

## IMPLEMENTATION OF DIGITAL TECHNOLOGIES IN OCEAN FREIGHT TRANSPORTATION

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**Abstract.** *The long-term proliferation of digital technologies plays a crucial role in shaping the economic and societal development. Today, digital technologies are key factors in the development of global supply chains. The implementation of modern digital solutions is taking place on all types of transport, and on the sea in particular.*

Today's societal development processes are characterized by the transition from an industrial economy to a digital one. Information is becoming the most important resource, and the speed of its processing and transmission will determine the efficiency of enterprises and their level of competitiveness.

Digital economy is an economy based on digital computer technologies. The digital economy is also sometimes called the internet economy, the new economy, or the web economy. Increasingly, the "digital economy" is intertwined with the traditional economy, making a clear distinction more difficult. The digital economy refers to the production, sale and supply of goods through computer networks. [1]

The digital economy is based on digital technologies, which in turn can be defined as applied technologies for searching, collecting, storing, processing, transmitting and presenting data in electronic form, the basis of which are software and hardware tools and systems that are in demand in all sectors of the economy, create new markets and change business processes. The technologies that receive the most attention today are Big Data, Artificial Intelligence and Blockchain.

The technology of Big Data is collection, processing and storage technologies structured and unstructured arrays of information which are characterized by a significant volume and speed of changes (including in real time), which requires special tools and methods of working with them.

Artificial Intelligence is a system of software and/or hardware that is able to perceive information with a certain degree of autonomy, learn and make decisions based on the analysis of large data sets, including imitating human behavior.

Blockchain is algorithms and protocols of decentralized storage and processing of transactions, structured in the form of a sequence of connected blocks without the possibility of their further change. [2]

The digital economy significantly impacts the logistics sector, introducing a range of technological advancements and innovations that enhance efficiency, transparency, and connectivity across the supply chain.

Through digital technologies, real-time tracking and monitoring of goods become possible, providing accurate visibility into product movement. This improved transparency enables businesses to optimize inventory management, reduce delays, and enhance overall operational efficiency.

The digital economy brings automation and digitization to processes like order management, inventory control, and transportation management. This streamlines operations, reduces manual errors, and boosts productivity, resulting in cost savings and improved customer satisfaction.

With the digital economy generating vast amounts of data, logistics companies can analyze this information to gain valuable insights into customer behavior, demand patterns, and operational performance. By leveraging data analytics and predictive modeling, informed decisions can be made, routes can be optimized, and resource allocation can be improved.

The growth of the digital economy has fueled the expansion of e-commerce, leading to a higher demand for efficient last-mile delivery services. Logistics providers are adapting to this shift by implementing technologies such as route optimization algorithms, delivery drones, and autonomous vehicles to ensure faster and more reliable deliveries.

The digital economy revolutionizes the logistics industry by introducing advanced technologies and data-driven approaches, resulting in improved efficiency, cost savings, and enhanced customer experiences. [3]

In ocean freight logistics, the most recent digital technology that started to be implemented is Blockchain.

Blockchain is a distributed ledger technology that allows transactions to be securely recorded in a ledger in multiple locations simultaneously and through multiple individuals without the need for central administration or intermediaries. [4] Some logistics processes and documents are involved in Blockchain are presented on the Fig.1.

Several ocean carriers have been exploring and implementing blockchain technology in their operations. Some notable ocean carriers that have shown interest or have piloted blockchain initiatives include Maersk, CMA CGM, MSC, and Evergreen. These carriers have recognized the potential benefits of blockchain in enhancing transparency, efficiency, and security in the shipping and logistics industry.

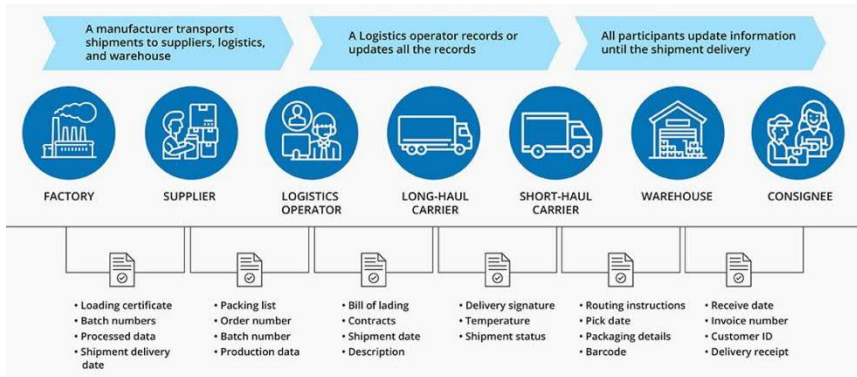


Fig. 1 - Logistics processes with blockchain

In April 2021, leading shipping company MSC announced its decision to adopt WAVE BL. This is a “document courier platform” that electronically transfers paper using blockchain technology. MSC stated that the platform is the only solution “mirroring the traditional paper-based process”. Bills can be digitally encrypted and signed. They’re then transferred between parties on an encrypted Peer-to-Peer (P2P) network. [5]

Since launching global solution in 2021, MSC have issued hundreds of thousands of eBLs. The white paper forms part of MSC ongoing efforts to promote the eBL and fulfil their commitment to achieve 100% eBL by 2030, a goal that is also shared by the eight other ocean carrier members of the Digital Container Shipping Association (DCSA).(Fig.2)

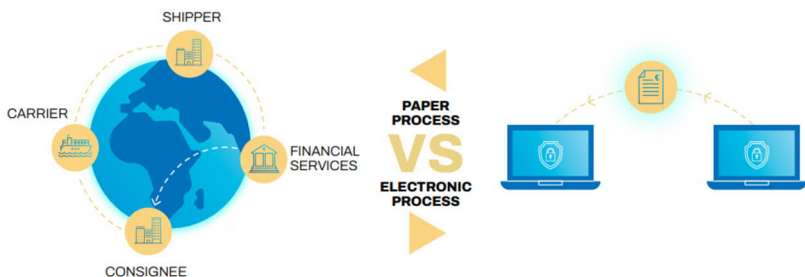


Fig. 2 - BL vs eBL process

MSC defined key advantages of the eBL:

1. **Faster** - The document is transferred in moments, instead of weeks;
2. **Greener** - Paperless process, reduced carbon footprint;

3. Simpler - Easy-to-use platform, accessible from any device and available 24/7;
4. Cost-Efficient - Reduced courier fees, reduced workload and zero paperwork to process or store;
5. Safer - No risk of document loss, forgery, or fraud. [6]

### **Conclusions**

For companies that want to maintain their level of competitiveness in the market today, the use of digital technologies in their activities is very important. In addition, the use of digital solutions contributes to the preservation of the environment, as it significantly reduces the volume of paper document circulation. When implementing digital technologies, companies primarily seek to gain economic benefits, but considering the benefits, one should not overlook the risks that arise during digital transformations. One of the key ones is the risks associated with the protection of information. Companies must create protection systems against both external and internal threats. It is also important to consider the risks of the profitability of digital solutions, since the modern technologies require significant investments and there is a risk that the economic effect of the implementation will not be sufficient to compensate the costs of the project. Therefore, at the stage of planning the introduction of innovations into their activities, companies should analyze in detail not only the advantages, but also the risks and threats that may arise.

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