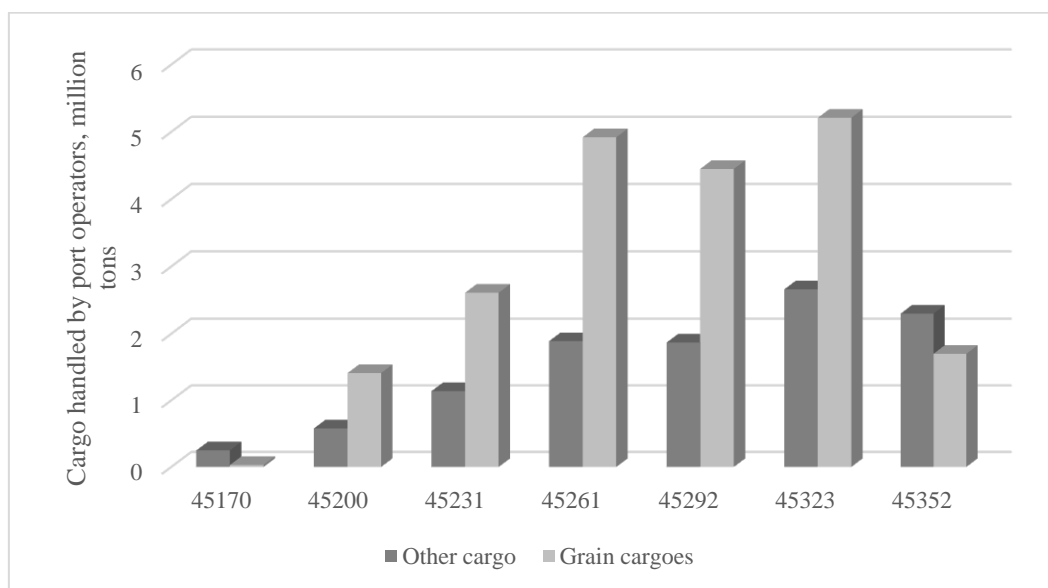


Fig. 6. Volumes of cargo handled by stevedore companies in the ports of Great Odesa by their types from September 2023 to March 2024

Source: developed by the author based on the data of the Administration of Sea Ports of Ukraine [18].

At the same time, the volumes of grain cargo handled by port operators in Izmail have reached the maximum capacity of the port infrastructure. Most stevedoring companies in Izmail operate directly from railway wagons due to the lack of adequate storage infrastructure, which poses significant risks of grain spoilage in case of bad weather. This is due not only to the insufficient throughput capacity of the railway line from Bilhorod-Dnistrovskyi to Izmail but also to poor organization and planning of the stevedoring companies' work, resulting in irregular unloading.

In peacetime, the Danube river ports were less competitive compared to the ports of Greater Odesa. Consequently, the infrastructure of the stevedoring companies in these ports was not ready to handle large volumes of cargo, particularly grain, at the beginning of the full-scale war. If, before the aggression, port operators in the Danube river ports handled up to 200,000 tons of grain cargo annually, currently, the monthly volumes exceed this figure tenfold. To maintain the competitiveness of the Danube river ports in the post-war period, it will be necessary to revise the railway tariffs for transporting grain cargo to these ports, aligning them with the railway tariffs to the sea ports of Greater Odesa.

Thus, the impact of the war has led to significant changes in the activities of the stevedoring companies of the Danube region ports (see Table 5).

Table 5. Results of stevedoring companies of ports in the Danube region

Year	Number of ships handled by port operators, units	Growth relative to the indicators of 2021, %	Volume of cargo handled by port operators, million tons	Growth relative to the indicators of 2021, %
2021	3252	100	4,9	100
2022	8944	275	14,5	275
2023	13045	401	29,4	597

Source: processed by the author based on the data of the Administration of Sea Ports of Ukraine [18].

Stevedoring activity in this region is reviving, with new players entering the market, signaling a recovery of economic activities in the ports despite the risks of war [21]. An example is the commencement of Danube Logistics Group in 2023, providing cargo handling and storage services in Reni and Odesa ports, along with comprehensive transport and forwarding services.

Overall, scholars and practitioners assert [18] that if the main factors affecting water transport activities remain unchanged, the volume of grain transshipment can reach the levels of 2019-2021, amounting to 6 million tons per month. The volumes of other types of cargo handling will also increase, but they will not reach the pre-war levels due to factors unrelated to port activities [20].

