

MAIN ROUTES FOR IMPROVING THE EFFICIENCY OF MARITIME TRANSPORT IN THE FACE OF NEGATIVE EXTERNALITIES

^aOLHA PETRENKO, ^bLARYSA RAICHEVA, ^cANATOLII HORBAN, ^dIRYNA TYKHONINA, ^eALINA NECHYPORUK, ^fRUSLANA SODOMA

^{a,c}State University of Infrastructure and Technologies, 9 Kyrylivska Str., 04071, Kyiv, Ukraine

^bInternational Humanitarian University, 33, Fontanska doroha Str., 65009, Odesa, Ukraine

^dOdessa National Maritime University, 34, Mechnikova Str., 65029, Odesa, Ukraine

^eState University of Trade and Economics, 19, Kyoto Str., 02156, Kyiv, Ukraine

^fLviv State University of Life Safety, 35, Kleparivska Str., 79007, Lviv, Ukraine

email: ^aolga.petrenko.bltd.duit@gmail.com,

^blarisa_1991@ukr.net, ^cinnakdavi@ukr.net, ^dihirina19@ukr.net, ^ea.nechyporuk@knute.edu.ua, ^fsodomaruslana@gmail.com

Abstract: The article examines the current features of the maritime transport system. The specifics of the impact of negative externalities on the dynamics of maritime transport and the dynamics of international trade in recent years are considered. The relationship between the dynamics of world GDP growth and the volume of maritime transport is analyzed, taking into account that this industry is dependent on the state of the world economic system. It has been researched that the main way to improve the efficiency of the maritime transport system in modern conditions is the widespread introduction of digital and information technologies in the activities of transport companies. The key advantages of digitalization of the maritime transport system, which consist of the application of flexible logistics principle in business processes, are identified.

Keywords: maritime transportation; efficiency; digitalization; maritime transport.

1 Introduction

The systemic crisis that has engulfed global trade and international trade since 2020 has caused negative trends in the shipping industry, leading to destructive transformations in this sector. The COVID-19 pandemic has threatened the entire system of international shipping and caused a shortage of capacity in the logistics of the goods delivery. The unbalanced regulatory policy of some countries during this period also led to problems with the staffing of transport companies. The intensification of trade wars between the US and China, as well as China's unjustified zero-tolerance strategy towards COVID-19, also had a negative impact on the industry and led to a reduction in turnover in certain areas of economic activity and forced transport companies to reorient their services to other markets. In addition, Russian aggression against Ukraine had a significant impact on the dynamics of international transport. As a result of the international community's adoption of a set of fair sanctions against Russia's aggressive, degenerate, and anti-civilization policy, significant changes have taken place in the structure of transport, including maritime transport.

In today world, maritime transport is considered the most profitable and versatile in both international and domestic trade. Maritime transport plays an extremely important role in international transport and is highly efficient compared to other modes of transport. However, maritime transport is also subject to fierce competition. At the same time, there is a problem of ensuring the efficiency of international maritime transport as a tool for increasing the competitiveness of the transport and production sector. In particular, maritime transport is characterized by relatively high costs of maintaining permanent facilities, which limits its competitiveness on short routes. However, for long-distance transport, maritime transport has the lowest costs compared to any other mode of transport. This property is extremely important, so in most cases, sea transport is preferred. In addition, seaports are an integral part of the transport and production infrastructure of maritime transport, given their location along international transport corridors. In general, the entire competitiveness of the maritime transport system in the global market depends on the efficiency of seaports, the level of their technological and technical

equipment, and the compliance of the management and infrastructure development system with modern international requirements.

Thus, in today's environment, characterized by a significant impact of negative factors on international trade in general and the maritime transport system in particular, the relevance of researching the problems of ensuring its efficiency is growing significantly. Therefore, solving these problems requires the application of new approaches based on the formation of new global trends in economic development, including digital and information technologies.

