

## PRINCIPLES OF «SEAMLESS» TECHNOLOGIES IN TRANSPORT LOGISTICS

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### Abstract

An urgent problem in transport and logistics systems for the delivery of goods is long delays in cargo at terminals. In modern conditions of digital transformation of business processes, the strategic task of the transport industry is the implementation of «seamless» technologies. The goal of «seamless» technologies is to achieve high performance of transport and logistics delivery schemes through optimization technological interaction. The implementation of «seamless» technologies in transport logistics is possible through process management based on the integration of information systems of participants in transport and technological delivery schemes in a single digital space. The ways of implementing the principles of «seamless» technologies based on the creation of digital platforms are considered.

**Keywords:** transport logistics, «seamless» technologies, electronic shipping document, multimodal transportation, digital platform, freight forwarder.

### ПРИНЦИПЫ «БЕСШОВНЫХ» ТЕХНОЛОГИЙ В ТРАНСПОРТНОЙ ЛОГИСТИКЕ

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### Реферат

Актуальной проблемой в транспортно-логистических системах доставки грузов являются продолжительные задержки грузов на терминалах. В современных условиях цифровой трансформации бизнес-процессов стратегическая задача транспортной отрасли – реализация «бесшовных» технологий. Цель «бесшовных» технологий – достижение высоких показателей транспортно-логистических схем доставки грузов за счет оптимизации технологического взаимодействия. Реализация «бесшовных» технологий в транспортной логистике возможна посредством управления процессами на основе интеграции информационных систем участников транспортно-технологических схем доставки в едином цифровом пространстве. Рассматриваются пути реализации принципов «бесшовных» технологий на основе создания цифровых платформ.

**Ключевые слова:** транспортная логистика, «бесшовные» технологии, электронный перевозочный документ, мультимодальные перевозки, цифровая платформа, экспедитор.

### Introduction

Technological support of transportation processes has always been a condition for the effective organization of transportation in transport. Technological processes were given a lot of attention. And the more operations were included in the technological process, the more stringent requirements were imposed on the standards for their implementation. This is justified by the fact that the technological processes themselves must be coordinated with each other in terms of the time factor and prevent unproductive inter-technological downtime. Multi-operational technological processes are typical of such types of transport as railway and aviation. Less complex technological algorithms can be used in road transport.

In transport, the problem of reducing long delays of goods at cargo terminals is still relevant, including its handling from one mode of transport to another, documents reissuing and control procedures by government agencies, etc. It is known that downtime at terminals and transport hubs in some cases reach 50-60% of the total time of movement of cargo from shippers to consignees.

Informatization of technological processes and the creation of intelligent systems for information support of transportation processes was at once one of the most effective measures in transport services related to the movement of goods. Information technologies contributed to the improvement of technological processes, the development of manageability in transport and logistics systems. Currently, informatization is acquiring a new conceptual format - digitalization. One of the goals of the digitalization strategy of the transport industry is the implementation of «seamless» technologies, both in national and international traffic [1].

### Main part. Principles of «seamless» technologies

The terms «seamless logistics», «seamless technologies» refer to logistics systems which are to conditionally designate the tasks of reducing, and ultimately, eliminating inter-operational and inter-technological downtime in the process of the movement of logistics flows. Theoretically, the terms are applicable to any industry, but more often they can be found in relation to the transport processes associated with transportation, without which no economic system can function. In modern economic

systems, modern logistics solutions based on digital technologies come to the aid of the transport business. According to the author, «seamless logistics» may well be attributed to the list of logistics concepts such as JUST-IN-TIME, QUICK RESPONSE, KANBAN and others.

The essence of the concept of «seamless logistics» is the desire to optimize the technological interaction between all participants in the transport and technological scheme for the delivery of goods from the cargo owner to the consumer. The goal of such technological interaction should be the minimum and reasonable delivery time, reduction of transport costs, transparency of all business processes with the unconditional safety of the cargo and the safety of its transportation. Considering ways to achieve «seamlessness» in transport and logistics systems, attention is focused on technologies that were previously called end-to-end technologies, but today are «seamless», possibly implying a close logistical connection between them.

The organization of «seamlessness» is especially relevant and complex in multimodal transport and logistics systems, which involve the involvement of carriers of different modes of transport. In these cases, responsible planning of transport and logistics processes is of great importance. With the advent of informatization, for each type of transport, under the influence of objective and subjective factors, «their own» characteristic information technologies have been formed.

The modern period of economic development of the world is characterized by the development of the concept of the digital economy, which involves the digital transformation of business processes. It is expected that digital transformation will eventually change thinking patterns, management methods and work organization using digital technologies [2]. Digital transformation is a process that is associated with the digitization of the description of material resources, the creation of copies of them, the formation of network interaction platforms to obtain the desired result in the process of exposure or the use of automation tools. Digitized data is used to manage business processes, to develop mechanisms for working with digital technologies [3].