Discussion. In the course of the scientific research, our statistics will carry out more in-depth identification of entropic manifestations for further scientific research. One of the key points discussed is the promotion of the concept of entropy management in the logistics process of agricultural business. At the same time, there is a lot of information about how effectively a similar model can be established in real minds, and further research and clarification is required. The article agrees that stevedoring enterprises play an important role in ensuring the sustainability of logistics routes, which confirms the necessity of finding new routes to ensure safety. Prote debate is deprived of nutrition, to what extent the speed and breadth of the enterprise of this galusa can adapt to crisis situations, such as military conflicts and economic upheavals. In the case of Ukraine, you can learn that businesses should keep their finger on the pulse and look at the different vectors of their major development and ensure the praise of Swedish management decisions. At the same time, food itself, despite the need for harmonization of legislation, gives rise to controversy, especially regarding the possibilities of integration into the international logistics system for a flow-based regulatory framework, therefore food is not without concern laws, and the real readiness of the infrastructure. However, it is necessary to note that in the minds of European integration this food cannot be supplied, so there is a need for a well-formed road map and clear planning of specific actions. The very role of the “green” approach to logistics is being debatable, despite its real importance in the minds of the unstable economic and political situation. allow us to stabilize not only logistical problems, but also allow us to establish clear partnerships with stakeholders .

Apparently, it can be noted that the topic is deeply controversial and has direct interest in the development of further research on nutritious foods, which in turn allows for the stabilization and improvement of logistics processes both and inter-lateral ligaments.

Conclusions. As a result of the study on the activities of stevedoring companies in Ukraine's seaports during the full-scale aggression by Russia, it was found that current challenges and problems significantly complicate their operations. Military actions affect logistics chains, transport safety, and the investment climate, leading to reduced cargo volumes due to the occupation and blockade of key ports, and loss of revenue and market share for Ukrainian port operators. The study indicates that the existing legal framework requires improvement to account for entropy management, flexibility, and adaptability of stevedoring companies in crisis situations. Harmonizing Ukrainian legislation with international standards is necessary to improve business conditions and attract foreign investors. At the same time, Ukrainian stevedoring companies have significant potential for recovery and development due to their strategic location and infrastructure modernization opportunities. The efforts of companies within associations are crucial for protecting corporate interests, lobbying for legislative changes, and coordinating joint actions.

This publication was supported by the Ministry of Education and Science of Ukraine 12/27/2023 No. 1572 within the project No. 0124U000632: Neuromodeling of the anti-entropy of the agro-trading logistics system of Ukraine.

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The article was received by the editors 18.09.2024

The article is recommended for printing 28.11.2024

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**Ентропійне забезпечення логістичних процесів в агробізнесі України:
роль стивідорних компаній в умовах сталого розвитку**

В сучасних умовах ентропійне забезпечення логістичних процесів в агробізнесі набуває важливості через необхідність постійного розвитку та зміни зовнішнього середовища. Ефективне управління логістикою є критично важливим для підтримки сталого розвитку та конкурентоспроможності агробізнесу. У роботі аналізується роль стивідорних компаній, які відіграють ключову роль у забезпеченні надійності та стійкості логістичних ланцюгів. Особливо розглядаються аспекти, що стосуються нормативно-правової бази та необхідності її удосконалення для підвищення гнучкості та адаптивності стивідорних компаній в умовах кризових ситуацій. Дослідження проводилося з використанням системного підходу, який включає аналіз економіко-політичних умов, а також специфічних аспектів логістичних процесів в агробізнесі України. Основна увага приділяється управлінню ентропійними процесами та їх впливу на ефективність логістичних операцій. Висвітлено, що правильна організація логістичних процесів сприяє мінімізації втрат та підвищенню ефективності постачання, що є ключовим для агробізнесу в умовах постійного розвитку та змін. Показано, що стивідорні компанії, завдяки своїй здатності адаптуватися до змін, значно впливають на ефективність логістичних операцій та економічні показники агробізнесу. У результаті дослідження встановлено, що ефективне управління ентропійними процесами є вирішальним для підтримки сталого розвитку агробізнесу України. Підкреслюється необхідність гармонізації українського законодавства з міжнародними стандартами для покращення умов ведення бізнесу та залучення іноземних інвесторів. Таким чином, дослідження підкреслює важливість ентропійного забезпечення логістичних процесів в агробізнесі та ролі стивідорних компаній у забезпеченні стійкості та конкурентоспроможності цього сектора в умовах постійних змін та розвитку.

Ключові слова: ентропія, ентропійне забезпечення, сталий розвиток, глобалізаційний розвиток, агробізнес, стивідорні компанії, логістика.

Для цитування: Nitsenko V., Mykhailenko V., Riepina I., Tepluk M., Hanzhurenko I. Entropy management of logistics processes in ukraine's agribusiness: the role of stevedoring companies under sustainable development conditions. Фінансово-кредитні системи: перспективи розвитку. №4(15) 2024. С. 168-180. DOI: <https://doi.org/10.26565/2786-4995-2024-4-13>

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Стаття надійшла до редакції 18.09.2024
Статтю рекомендовано до друку 28.11.2024