2 Literature Review

A lot of works in modern economic science are devoted to the study of problematic issues related to ensuring the efficiency of international maritime transport. In particular, studies of improving the efficiency of transportation based on the use of expert, information, and analytical systems, forecasting, and modelling systems that take into account trends in macro- and micro-environmental factors are currently of particular relevance. They are important in the increasing of transport companies' competitiveness, ensuring the growth of maritime transport efficiency, optimizing operating costs, and developing new equipment. This issue has been widely considered in the works of such researchers as I. Balaniuk [1], I. Britchenko [3-11], Y. Danshina [13], S. Koshova [22-23], N. Kunitsyna [25], Y. Pozdnyakov [27], J. Reitšpís [29], O. Shubalyi [34-35], O. Stashchuk [41-42], I. Tsybaliuk [44], Ya. Yanyshyn [53], O. Yatsukh [46], A. Zielińska [48], and many others.

It is also worth noting that the study of ensuring the efficiency of maritime transport is based on the use of the hierarchy analysis method, which allows for predicting scenarios of development strategies and thus can be useful for making management decisions. In this aspect, it is necessary to note the works of such scientists and practitioners as O. Binert [2], Y. Chaliuk [12], M. Dziamulych [14-21], M. Kryshchanovych [24], M. Masl'an [26], O. Ramos [28], T. Shmatkovska [31-33], R. Sodoma [36-40], I. Tofan [43], I. Yakoviyk [45], O. Yermakov [47], and others.

However, as practice shows, the growing number of negative externalities affecting the functioning of international trade leads to the need to develop new managerial and analytical approaches to ensure the efficiency of maritime transport. This requires further research in this area, taking into account the need to apply more effective performance management tools.

3 Materials and Methods

In the process of carrying out the presented research, we used a complex of general scientific and specialized methods of scientific knowledge.

Empirical knowledge is based on the study of reality and practical experience. Empirical research methods are decisive in the research work and ensure the accumulation, fixation, and generalization of the original research material. The data obtained with the help of these methods are the basis for the further theoretical understanding of cognitive processes and create a holistic unity of scientific knowledge.

An important role in scientific research is played by cognitive tasks that arise when solving scientific problems. Empirical tasks are aimed at the identification, accurate description, and detailed study of various facts, phenomena, and processes. Empirical research provides an opportunity to obtain versatile information about the state of phenomena and processes and contributes to the deepening of their quantitative and qualitative analyses.

Comparison is one of the most common methods of cognition, which establishes the similarity or difference of various objects

of research according to certain characteristics. Comparison is the process of comparing objects or phenomena of reality in order to establish similarities or differences between them, as well as finding a common, inherent thing that can be characteristic of two or more objects of research.

Comparisons are widely used to systematize and classify concepts, because it makes it possible to correlate the unknown with the known, to explain new things through already existing concepts and categories. At the same time, the comparison is a prerequisite for analogy.

Visual, or graphic, methods - graphs, schemes, diagrams - make it possible to get a synthesized idea of the researched object and at the same time to visually show its components, their specific weight, and cause-and-effect relationships.

Infometric methods were used in the work. Informatics studies mathematical and statistical methods, as well as models and their use for quantitative analysis of the structure and features of scientific information, and patterns of scientific communication processes, including the detection of these patterns themselves. A characteristic feature of informatics is that its main goal is to obtain scientific knowledge directly from the information.

4 Results and Discussion

As practice shows, today's realities are transforming the operating conditions of the entire transport and logistics sector of global trade, including the system of maritime freight transport. This is due to a number of factors, the key ones being digitalization, the dynamics of domestic markets, the dynamics of international trade, changes in logistics processes, and the introduction of new software into the operations of transport companies. It can be argued that the practical implications for the international maritime transport system caused by the above factors are already noticeable. In particular, the transition to general digitalization, and the introduction of new equipment and software in the activities of maritime carriers have become the determining factors for many transport companies to adjust their business processes.

At the same time, in recent years, there has been a significant decline in the growth of international shipping volumes. And the impact of the global pandemic and other trade risks has even led to a decrease (Figure 1), which has resulted in an overall decline in revenues in the shipping industry.

