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THE ROLE OF INFORMATION TECHNOLOGY IN MANAGING GLOBAL SUPPLY CHAINS

Rostislav Popov
State University of Infrastructure and Technologies, Kyiv, Ukraine

Abstract

The article discusses the peculiarities of using information technology in the management of global supply chains. The author emphasizes the importance of digital transformation of supply chains in order to improve their management and ensure smooth interaction with stakeholders around the world. The author presents the evolutionary process of development of innovative technologies, which has become a prerequisite for the formation of the fifth industrial revolution, Industry 5.0. An example is given of the international logistics company DHL, which has developed a logistics trend radar for its customers and the logistics community. It consolidates the key trends in logistics, where artificial intelligence (AI) and sustainability play a leading role. It describes several trends in the use of information technology that have a direct impact on global supply chain management, namely: automation and process optimization; monitoring and tracking; forecasting and analytics; global integration and communication.

Keywords: supply chains; information technology; digital transformation.

Introduction

Geopolitical relations between countries around the world have a significant impact not only on international trade but also on the formation of supply chains. The globalization of the world economy has been developing in waves for a long time, and recent events in the world are no exception. The COVID-19 pandemic, geopolitical upheavals in the economies of most countries, which provoke strategic risks in the future and those already reflected in the war in Ukraine, create uncertainty today and provoke instability and vulnerability in doing business.

Supply chain formation is a complex phenomenon that describes the process of creating a network of connections between the actors involved over intra– and multi-continental distances. As logistics companies strive to optimize and adapt their business processes to meet the challenges, innovation has become a key factor. The use of IT technologies helps to increase

efficiency, transparency, and sustainability in their management, thus transforming traditional supply chains into digital ecosystems.

Digital transformation is the main driving factor in the logistics industry and innovation is inevitable for its prosperity. It is worth noting that innovation processes in the world, which have transformed various business sectors and society, have developed in several waves:

1. The introduction of new technologies in the textile industry and the expansion of hydropower (1785-1830).

2. The development of steam power, the expansion of railroads and the importance of the steel industry (1845-1900).

3. The invention of electricity, the internal combustion engine and mass production (1902-1924).

4. From radio to information technology and from television to computers. This wave of innovation was marked by the crash of 1929, but it marked the next waves of innovation, which today is dominated by information technology.

5. Invention of the microprocessor, personal computers and the mobile revolution – early 1970s. This wave reached its peak with the spread of the Internet and the emergence of mobile technologies in the early 2000s. This period is characterized by the digitalization of information and communication, which has changed the way people interact, work and consume.

6. The era of sustainable technologies – energy transition and Artificial Intelligence (XXI century) [1]. The presented evolution of innovative technologies has become a prerequisite for the formation of the fifth industrial revolution, Industry 5.0, when its three main elements – smart devices, smart systems, and smart automation – fully merge with the physical world in cooperation with human intelligence [2].

Understanding and harnessing these waves is crucial to maximizing the transformative power of innovation in the transportation industry. There are many innovation trends for the development and operations of various supply chain actors. Taking into account key data from thousands of interactions with stakeholders, internal experts, research and development partners, startups and customers, the international logistics company DHL has developed a logistics trend radar that provides an in-depth and unparalleled analysis of logistics trends, their impact and opportunities that can be used to support and grow the logistics business [3]. According to this radar, today's logistics trends include e-commerce, which is a digital economy sector that has united various businesses through online commerce, where well-established supply chains

ensure efficient delivery of goods to end users. The introduction of modern information technologies into supply chains has paved the way for more structured and efficient data exchange. Let's look at a few trends that have a direct impact on their operations, helping to reduce human errors, optimize costs and improve the quality of service delivery:

– Automation and process optimization, such as ordering goods, customer communications, delivery tracking, inventory management, etc;

– monitoring and tracking, in particular IoT (Internet of Things) and tracking systems used to monitor the movement of goods in real time (for example, sensors with IoT SIM cards that are installed on containers to track their location) [4];

– Forecasting and analytics: in particular, the use of Big Data tools to process a large amount of information and establish complex interdependencies between different indicators or parameters (for example, choosing the optimal location of a warehouse in relation to existing customers);

– global integration and communication through the use of unified information platforms or cloud environments for information processing, in particular, this is interaction through an integrated management system, i.e., an ERP system (Enterprise Resource Planning), which today is not just a highly specialized solution, but has become an information platform for ensuring effective communication between various participants in global supply chains, including suppliers, manufacturers, distributors and consumers.

There are many other modern technologies that enhance global supply chain management and seamlessly help to interact with partners around the world, which allows for faster movement of material and related information and financial flows, reducing costs and ensuring timely deliveries.

Conclusions

In today's world, supply chain management is impossible without the use of information technology, as the integration of the latest IT solutions is becoming an important component of companies' competitiveness in the global economic environment. Leading logistics companies are building their own digital supply chains using the most advanced information technologies to better understand each participant: from the entry-level supplier to the end consumer.

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