

THE SIGNIFICANCE OF INFORMATION AND DIGITAL TECHNOLOGIES IN THE REALM OF LOGISTICS

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Abstract. *This article delves into the pivotal role played by information and digital technologies within the logistics sector. It highlights the primary trends associated with the digital transformation of supply chains, outlines the potential applications of digital technologies, and conducts a comprehensive analysis of cloud services within logistics. The article further explores the process of implementing digital technologies, elucidates the advantages of big data analytics, and tracks the evolving efficacy of digitizing supply chain systems. Additionally, it offers valuable recommendations for selecting the most suitable information technologies for logistics operations. The article underscores how information technologies enhance organizational and communication capabilities, ultimately concluding on the contemporary significance of information and digital technologies.*

Keywords: *logistics, information and digital technologies, cloud services, computer programs, cloud services.*

Information logistics represents the flow of information, serving as the connecting threads that link all elements of a logical system. The challenge arises when the market imposes substantial demands on businesses. There is a need to rapidly modernize production, better control prices, account for expenses, analyze the efficiency of individual orders and products. In various industries, the shift from large-scale production "for storage" (at the manufacturer's discretion, i.e., specific orders at the start of production) is increasingly moving towards custom production for specific orders with fast deliveries. Information technology can significantly contribute to meeting these requirements and solving this problem. While a certain level of efficiency can be achieved through local computing systems, transparency and flexibility are significantly enhanced only through the use of integrated information and management systems that transcend the boundaries between enterprise divisions [3].

Here are the 10 key trends in the digitalization of supply chains in industry and commerce:
Consumers will demand faster delivery times and a variety of options for "last-mile" delivery.

Companies will localize warehouse construction.

Improvements in transportation infrastructure by governments will drive the development of digital logistics.

The boundaries defining the peak shopping season will blur, requiring greater flexibility in logistics through predictive analytics and advanced forecasting.

Companies will seek to improve their relationships with 3PL (third-party logistics) providers.

Variable logistics operations will become the norm.

NEW Waves technologies (blockchain, the Internet of Things, artificial intelligence, virtual reality, machine learning) will require a reassessment of logistics strategy.

Specialized stores will remain relevant.

Customers will demand increased transparency in logistics operations.

The openness of logistics to new digital technologies will increase [5].

These trends create prospects for the application of digital technologies in the field of logistics. Specifically, a key direction in the development of information technologies in logistics is the integration of information flows and communication support for the transportation of goods. These directions are associated with integration processes in the economies of developed countries and represent a new scientific and practical field known as telematics. The development of this field is oriented towards the active utilization of computational systems and information networks [2].

The process of implementing digital technologies occurs in stages:

The initial stage involves accumulating experience in using personal computers (PCs) and automating accounting calculations for specific tasks.

The control stage focuses on stabilizing the PC infrastructure, defining their areas of application, conducting information searches on the internet, and establishing local networks within the enterprise.

The integration stage encompasses various network solutions, decentralizing management using PCs, and establishing a new organizational foundation for enterprises based on the widespread use of complex corporate information systems integrated into the internet [4].

In the private sector, many leaders have already recognized the importance of data and its role in supporting digital technologies and innovations. They have identified the concept of Big Data as one of the cutting-edge factors for future success. The adoption of this technology has become widespread due to its cost-effectiveness. 79% of businesses believe that Big Data will have a significant impact on profitability, and 59% of executives will use it to gain a more comprehensive understanding of customer needs.

Big Data technology enables efficient acquisition, integration, storage, and utilization of data generated by supply chain agents.

It is important to highlight the advantages of Big Data analytics (BDA), which enable organizations to enhance the efficiency and quality of their business processes through effective management [7].

Currently, the marketplace offers a genuine diversity of options for the development and delivery of automated personnel management systems and cloud services in the field of logistics, both local and Western. Among the advantages of local software packages are their adaptability to the local accounting and workflow system, as well as their lower cost compared to the most well-known Western packages [8].