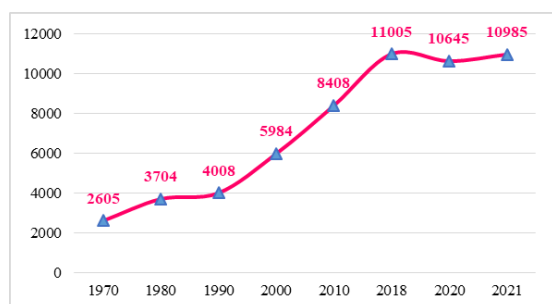


Figure 1. Dynamics of international sea freight in 1970-2021, million tonnes
Source: [30]

As we can see, the crisis trends have resulted not only in a reduction in the volume of traffic but also in direct losses for transport companies. At the same time, it should be noted that the entire global shipping system is highly dependent not only on the dynamics of international trade but also on the economic growth rate of the global economy in general. This is due to the significant influence of globalization, which has so closely linked various economic clusters that their interaction is possible only in conjunction with each other. Therefore, the issue of forecasting the dynamics of maritime transport largely depends on the growth rate of the global economy. This dependence can

be verified by analyzing the dynamics of global GDP and the dynamics of maritime traffic over the relevant period (Figure 2).

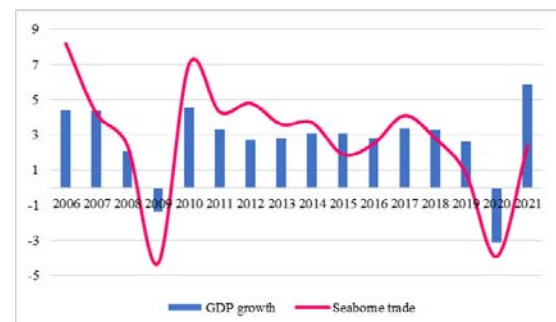


Figure 2. Growth dynamics of international shipping and world GDP in 2006-2021, %
Source: [30]

As we can see, the key points of change in the dynamics of both indicators are synchronized, which can be traced back to the financial crisis of 2008-09 and the COVID-19 pandemic.

Thus, when determining the objective need to improve the efficiency of the maritime transport system, it should be noted that due to the dependence of the transport itself on global economic and political trends, its improvement should relate to the management mechanism of transport companies and raising of the productivity of the analytical apparatus used in the process of planning logistics flows. At the same time, the rational planning of logistics flows in maritime transport involves an efficient procedure for the formation of cargo, and efficient distribution of cargo accumulation costs between the road, shippers, and consignees.

Achieving these objectives in the current environment is possible only through the rationalization of business processes of maritime transport companies based on the use of the latest digital and information technologies. It is understood that the introduction of digital technologies has significant reserves for a sound increase in the efficiency of maritime transport through the widespread automation of business processes, an overall reduction in the time and costs of administrative operations, improved safety, and greater accuracy in the planning and providing transport services. At the same time, the main ways of integrating digital technologies into the system of international maritime transport include the following:

1. The use of the Internet of Things (IoT) – the placement of sensors on ships and containers to track their current location, state, and cargo conditions, which will allow transport companies to more accurately plan their own logistics routes, improve the safety of cargo and generally increase the safety of transportation.
2. Use of cloud technologies – storage and processing of data in the cloud will allow maritime carriers to reduce the cost of building their own IT infrastructure and provide prompt access to information from any location.
3. The use of automated control systems that can provide automated control of the vessel, including control over fuel consumption, cargo condition, route, and other logistics processes, will result in increased efficiency of transportation and reduce the risk of errors.
4. Use of weather monitoring and forecasting systems. Such systems allow for the prompt receipt of information on weather conditions and timely response to natural disasters, which reduces the risk of cargo loss by carriers and reduces insurance costs, that account for a significant share of the cost of transportation, even if ship-owners participate in insurance pools.
5. Use of artificial intelligence and machine learning systems. These technologies can be used to forecast demand for transportation, determine the best route, and optimize schedules and other processes, which increases the

efficiency of maritime transportation and reduces ship owners' costs.

