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DIGITAL SOLUTIONS IN SUPPLY CHAIN MANAGEMENT

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Abstract

This study reflects trends in digital transformation in global supply chain management. It provides an overview of digital transformation by region in 2024 and highlights further initiatives through 2030. It is emphasized that digital transformation integrates the development of advanced technologies in supply chains. It is noted that through the use of digital solutions in supply chains, it will be possible to anticipate possible risks, speed up logistics operations, improve management decisions, and ensure uninterrupted information exchange. An example of the use of artificial intelligence to solve the problem of information exchange at the supplier level in supply chains is presented. The main software products that are most relevant in the use of modern companies for the digitalization of logistics processes are highlighted: TMS, CMS, WMS, ERP and SCOR:DS. The author presents those technological and digital developments that will help shape the landscape of global changes in supply chain management.

Keywords: digital transformation, supply chain.

Introduction

The global digital transformation market was estimated at USD 1070.43 billion in 2024, and is expected to grow by 28.5% from 2025 to 2030 [1]. The digital transformation of any business helps companies take advantage of the latest technologies to improve the quality of goods or services. The North American region is considered to be the leader in the use of digital transformation in the international market, dominating the global industry with a revenue share of over 43% in 2024. Digital transformation has played a special role in the container technology sector, thanks to significant investments in startups developing advanced container solutions. Market trends in other regions of the world also provide for further implementation of digital transformation initiatives, in particular [1]:

- Europe and the UK – expected to grow to 29% due to the implementation of Industry 4.0 initiatives combined with artificial intelligence, machine learning, automation and digitization of business operations;

- Asia Pacific – expected to grow to 31.2% due to the use of artificial intelligence-based analytics tools and BigData for various business processes;
- Middle East and Africa – emphasis on machine learning, business intelligence and artificial intelligence combined with cloud technologies.

Supply chains are an area where digital transformation ensures the integration of various advanced technologies at every stage of the material flow, stimulating the acceleration of logistics operations, management decision-making and the seamless exchange of information between all involved parties. As a result, logistics teams are freed from low-value-added tasks (e.g., filling out waybills, etc.) and can focus their resources on managing more strategic processes.

As today's global supply chains become increasingly complex, the adoption of digital technologies provides an opportunity not only to stay ahead of the competition, but also to anticipate existing risks. For example, businesses may face problems such as supplier instability or unexpected disruptions due to unforeseen events (e.g., natural disasters, military conflicts, etc.). Most of the risks are usually solved by information exchange. For example, by using artificial intelligence, Semantic Visions [2], a global leader in supply chain data analysis and technology, has learned to identify hidden information links, risks, and potential failures that are often overlooked when working with first-tier suppliers to track and analyze relationships with suppliers at all levels of the supply chain.

Some digital solutions can be considered classics in managing supply chains and various stages of material, information, and financial flows in companies. Among them, in particular, are systems that help improve management in the context of certain logistics functions [3]. The main software products in the digitalization of logistics processes include:

- Transport management system (TMS);
- Cargo management system (CMS);
- Warehouse management system (WMS);
- Enterprise resource planning system (ERP).

At the same time, the basis of digitalization in supply chain management is the Supply Chain Operations Reference (SCOR), which is the only comprehensive, generally accepted and open standard in supply chain management used by large and small companies. This management system was developed by the Supply Chain Management Association (ASCM). It is worth noting that SCOR is not a static set of standards [4]. The SCOR Digital Standard platform itself is the latest iteration of this system, characterized by full digitalization and openness. The advanced version of this system makes

it possible not only to create and manage business processes in supply chains, but also to manage performance through continuous improvement, data and information management, regulate and comply with regulatory requirements, sign contracts, manage risks, take into account environmental impact, ensure cyclic supply chain management, etc.

The future of supply chain management is promising. Thanks to advanced software solutions using modern information technologies, such as the Internet of Things (IoT), BigData, artificial intelligence, blockchain, etc. and the widespread adoption of 5G communication technology and quantum computing, it will be possible to revolutionize supply chain optimization and shape the landscape of global change with new market opportunities.

Conclusions

Today, the international market is characterized by an extremely high degree of uncertainty, so maintaining a single competitive advantage in the supply chain is difficult to ensure in the long term. However, the digital transformation of its own business processes using advanced and adaptive information technologies will conceptually reformat the existing vision of the company's strategic development and approaches to supply chain management. It should be noted that the digitalization of the company should be based on joint inter-integrating solutions with the trends of the present.

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