

FaR 2021**International Forum “Freedom and responsibility in pivotal times”****STRATEGY FOR DEVELOPMENT OF A SEA CONTAINER LINE
IN THE DIGITAL ECONOMY**

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Abstract

The subject of the research is the conditions and key problems of forming a strategy for the development of a sea container line in the digital economy. The purpose of the study is to determine the problem field for the effective functioning of the sea container line as a link in the supply chain in the digital economy, which will form the basis for the development of methodological foundations for building a strategy for its development, considering the new business environment. The work used methods of observation, study, and generalization of domestic and foreign experience, analytical, expert. A review of scientific sources was carried out, analytical materials were studied, an expert survey of clients was conducted. It has been established that today digital tools are already used in the operation of container lines, for example, Blockchain technologies, and it is also planned to develop Smart Ship, Smart Port, and Smart Ship technologies. It has been determined that the key problems in the operation of the container line because of the introduction of digital technologies and the Internet of things, are the fight against cyber risks, the reduction of transaction costs (the classification of which is proposed by the authors). The authors revealed an insufficient elaboration of theoretical provisions for building a strategy for the effective development of a container line, considering the use of digital tools aimed, among other things, at minimizing costs and risks, the emergence of which is due to the digitalization of the industry.

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1. Introduction

Empirical studies carried out by the authors over the past five years have shown that today the concept of the Internet of Things is widely used in container transportation both at terminals and in sea lines. Thanks to IoT, such processes are optimized as: automation of vessel capacity, berthing and loading analytics, tracking and control of cargo in real-time at all levels, determining the location, settlements, as well as the time and place of cargo delivery or its breaking, etc. Thus, this technology is applicable and useful for all participants in the process of delivering goods by sea.

In addition to our observational studies, a literature review was made, which made it possible to identify the current main tools used in the logistics sector (Cyber risks in the transport and logistics sector...2021; Cheung et al., 2021; Maersk, 2019). First, there is the Internet of Things (IoT): the concept of a data transmission network between physical objects ("things") equipped with built-in tools and technologies to interact with each other or with the external environment. Secondly, today data mining is already actively used, including the processing of big data, which makes it possible to optimize business processes. As a third tool, it is proposed to highlight Blockchain technologies (smart contracts, etc.): a digital register of transactions and transactions, when using which digital records are combined into blocks that are linked cryptographically and chronologically into a chain using algorithms. All the above tools offer different solutions for transforming business processes both for an individual company and for a container line. It should also be emphasized that their use now should be considered as one of the key conditions for conducting effective business.

The creation of new solutions always leads to the emergence of additional risks and costs, which, to achieve maximum efficiency of the transport process, must be promptly identified and minimized. On the one hand, the process of global digitalization can no longer be stopped, the significance of its implementation in all spheres of the national economy is obvious and is not subject to the slightest doubt. On the other hand, the digitalization process determines the emergence of new types of risks. Cyber risks have already become a rather acute problem, in case of impossibility to prevent which, the entire value chain suffers quite serious losses. As a separate direction in the field of increasing the efficiency of the container line, it is necessary to highlight the presence of transaction costs arising, including through the implementation of digital tools. At the same time, it should be borne in mind that the contradiction already exists, the tools are used in practice, but the theoretical provisions that develop the basis for building an effective development strategy considering the digital transformation of the business environment of the line are absent, which actualizes further research of this issue.

2. Problem Statement

The creation of new solutions always leads to the emergence of additional risks and costs, which, to achieve maximum efficiency of the transport process, must be promptly identified and minimized. On the one hand, the process of global digitalization can no longer be stopped, the significance of its implementation in all spheres of the national economy is obvious and is not subject to the slightest doubt. On the other hand, the digitalization process determines the emergence of new types of risks. Cyber risks have already become a rather acute problem, in case of impossibility to prevent which, the entire value

chain suffers quite serious losses. As a separate direction in the field of increasing the efficiency of the container line, it is necessary to highlight the presence of transaction costs arising, including through the implementation of a lot of scientific works are currently devoted to the study of the transformation of business conditions. In the work (Miroslavskaya & Kozyrev, 2021) it is shown that the digital economy is due to the intensive development of information and communication technologies and is not only a driver of economic growth in our country but also the basis for the formation of the VI technological order. Some authors note the following: thanks to new innovative tools; it becomes possible to provide services at a higher quality level because of meeting the changing needs of customers, which in turn will provide additional value for services (Melenkin & Chesheva, 2020). Davidenko (2021) emphasizes that digital transformations dictate the need to change the enterprise management system since new tools open additional opportunities for interaction. Other authors (Batov et al., 2019) quite rightly, in our opinion, define technologies as a factor that ensures advanced development and contributes to the renewal of the material and infrastructural base. Given the global nature of the digitalization of the world economic system, it is studied by some researchers (Dudin & Shkodinsky, 2021) as a logical continuation of the "evolution of the economic thought of mankind." At the same time, they note that the digital economy, on the one hand, promotes openness to innovation, and on the other, it increases risks. Also, studies have shown that there are very few works devoted to the theoretical foundations of building strategies for the effective functioning of enterprises in the maritime transport industry, and all of them, as a rule, have a narrow focus. It can be argued that today it is time to change the view on the methodological aspects of building a strategy for the development of a container line, considering not only its industry characteristics but also the demand for the use of new tools f digital tools. At the same time, the contradiction already exists, the tools are used in practice, but the theoretical provisions that develop the basis for building an effective development strategy considering the digital transformation of the business environment of the line are absent, which actualizes further research of this issue.