6. The use of electronic document management systems that effectively reduce the time required to process cargo-supporting documents, which reduces the time costs, increases the efficiency of interaction with shippers and consignees, and significantly reduces the risk of errors in making management decisions regarding the planning of transport companies' operations.
7. Use of drones to monitor cargo and ensure safety on board a ship.

In general, it can be argued that the introduction of digital technologies can significantly increase the efficiency of the entire international shipping system, reduce ship owners' costs and improve the safety of doing business in this area. Undoubtedly, the main benefits of introducing digital technologies into the business processes of maritime transport companies are related to cost reduction and acceleration of cargo movement. Moreover, their implementation provides significant competitive advantages for those companies that invest in the development and integration of the necessary software solutions into their own business processes.

At the same time, it is necessary to take into account the need to incur significant costs for the development and implementation of digital software solutions that will form the basis of transport companies' activities, as well as to take into account potential risks related to cybersecurity and data protection. In particular, the main risks inherent in integrated business process management systems include the following:

1. Digital systems may be subject to cyber-attacks, which may result in data theft, destruction of various systems, and in some cases, ransom demands for their restoration, etc.
2. Risk of data leakage – digital systems collect and store a large amount of data on users, logistics, maritime transport, and other processes, which may be subject to data theft and undesirable use.
3. The increase in the number of network-connected devices, including ships involved in transport, may result in unauthorized access to systems and information, which may adversely affect the business processes of transport companies.
4. Equipment failures – digital systems can be sensitive to electrical interference, which can lead to equipment failure and reduce the efficiency of automated transport control systems.

However, it can be noted that the general and most significant advantage of the widespread use of digital and information technologies in maritime transport will be a significant increase in the flexibility of logistics throughout the system. Already, global vessel tracking systems allow managers to plan their use for cargo transportation several months in advance. As the efficiency of systems for monitoring the operation of transport companies and each individual vessel in them increases, the possibility of more reliable forecasting of each stage of the business process in the future is growing. Therefore, digital technologies and software solutions are the basis for ensuring the growth of the efficiency of the maritime transport system.

5 Conclusion

We conclude that in today's environment, improving the efficiency of logistics management in the field of maritime transport requires the development of fundamentally new approaches to ensure maximum efficiency of management decisions at all stages of cargo movement, an appropriate level of interaction with the external environment and the maximum reduction of management costs in business processes. Digitalization makes it possible to solve these problems with the highest possible efficiency by speeding up operations at all stages of freight transportation, which will allow transport companies to create new unique and comprehensive solutions for their customers in the field of cargo delivery. The overall acceleration of the digital transformation of business processes

in the maritime transport sector will make it possible to move all management interactions both within companies and in their contacts with customers online. At the same time, the widespread use of artificial intelligence and chatbots to improve the efficiency of interaction and the effectiveness of management decisions will be crucial to ensuring the appropriate level of competitiveness of maritime carriers in the market.

Literature:

