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IMPROVING THE EFFICIENCY OF TRANSPORT SERVICES BY INTRODUCING TECHNOLOGICAL INNOVATIONS IN THE SUPPLY OF PRODUCTS

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Most businesses face challenges related to the efficient flow of products in the logistics chain, timeliness of deliveries, identification of the causes of late deliveries and preventing product damage. Services for transportation of heavy goods is no exception. As globalisation continues to grow companies face new challenges in the field of supply and logistics. The introduction of technological innovations allows companies to effectively manage their supply chains and ensure smooth operations, even on an internationally. Today's carriers have to adapt , as consumers are becoming increasingly demanding of speed and reliability of product delivery. The introduction of technological innovations can help companies to improve the quality of their services and reduce costs, making them more competitive in the market. A very important factor in this process is the quality of transport services, which is an important social and economic issue for both settlement and society as a whole. The quality of transport services service depends on the efficiency of the functioning of all economic entities and the population[1].

To improve the quality of service, it is necessary, first of all, to reconcile consumer rights and achieve economic benefits. From this point of view, the

programme development of road transport and transport services is a complete set of socio-economic, industrial and technical measures carried out by organisationally separate participants to achieve a goal or problem at the meso-, macro- or mini-levels, justified and linked by resources, performers and deadlines. Ensuring the appropriate level of development of road transport and transport services, as in the general statement of the problem, is associated with important scientific and practical tasks that are envisaged by business entities and the population.

Integrating technological innovations into transport logistics can be a key factor in achieving this goal. In this section, we will look at how the introduction of the Internet of Things (IoT), mobile apps for shippers and drivers, and blockchain for supply chain logistics can help improve the efficiency of transport services. Let's take a closer look at each of these innovative solutions.

INTERNET OF THINGS (IOT) FOR CARGO TRACKING IN THE SUPPLY CHAIN. The Internet of Things (IoT) in the context of shipping and delivery is proving to be an extremely powerful tool, especially when it comes to tracking cargo at various stages of the supply chain. The introduction of IoT technologies into this process leads to significant improvements in efficiency, security and control of shipments. Cargoes are equipped with sensors and transducers that measure various parameters such as temperature, humidity, pressure, and geolocation. This data is transmitted in real time via the IoT network.

This technology provides up-to-date information about the status of the cargo in real time. This is important for pinpointing the exact location of the cargo, identifying unforeseen delays or other events that may affect delivery. IoT enables route planning and delivery optimization. Data on the movement of cargo allows you to analyze traffic, speed and other factors to ensure the best route. IoT systems can detect any anomalies in the cargo, such as changes in temperature, damage, or container opening. This allows for a quick response to potential problems and ensures a high level of cargo protection.

IoT integration allows businesses and their customers to access up-to-date data on the location and condition of cargo. This increases transparency and collaboration

throughout the supply chain. The data collected from sensors can be used to improve workforce management, determine the most convenient times for loading and unloading cargo.

The overall adoption of IoT technologies for cargo tracking contributes to the efficiency and accuracy of product delivery, making transport operations more transparent, controlled and secure.

MOBILE APPS FOR SHIPPERS AND DRIVERS. Mobile applications have become an integral part of modern logistics, simplifying and optimizing the interaction between shippers, drivers and other supply chain participants. They enable fast and efficient communication, tracking of goods and automation of a range of logistics operations. They allow shippers and drivers to track the location of goods in real time. This not only facilitates delivery control, but also helps to avoid delays and optimize routes. Instead of traditional paper documents, mobile apps provide the ability to create, sign and exchange electronic documents. This reduces bureaucratic processes and speeds up the completion of tasks.

Apps can provide detailed routes and navigation instructions. They take into account traffic, weather conditions and other factors for optimal route planning, and the ability to exchange messages and information in real time simplifies interaction between shippers, drivers and other stakeholders. This is especially important for responding quickly to changes in plans and road conditions. Some applications include electronic departure and arrival logs that meet the requirements of electronic driver time management systems. This helps to comply with working time and rest regulations.

This innovation allows the condition and technical characteristics of vehicles to be monitored. This helps to plan regular maintenance and reduce the risk of accidents. Apps can help optimize deliveries by taking into account various factors such as the size of the shipment, the type of vehicle, the cost of transport and other parameters.

Some apps include electronic departure and arrival logs that meet the requirements of electronic driver time management systems. This helps to comply with the rules governing working hours and rest. Mobile apps can also be easily integrated

with other logistics systems, such as supply chain management or ERP systems, providing a single point of access to important information.

The use of such an innovative solution in the supply chain helps to improve efficiency, reduce time costs and increase the overall quality of service.

BLOCKCHAIN TECHNOLOGY IN PRODUCT SUPPLY. The term blockchain literally means "chain of blocks", where each block is linked to the previous one. A block is an information package that contains all the previous information and some new information. And the entire chain is a database distributed among many participants, operating without centralized management, i.e. there is no intermediary in the form of a single "central server" that stores all information. This lack of centralization is an important element of the technology, as all data is stored on users' computers. All users of the chain are equal and form a network of computers, each of which stores a copy of the blockchain data. It is impossible to hack or "turn off" the blockchain, because as long as at least one computer connected to the network is functioning, the technology will work. Blockchain technology is based on a complex encryption system in which each block has its own unique key. The use of a cipher ensures that users can only change those blocks of the chain to which they have access, i.e. which they own, knowing the corresponding key, without which it is impossible to write to the file. Let's consider the prospect of using this technology in the retail and logistics sector. Given that supply chains are a sequence of delivery points from an initial point to a final destination, it is important to have information on the movement of goods through decentralised records. One of the most universally applicable capabilities of blockchain technology is that it can be a good solution for capturing and controlling elements of supply chains, ensuring secure and transparent tracking of transactions. In today's competitive world, transparency and security are seen as key to business success. Sharing information between all parties in the supply chain can improve relationships between them and make them more efficient. The main factors of using blockchain components that can be useful for improvement in the logistics industry are

- provides access to information about activities within the supply chain;

- enables customers to evaluate products, services, suppliers, and carriers before making a purchase decision;

- provides customers with the information they need about the origin of the goods and the freight route;

- reduces the risk of fraud or counterfeit goods;

- simplifies the exchange of goods and payment systems. [3]

The integration of blockchain technology in transport logistics helps to improve security, transparency and efficiency in cargo management, as well as helps to solve the classic problems of interaction and trust between participants in the supply chain.

In a world where technology is rapidly evolving, the use of innovative supply chain solutions is becoming a key factor in the success of businesses. In this article, we have reviewed a variety of technological tools that simplify logistics processes, ensure accurate inventory management and provide effective demand monitoring. The use of these solutions allows businesses to improve efficiency, reduce costs and increase customer satisfaction. However, it is important to remember that success also depends on the proper integration of technology with business processes and continuous improvement of management strategies.

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MULTIMODAL TRANSPORT HUBS IN UKRAINE

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