3. Research Questions

The authors identify the following as the key tasks of the study: 1) determination of the current main digital tools used in the field of logistics in maritime transport; 2) study of domestic and foreign experience in building the work of enterprises in the maritime transport industry, as an element of the logistics chain for the delivery of goods by sea from the standpoint of digitalization; 3) determination of the impact of ITC services on the occurrence of transaction costs of the sea container line and their customers; 4) identification of key cyber risks associated with the operation of the container line; 5) interpretation of the results obtained and the formulation of conceptual provisions, construction of a strategy for the development of a container line in new business conditions.

4. Purpose of the Study

The purpose of the study is to determine the problem area for the effective functioning of the sea container line as a link in the supply chain from the standpoint of the digital economy. This will make it

possible to propose methodological principles and highlight the key priorities for building a strategy for its development, considering the new business conditions.

5. Research Methods

The study uses methods of observation, study, and generalization of domestic and foreign experience, analytically and in expert opinion. The study carries out a review of scientific sources, studies analytical materials and performs an expert survey of clients.

6. Findings

Practice shows that today the most common IoT product in container transportation is a smart container. It is used on all major lines, and especially for the transport of refrigerated cargo, where it is important to track the temperature and humidity in the container during transportation. Also important is the real-time GPS tracking of containers. All this becomes possible thanks to the installation of a chip, which makes an ordinary container "smart". Another example of the use of IoT by maritime lines is the development of smart ships. Yang Ming's Smart Ship technology is under active development, with the vessels to be equipped with intelligent information infrastructure for big data collection and cloud transfer, which will monitor the durability of the ship's structure and future awareness of the state of the structure through a dedicated analysis program to ensure navigation safety (Cheung et al., 2021). The IoT concept is also used with other previously listed tools. So, for example, the number of terminals using blockchain, big data, IoT is constantly growing. An example of a smart port project is the port of Antwerp, which is part of a broader smart city initiative (Cheung et al., 2021). The first smart port is constructed in China Xiamen Ocean Gate Container Terminal, which is fully automated with an intelligent control system for all operations from unloading to storage. The terminal uses security applications, including artificial intelligence and augmented reality. The use of these technologies is quite difficult to implement without the use of tools such as big data and IoT. In addition to the above, we note that the Maersk container line, together with IBM, developed the TradeLens blockchain platform, which provides an efficient and secure exchange of information, which fosters cooperation and trust throughout the global supply chain. Shipping companies Hapag-Lloyd and ONE are implementing TradeLens, which provides timely information on the movement of cargo along the supply chain, the ability to store documents, etc. One of the successful examples is the transportation of a container with flowers from Mombasa to Rotterdam, which went all the way using this platform (Maersk, 2019). At the same time, it was determined that in the transport and logistics sector, the most obvious consequences of cyber-attacks are the loss of cargo, transportation, or any other consequences.

A list of key cyber risks when using the concept of the Internet of Things for a sea container line (Overview of maritime transport year 2020, 2020) includes:

- use of personal information for illegal purposes;
- data manipulation;
- abandonment of modern IT equipment;
- tampering with a web product;

- failure of cyber systems;
- low protection of cargo in transit;
- information theft.

In addition to the above, we consider it necessary to emphasize that classical insurance does not cover financial losses associated with cyber-crime. Therefore, the development of cyber insurance is a very relevant area today.

Based on the study of the literature (Sharrock, 2018; Tu et al., 2018), the main consequences associated with cyber-attacks are identified, which can be divided into three groups:

- impact on operational work – disruption or interruption of business processes, decline in turnover, loss of clients / patents / contracts, damage to reputation, decrease in the value of the company;
- additional costs – expenses for legal assistance, crisis management, system and data recovery, extortion, preventive actions to prevent future intrusions;
- legal consequences – administrative and court fines, payment of compensation.