1. Balaniuk, I., Kyrylenko, V., Chaliuk, Yu., Sheiko, Yu., Begun, S., & Diachenko, S. (2021). Cluster analysis of socioeconomic development of rural areas and peasant farms in the system of formation of rural territorial communities: a case study of Volyn region, Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 21(3), 177-188.
2. Binert, O., Sodoma, R., Sadovska, I., Begun, S., Shmatkovska, T., & Balash, L. (2021). Mechanisms for improving economic relations in the milk subcomplex of the agricultural sector: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 21(2), 101-110.
3. Britchenko, I., & Bezpartochnyi, M. (2020). Optimization of commodity stocks the enterprise by means of HML-FMR clustering. *Financial and Credit Activity: Problems of Theory and Practice*, 3(34), 259-269.
4. Britchenko, I., Bohomolova, N., Pinchuk, S., & Kravchenko, O. (2018). Assessment of the determinants of the financial security of railways in Ukraine. *Financial and credit activity: Problems of Theory and Practice*, 4(27), 270-281.
5. Britchenko, I., & Cherniavska, T. (2017). Transport security as a factor of transport and communication system of Ukraine self-sustaining development. *Scientific Bulletin of Polissia*, 1(9), 16-24.
6. Britchenko, I., Drotárová, J., Antonov, M.; Kholodna, J.; Polonska, O.; & Popova, Y. Environmental and economic security in the conditions of digitalization of the Ukraine's economy. *AD ALTA: Journal of interdisciplinary research*, 12(2), Special Issue XXIX, 118-122.
7. Britchenko, I., Drotárová, J., Yudenko, O., Holovina, L., Shmatkovska, T. (2022). Factors and conditions of the environmental and economic security formation in Ukraine. *AD ALTA: Journal of interdisciplinary research*, 12(2), Special Issue XXIX, 108-112.
8. Britchenko, I., Hladchenko, S., Viktorova, L., Pronoza, I., & Ulianova, K. (2022). Information as Element of Enforcing the States Information Security. *AD ALTA: Journal of Interdisciplinary Research*. 12(1), Special issue XXV, 110-114.
9. Britchenko, I., Kraus, N., & Kraus, K. (2019). University innovative hubs as points of growth of industrial parks of Ukraine. *Financial and Credit Activity: Problems of Theory and Practice*, 4(31), 448-456.
10. Britchenko, I., Smerichevskyi, S., & Kryvovyazyuk, I. (2018). Transformation of entrepreneurial leadership in the 21st century: prospects for the future. In *Advances in Social Science, Education and Humanities Research. Proceedings of the 2nd International Conference on Social, Economic and Academic Leadership (ICSEAL 2018)*, 217, 115-121.
11. Britchenko, I., Svydruk, I., Pidlypnyi, Y., & Krupskyi, O. P. (2020). Lessons to Be Learned from Ukraine's Positioning in International Rankings: The Need for Institutional Support and Financial Support for Economic Creativity. *Management Issues*, 18(4), 90.
12. Chaliuk, Y., Dovhanyk, N., Kurbala, N., Komarova, K., & Kovalchuk, N. (2021). The digital economy in a global environment. *AD ALTA: Journal of Interdisciplinary Research*, 11, Special issue XVII, 143-148.
13. Danshina, Y., & Britchenko, I. (2018). Net structure of subject-to-subject relations in the management of the system of administrative services provision. *Baltic Journal of Economic Studies*, 3(5), 108-115.
14. Dziamulych, M., Hrytsenko, K., Krupka, I., Vyshyvana, B., Teslia, S., Tereshko, O., & Fadyeyeva, I. (2022). Features of banks' liquidity management in the context of the introduction of the LCR ratio in Ukraine. *AD ALTA: Journal of interdisciplinary research*, 12(1), Special Issue XXVII, 148-152.

