

fostering global cooperation will continue to grow, making it an indispensable component of our modern society. And thanks to the presence of a single transport system, all types of transport are in interaction and interdependence, complement each other and develop, which ensures the effective use of each type.

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USE OF IDENTIFICATION AND INFORMATION EXCHANGE TECHNOLOGIES IN LOGISTICS

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Logistics, as a key element of modern business processes, is constantly improving and adapting to changes in the technological environment. The introduction of new technologies and the updating of existing technologies in this industry is of great importance for optimizing processes, increasing efficiency and reducing costs. Among the key technologies used in logistics are barcodes, QR codes, RFID and blockchain.

Purpose of the work. To consider in detail the role of identification and information exchange technologies in logistics, to reveal their capabilities and limitations, and to highlight the importance of their implementation for modern logistics practices.

To support our research, we used a wide range of scientific articles, books and online resources related to logistics. The methods of analysis and synthesis were used to study current problems and develop strategies for their solution.

To begin with, barcodes are symbols consisting of black bars and spaces that encode information. They can be read using special scanners or cameras of mobile devices.

Barcodes were first used in 1952 in the United States to identify goods in stores. Since then, they have become widely used in various industries, including logistics, and are now an integral part of many technological processes.[1]

In modern companies, barcodes are commonly used to identify goods, track their movement through the supply chain, control inventory, and automate processes in warehousing and production.[2]

The advantages of barcode technology include:

- Ease of use and low cost of equipment.
- High speed of scanning and identification.

The disadvantages of the technology include:

- Limited capacity, which limits the amount of information that can be encoded.
- Dependence on direct eye contact, which may require additional effort when scanning.

The use of barcodes in logistics can improve the identification and tracking of goods, reduce errors in accounting, and increase the speed and efficiency of processes. The use of barcodes in logistics will help to avoid errors in the identification of goods, reduce the time required to process and dispatch orders, and improve the overall efficiency of logistics processes.

Let's move on to the QR code technology. QR codes (Quick Response Codes) are two-dimensional matrix barcodes that can store more information than regular barcodes.

QR codes were developed by the Japanese company Denso Wave in 1994 for use in the automotive industry. Later, they were widely used in many industries, including logistics.

In modern companies, QR codes are used for quick access to information about goods, tracking their movement, as well as for advertising and marketing purposes.[3]

Advantages of QR code technology:

- Higher capacity compared to conventional barcodes.
- The ability to store a variety of information, including URLs and contact information.

Disadvantages:

- Requires special hardware or software for scanning.
- Can become inefficient with large amounts of data due to limited dimensionality.

The use of QR codes in logistics allows you to improve communication, quickly access important information about goods and orders, and simplifies the process of tracking their movement.

The use of QR codes will help to provide quick and convenient access to detailed information about goods, improve communication between participants in logistics processes, and simplify tracking their movement.

Next, let's take a look at RFID (Radio Frequency Identification), a technology that uses radio frequency signals to wirelessly transfer data between electronic tags and readers.

This technology was invented in the 1940s, but became widely used in logistics in the 1980s. It has evolved over time and has become an integral part of modern logistics systems.

In today's companies, RFID is used for real-time tracking of goods, inventory control, automation of delivery processes, and theft protection.[4]

Advantages of RFID:

- Automatic and contactless tracking of goods.
- Can be used in difficult conditions and over long distances.

Disadvantages of RFID:

- High cost of equipment and implementation.
- Limited reading range, which may require additional efforts to cover large areas.

RFID can improve the accuracy and speed of product identification, reduce losses, increase the efficiency of inventory management processes, and provide greater accuracy in tracking the movement of goods through the supply chain.

RFID technology can help reduce errors in product identification and tracking,

improve inventory control and reduce losses, and simplify and automate logistics processes.

The newest technology on this list, Blockchain is a distributed database that ensures that data is secure and cannot be altered. In logistics, blockchain is used to create secure and non-dated records of transactions, track the origin of goods, and confirm their authenticity.

Blockchain technology was first used in 2009 as the basis for the Bitcoin cryptocurrency. Since then, it has been widely used in various industries, including logistics.

In modern companies, blockchain is used to authenticate goods, create secure records of transactions, track their movement through the supply chain, and increase trust between parties.[5]

The advantages of blockchain technologies include:

- Data security and non-repudiation.
- Transparency and openness in transactions.

The disadvantages include:

- High infrastructure and implementation costs.
- Difficulty of integration with existing systems and processes.

The use of blockchain technology in logistics can improve the security and authenticity of data, simplify and speed up information exchange processes, and increase trust between supply chain participants.

The use of blockchain technology will help reduce the risk of product counterfeiting, increase transparency and trust in logistics processes, and simplify and automate data exchange between supply chain participants.

The introduction of identification and information exchange technologies in the logistics sector is of great importance for increasing the efficiency and competitiveness of companies. Each of the technologies discussed - barcodes, QR codes, RFID and blockchain - has its advantages and disadvantages, but in general they contribute to improving logistics processes and ensuring greater transparency and efficiency in this area.

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MODERN LOGISTICS PROBLEMS AND WAYS TO SOLVE THEM

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Introduction. Logistics is an integral part of modern business, ensuring efficient and optimal organization of supply, production and distribution of goods and services. However, due to the constant development of technology, changes in consumer preferences and the globalization of the economy, logistics faces significant challenges and problems. This article explores the current problems of logistics and ways to solve them.

Purpose of the work. The main purpose of this paper is to analyze the current problems of logistics and highlight potential ways to solve them.

Materials and methods. To support our research, we used a wide range of scientific articles, books and online resources related to logistics. The methods of analysis and synthesis were used to study current problems and develop strategies for their solution.

Results and discussion. Below are the problems and ways to solve them.