Consequently, the creation and use of ICT technologies, in particular the Internet of Things, determines the emergence of not only positive consequences but also creates the prerequisites and conditions for criminal actions associated with them, as well as an increase in transaction costs. Traditionally, transaction costs are understood as the costs incurred by an organization in the process or completion of a trade or transaction. These often include time taken to close a deal, legal fees, communication fees, or the cost of obtaining information. The use of ICT services in transport and logistics organizations (personal account, online portals, the use of electronic document management, as well as an electronic bill of lading) can both reduce and increase the transaction costs of the company, shipping line, terminal. The use of ITC services can be either positive or negative (Table 01).

Table 1. Positive and negative impact of ITC services on the transaction costs of the sea container line and their customers

| No | Positive effect | Negative effect |
|----|--|---|
| 1 | reduction of time for payment of invoices for payment of goods through electronic document flow | increase in the cost of obtaining information (growth of jobs provided with Internet access) |
| 2 | the use of an electronic bill of lading, which allows you to transfer the right to use the goods from the sender to the recipient at no extra cost | cyber risks (program malfunction, information theft), which directly negatively affects the daily work of all participants in the transport process |
| 3 | the ability to observe rates, transportation in real time, which subsequently helps to reduce transaction costs for concluding a contract | |
| 4 | monitoring refrigerated containers and cargo to timely prevent damage to the cargo, speed up the process of claims in case of problems | |

Note that Table 01 was compiled based on data from a survey of the clients of the sea container line, which was conducted anonymously over the past year. The respondents were regular customers of the line with more than ten years of experience in the maritime business. The influence of ITC services on the transaction costs of the sea terminal (independently studied by the authors by the method of in-depth

interviews of experts – the terminal employees with whom the sea line cooperates) can also be positive (reducing the time for providing information from the line, importers, etc. the terminal's capabilities for loading and unloading operations, inspection operations, etc.) and negative (cyber risks, the need for compatibility of services used by all participants in the transaction, etc.). In the formation of this table 01, the authors' observations were also used, which were carried out over the past five years.

Based on the information presented above, the authors propose the following general classification of the transaction costs of the container line and terminal:

- costs arising from the wasted time when concluding contracts with the container line;
- costs incurred because of delays in the execution of documents, including financial ones, their delivery to the client (via electronic services);
- costs arising from the increase in the amount of time spent by the container at the terminal (including inspection operations, etc.);
- costs arising from the loss of cargo, valuable information (reason: cyber risks);
- costs of using the Internet (special speed, other overstated requirements, including those for ensuring cyber security), special electronic platforms.

Practice shows that for each item from the above classification for a particular company (line, terminal, port, etc.), the costs can be completely different. This happens due to the specifics of the services provided, the scale and scope of the business. In this regard, the authors have proposed a generalized classification, which will undoubtedly be supplemented with further elaboration of this direction.

Taking into account the results obtained during the study, when forming the methodological foundations for building a strategy for the effective development of a container line, the authors believe that this strategy should be based on the principles of adaptability, flexibility, transparency, fruitful cooperation with customers (it involves active interaction aimed at the timely identification of individual wishes in areas of competent use of digital tools, which will ensure the growth of the value of the services provided), as well as compliance with the applied digital technologies.

As the key priorities of the container line development strategy, it is worth highlighting the transition to a new business model and the transformation of business processes from the position of considering it as an ecosystem for the provision of a range of services based on platform solutions (a single digital platform) that ensure the interaction of all parties interested in the transaction, with taking into account their capacities, the level of digitalization and the digital tools used (Internet of things, blockchain, etc.). Authors pay attention to the development of regulations, standards, and requirements for the use of digital technologies by all participants in the transport and logistics process. Special attention is paid to highlight such a direction as cyber insurance, including the development of measures to prevent cyber risks, as well as regulations to prevent and eliminate transaction costs caused by the digitalization of business processes.

7. Conclusion

Now, all sectors of the economy are actively developing following modern developments. At the same time, it is difficult to argue with the fact that the creation of cyber-physical systems has become a key driver and the development of the transport sector based on the principles of digitalization is in demand and relevant. Sea lines, ports, terminals are developing and introducing new technologies that will allow moving

to a higher technological level. Nevertheless, the introduction of ICT technologies into the production process, their imperfections, as well as the incomplete readiness of the business to innovate, create the preconditions for cyber-crimes, the consequences of which can be catastrophic for the entire global supply chain. Transaction costs, formed under the influence of many factors and, first, digital solutions in economics and logistics, are of particular importance today. Their timely detection and identification based on the classification presented in the work will improve the efficiency of the container line and its partners through the development and adoption of preventive measures. Summarizing the above, the authors conclude that it is necessary, when building a strategy for the development of a container line, to focus on identifying transaction costs, predicting cyber risks, and to consider the line as an ecosystem whose business processes are aimed at using digital tools. In this regard, the principles and priority directions of the container line development strategy are proposed, formulated based on studying practical experience and theoretical studies on this issue, the implementation of which will ensure an increase in the efficiency of its operation, including by reducing cyber risks and transaction costs.

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