To determine the feasibility of applying a particular class of information systems in logistics, the methodology of foresight research can be utilized. Within this framework, information on key trends and information technologies in logistics, enabling breakthrough and innovative activities for industrial organizations, is identified and systematized. The selection of experts, verification of results, and the principles of conducting expert panels play an important role in this process.

Recommendations for choosing information technologies in the logistics activities of a company are based on the comparison of performance indicators of the specific company and its subsidiary units, external environmental factors, analysis of existing and potential markets, as well as the nature of the information systems/technologies already in use within the organization.

Cloud services are a concept/technology for providing convenient network access on-demand to a collectively shared and customizable set of computing resources (such as networks, servers, data storage, applications, and/or services) that users can readily deploy for their tasks while minimizing interactions with the service provider or their own management efforts. This concept aims to enhance the accessibility of computing resources and includes three service models:

Based on the above, cloud services for small companies consist of applications for automating business processes, distributed via the Software as a Service (SaaS) model through the cloud and accessible to a broad range of customers at an affordable price. Additionally, there are three main models of cloud services:

Cloud Software as a Service (SaaS) - cloud software as a service.

Cloud Platform as a Service (PaaS) - cloud platform as a service.

Cloud Infrastructure as a Service (IaaS) - cloud infrastructure as a service[1].

Today, cloud services are widely used by IT companies and system integrators (including SAP, Oracle, Infor, IBM, Generix, Visagio, and others) for managing logistics business processes in supply chains.

The advantages of using cloud technologies in logistics and supply chain management (SCM) can be highlighted as follows:

Cloud services make the automation of supply chain business processes significantly more accessible.

The cost of cloud services continues to decrease, and implementing such applications becomes easier and faster. Cloud solutions do not require any capital expenditures (such as purchasing servers and technical support), resulting in reduced production costs and operating expenses.

Cloud technologies enable supply chain participants to enhance the speed and accuracy of key logistics business processes, which is crucial in meeting customer orders. Companies that do not use cloud services are forced to spend their time on data backup and recovery in case of IT system failures, leading to a decrease in operational efficiency [4].

The high complexity of supply chains and the inherent risks associated with both demand and resource supply, especially during economic downturns, are recognized as key inhibiting factors in achieving high levels of supply chain efficiency. The role of using modern decision support systems in the field of information technology is rapidly becoming an indispensable tool for designing and managing complex network structures of supply chains (SC).

SCs are complex adaptive systems with a large number of nodes and intricate interactions between their active elements and participants. In the face of external environmental changes, the dynamics of decision-making in management intensify, necessitating responsive actions in near real-time to address disruptions, critical situations, events, and conflicts that may arise among different SC participants [5].

Information technologies do not merely enhance the quality of logistics but are a necessity in the modern world, also expanding the organizational and communication capabilities of market participants at various levels [9].

The process of implementing information technologies is an integral part of the functioning of logistics in the modern world. Information technologies contribute not only to improving the efficiency of information exchange and processing but also to reducing losses and disruptions in the operation of logistics chains even at the planning stage. Even with an initial technological level of integration of informational elements into logistics, the quality of flow management processes within the enterprise is enhanced. New opportunities for real-time monitoring of the movement of goods and production processes emerge [10].

Based on the results of the conducted research, the role of information and digital technologies in the field of logistics provides significant advantages and opportunities in this domain.

Throughout the study, the primary directions of information technology development were analyzed, and it can be concluded that they bring about convenience and high-speed information exchange among producers, suppliers, and buyers. They also entail relatively low costs for maintaining and servicing computer equipment, facilitate the transfer of large volumes of data, and result in minimal delays.

The research also delved into some contemporary delivery methods within the logistics field. The evolution of integration, including information integration, initiates the formation of a digital ecosystem that enables the offering of comprehensive services to customers.

In this study, cloud services were analyzed, which can assist participants in value chains in working more closely together. Companies in supply chains can either independently form and organize a digital ecosystem or focus on a niche service that enhances the value of customer service.

The paper underscores the exceptional role of information and digital technologies in the logistics field, emphasizing that their use will lead to more adequate results in the digital transformation of supply chains across various industries. It is essential to consider this when shaping a quality management system for any organization, regardless of the specific nature of its business and target markets.

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