15. Dziamulych M., Krupka, I., Andruschak, Y., Petyk, M., Paslavskaya, R., Grudzevych, Y., & Martyniuk, R. (2022). Banking liquidity risk management in Ukraine based on the application of digital and information technologies. *AD ALTA: Journal of interdisciplinary research*, 12(2), Special Issue XXIX, 102-107.
16. Dziamulych, M., Krupka, I., Petyk, V., Zaplatynskiy, M., Korobchuk, T., Synenko, V., & Avramchuk, L. (2023). Operational efficiency of Ukraine's banking system during the war. *AD ALTA: Journal of interdisciplinary research*, 12(2), Special Issue XXXII, 164-168.
17. Dziamulych, M., Kulinich, T., Shmatkovska, Y., Moskovchuk, A., Rogach, S., Prosovykh, O., & Talakh, V. (2022). Forecasting of economic indicators of agricultural enterprises activity in the system of ensuring their management on the basis of sustainable development: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 22(1), 207-216.
18. Dziamulych, M., Myskovets, I., Zubko, A., Tereshchuk, O., Baidala, V., Voichuk, M. (2022). Formation of the natural resource economics in the system of environmental and economic security. *AD ALTA: Journal of interdisciplinary research*, 12(2), Special Issue XXX, 142-146.
19. Dziamulych, M., Petrukha, S., Yakubiv, V., Zhuk, O., Maiboroda, O., Tesliuk, S., & Kolosok, A. (2021). Analysis of the socio-demographic state of rural areas in the system of their sustainable development: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 21(4), 223-234.
20. Dziamulych, M., Shmatkovska, T., Petrukha, S., Zatssepina, N., Rogach, S., & Petrukha, N. (2021). Rural agritourism in the system of rural development: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 21(3), 333-343.
21. Dziamulych, M., Stashchuk, O., Korobchuk, T., Mostovenko, N., Martyniuk, R., Strelkova, I., & Grebeniuk, N. (2021). Banking innovations and their influence on the formation of digital banking. *AD ALTA: Journal of Interdisciplinary Research*, 11(2), Special issue XXI, 108-112.
22. Koshova, S., Britchenko, I., & Bezpartochnyi, M. (2022). Investment in the space industry: a comparative analysis of Ukraine and the EU. *Baltic Journal of Economic Studies*, 8(3), 2256-0742.
23. Koshova, S., Britchenko, I., & Bezpartochnyi, M. (2022). The essence of financing the space in the post-war period as an integral part of the country's reconstruction plan. *Financial and Credit Activity: Problems of Theory and Practice*, 4(45), 405-415.
24. Kryshchanovych, M., Britchenko, I., Lošonczi, P., Baranovska, T., & Lukashchevska, U. (2022). State Management Mechanisms for the Exchange of Information Regarding Cyberattacks, Cyber Incidents and Information Security Incidents. *IJCSNS International Journal of Computer Science and Network Security*, 22(4), 33-38.
25. Kunitsyna, N., Britchenko, I., & Kunitsyn, I. (2018). Reputational risks, value of losses and financial sustainability of commercial banks. *Entrepreneurship and Sustainability Issues*, 5(4), 943-955.
26. Masl'an, M., & Britchenko, I. (2023). Formation of an integrated system of state economic security. *AD ALTA: Journal of interdisciplinary research*, 12(2), Special Issue XXXII, 159-163.
27. Pozdnyakov, Y., Britchenko, I., Hryniv, N., & Nakonechna, T. (2022). Economic Measurements Methodology of Property Rights To Unbuilt Residential Real Estate Objects Market Value. *Financial and Credit Activity: Problems of Theory and Practice*, 4(45), 133-152.
28. Ramos O. R., Myronenko, Y., Britchenko, I., Zhuk, O., & Patlachuk, V. (2022). Economic security as an element of corporate management. *Financial and Credit Activity: Problems of Theory and Practice*, 1(42), 304-312.
29. Reitšpis, J., Mašlan, M., & Britchenko, I. (2021). Selection and application of appropriate analytical methods needed to assess the risks reducing the security of the protected system. *Baltic Journal of Economic Studies*, 7(3), 1-8.
30. Review of Maritime Transport 2022. (2022). United Nations conference on trade and development. New York : UN. 195 p.
31. Shmatkovska, T., Britchenko, I., Voitovych, I., Lošonczi, P., Lorvi, I., Kulyk, I., & Begun, S. (2022). Features of banks' liquidity management in the context of the introduction of the LCR ratio in Ukraine. *AD ALTA: Journal of interdisciplinary research*, 12(1), Special Issue XXVII, 153-156.
32. Shmatkovska, T., Kulinich, T., Dziamulych, M., Rogach, S., Bilochenko, A., Serdiukova, O. (2022). Analysis of investment efficiency in the agricultural sector of Ukraine on the basis of sustainable development. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 22(3), 649-657.
33. Shmatkovska, T., Volynets, L., Dielini, M., Magopets, O., Kopchykova, I., Kytaichuk, T., Popova, Yu. (2022). Strategic management of the enterprise using the system of strategic management accounting in conditions of sustainable development. *AD ALTA: Journal of interdisciplinary research*, 12(2), Special Issue XXIX, 123-128.
34. Shubalyi, O., Liashenko, O., Rud, N., Shubala, I., Mylko, I., Mykhalychynets, N. (2022). Economic activity of the rural population: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 22(4), 677-684.
35. Shubalyi, O., Rud, N., Shubala, I., Gordiichuk, A., Potomkina, O., Kosinskyi, P. (2021). Assessment of economic activity of the rural population by age and gender groups: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 21(2), 555-568.
36. Sodoma, R., Brukh, O., Shmatkovska, T., Vavdiuk, N., Bilochenko, A., Kupyra, M. & Berezhnytska, G. (2021). Financing of the agro-industrial complex in the context of the implementation of international experience. *Financial and credit activity: problems of theory and practice*, 38(3), 341-350.
37. Sodoma, R., Cherevko, H., Krupiak, I., Andrusiak, H., Brodska, I., & Shmatkovska, T. (2021). Regulation of the lending market and prospects of financial sector stabilization in Ukraine. *Financial and credit activity-problems of theory and practice*, 36(1), 4-13.
38. Sodoma, R., Lesyk L., Hryshchuk, A., Dubynetska, P., & Shmatkovska, T. (2022). Innovative development of rural territories and agriculture in Ukraine. *Scientific Papers. Series "Management, Economic Engineering in Agriculture and rural development"*, 22(4), 685-696.
39. Sodoma, R., Shmatkovska, T., Dziamulych, M., Vavdiuk, N., Kutsai, N., & Polishchuk, V. (2021). Economic efficiency of the land resource management and agricultural land-use by agricultural producers. *Management Theory and Studies for Rural Business and Infrastructure Development*, 43(4), 524-535.
40. Sodoma, R., Shmatkovska, T., Dziamulych, M., Vavdiuk, N., Kutsai, N., & Polishchuk, V. (2021). Economic efficiency of the land resource management by agricultural producers in the system of their non-current assets analysis: a case study of the agricultural sector. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 21(2), 577-588.
41. Stashchuk, O., Boiar, A., Shmatkovska, T., Dziamulych, M., Skoruk, O., Tesliuk, S., & Zintso, Yu. (2021). Analysis of fiscal efficiency of taxation in the system of filling budget funds in Ukraine. *AD ALTA: Journal of interdisciplinary research*, 11(1), Special Issue XVII, 47-51.
42. Stashchuk, O., Shmatkovska, T., Dziamulych, M., Kovalska, L., Talakh, T., & Havryliuk, O. (2021). Integrated assessment, analysis and management of financial security and stability of joint-stock companies operating in the agricultural sector: a case study of Ukraine. *Scientific Papers Series "Management, Economic Engineering in Agriculture and Rural Development"*, 21(2), 589-602.
43. Tofan, I. M., Ahres, O. H., & Shmatkovska, T. O. (2017). Problems in administration of tax on real estate other than land in Ukraine. *Scientific bulletin of Polissia*, 2(3), 148-153.
44. Tsymbaliuk, I. O., Shmatkovska, T. O., & Shulyk, Y. V. (2017). Tax alternatives to implement the tax capacity of internet