Thus, using the existing conceptual attitudes and expectations of scientists and practitioners from the digital economy, we can conclude that

the implementation of «seamless» technologies in transport logistics is possible through process management based on the integration of information systems of participants in transport and technological delivery schemes in a single digital space. The level of integration will determine the level of «seamlessness». An important indicator of digital interaction that can improve management efficiency in transport and logistics delivery systems, especially mixed ones, is the speed of interaction.

Interaction occurs between many entities providing services in the process of cargo flow: cargo owners, forwarders, brokers, stevedoring associations, carriers, operators of rolling stock and storage facilities, public authorities (customs, border, phytosanitary, veterinary and others). Currently, interaction (request for conditions, quotations, transfer of documents, negotiation of contracts, etc.) on various issues takes place by telephone, fax, and the Internet. Issues can take anywhere from an hour to several days to resolve. An increase in the speed of interaction can be facilitated by the creation of a single technological and digital space, or, in other words, a digital ecosystem of transport logistics. The digital ecosystem of transport logistics is a set of information systems and digital platforms that provide close information interaction and systemic exchange of electronic data between its main subjects within the boundaries of a single technological and information space, to solve the problems of effectively promoting material flow in logistics supply chains [4].

The principles of «seamless» technologies were laid down by the UN Convention on International Multimodal Transport of Goods (further – UN Convention), which is the main legislative document in the field of multimodal transport, signed in 1980. These principles include [5]:

close relationship of all participants in the process, especially when handling cargo by various modes of transport;  
prompt transmission of information;  
the minimum number of documents;  
strict coordination of terminal technologies of different modes of transport.

The UN Convention has also proposed logistics solutions aimed at reducing downtime and speeding up the movement of goods in complex multimodal transport and logistics systems. The main achievements of the UN Convention are the introduction of the concept of «multimodal transportation operator» and the need to execute transportation under a single transport document (end-to-end document).

The functions of the operator of multimodal transportation, and they become transport or forwarding companies, are reduced to a centralized organization of the delivery of goods to the recipient. Also, the operator is fully responsible for the cargo after he accepts the cargo. A single transport document defines a multimodal bill of lading developed by the International Federation of Forwarding Associations (FIATA).

However, the multimodal bill of lading has not entered the practice as a single end-to-end transportation document; each mode of transport involved in multimodal transportation has its own established bill of lading.

In the context of digital transformation, new ways are opened to improve the efficiency of intermodal logistics, and the decisions of the UN Convention may be more useful in a new digital format.

One of the ways to implement the principles of «seamless» technologies is to create a digital platform or an electronic platform, based on which a system of end-to-end exchange of electronic transportation documents will be formed, interactions between interested participants in various logistics services related to cargo and other related flows will be carried out. The creation and support of a digital platform should be carried out by system integrators capable of solving the tasks set by the delivery participants, whose information systems are integrated on the platform.

The best solution for organizing a high degree of «seamlessness» is the organization of delivery through the platform, and centralized management, especially in multimodal systems, should be carried out by operators or forwarders, who are considered aggregators in digital conditions.

In the field of using an electronic document in transport logistics, there are some developments. In rail transportation, the task of creating a single digital space, the transition to «paperless» technologies, the essence of which is the conversion of existing documents into digital events, a complete transition from information systems to information management ones, has long been set. Thus, the automated system «Electronic

Transportation» has been introduced in Belarus – a centralized automated system for electronic registration and support of cargo transportation using an electronic digital signature.

All intra-republican rail transportation is carried out using a legally significant electronic transportation document signed with an electronic digital signature. In international traffic, the issues of «paperless» interaction in freight transportation are being successfully worked out with many neighboring railway administrations and customs representative.

In road transport, transportation using an electronic waybill is not widely practiced, only in some experimental cases, although the legal framework and the procedure for interaction have been developed and approved at the legislative level [6]. The problems of road carriers are seen in their conservatism. Basically, these are private companies that do not have corporate unity, as in railway transport. Motor transport organizations operate on market conditions, developing primarily customer services to increase their attractiveness, and the introduction of information technology is more often associated with the primary tasks of improving the efficiency of their own business processes.

### Conclusion

Digital transformation are to implement the basic principles of «seamless logistics» in transport and logistics systems by transferring the details of a transportation document into digital events and accumulating them on a digital platform. The condition for «seamless» logistics is the creation of a digital platform, which should become the basis for the integration of information technologies of delivery participants, especially carriers.

At the same time, it is difficult to unite carriers of various modes of transport participating in transport and logistics delivery systems, due to the different level of development of informatization and readiness for integration, the unwillingness of participants to share their data on transportation, including tariffs. The way out to ensure a high level of «seamless» logistics is seen in the future creation of an expeditionary center based on a digital platform and digital technologies. At the same time, transport and logistics delivery schemes will be characterized by the presence of an aggregator for their rational organization and management of business processes, «seamless» or end-to-end technologies, as well as through tariffs.

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