activity in Ukraine. *Financial and credit activity problems of theory and practice*, 1(22), 336-344.

45. Yakoviyk, I., Chyzhov, D., Karpachova, N., Hlushchenko, S., & Chaliuk, Yu. (2020). National security policy in Ukraine: a change in the system of power relations of the modern world. *Revista San Gregorio*, 42, 224-235.

46. Yatsukh, O., Demchenko, I., Ilnytsky, D., Tsap, V., & Shmatkovska, T. (2021). Management of banking innovations in the conditions of digitalization. *AD ALTA: Journal of Interdisciplinary Research*, 11, Special issue XVII, 123-127.

47. Yermakov, O. U., Hrebennikova, A. A., Nahorni, V. V., & Chetveryk, O. V. (2019). Investment support and development of social responsibility of agrarian business entities. In *Proceedings of the 34 rd International Business Information Management Association Conference (IBIMA), Madrid, Spain*, 13260-13266.

48. Zielińska, A., Britchenko, I., & Jarosz, P. (2018). Leading innovations and investments into the new energy technologies. In *Advances in Social Science, Education and Humanities Research. Proceedings of the 2nd International Conference on Social, Economic and Academic Leadership (ICSEAL 2018)*, 217, 320-324.

Primary Paper Section: A

Secondary Paper Section: AE, AH