

INNOVATION AND SOLUTIONS IN BUSINESS LOGISTICS

Thanish THOMAS, Vytautas Magnus University, Agriculture Academy, Faculty of Bioeconomy Development,
email: thanish.thomas@vdu.lt

Abstract

Logistics plays a paramount role in modern business, ensuring all the operations are carried out efficiently. However, globalization and e-commerce have made this more complex and demanding. Companies functioning through a traditional approach face several challenges such as ineffective warehouse management, transport expenses, inefficient last-mile delivery, sustainability pressures, and lack of real-time experiences. The study aims to identify the current innovative technologies and solutions in business logistics and analyse how they can improve supply chain management. This article points out the challenges faced in the logistics sector and provides innovative solutions for business logistics by discussing various advanced methods that can be implemented to resolve these types of issues. These technologies include artificial intelligence, automation, IoT, blockchain technologies, etc. These technologies help in improving inventory management, optimizing transport routes, reducing inventory costs, and so on. Additionally, using sustainable logistics systems and approaches can also help in increasing efficiency and reducing overall operational costs. For companies looking to enhance supply chain performance and retain their strength in the global market, innovation and business logistics become crucial.

Keywords: logistics, innovation, digital logistics, supply chain management.

Introduction

With globalization, meeting consumer needs has become a challenge, and companies need new forms of production and logistics to avoid increasing costs and competitive disadvantages. Moreover, the new production and logistics era has to deal with current global business environments characterized by being unpredictable and competitive (Jacobs and Chase et al., 2018).

The role of logistics has changed expeditiously over the decades. Earlier logistics was exclusively related to the transportation and storage of goods. However, in the modern business era, logistics plays a strategic role in an organization's overall performance (Winkelhaus, Grosse, 2020). Businesses now depend on new technologies and efficient solutions to manage and optimize the flow of goods, information, and material handling, ensuring resources are available at all times.

With the expansion of global trade, logistics faces both new opportunities and challenges. Businesses now operate in highly competitive environments where customer satisfaction plays a crucial role; customers expect precise order fulfilment, fast and smooth delivery, and high-quality service (Ding et al., 2021). This shift has caused businesses to reconsider logistics methods and explore new approaches to supply chain management.

Despite the growing significance of advanced technologies in business logistics, many organizations struggle to implement these solutions due to high costs, lack of technological expertise, and resistance to change (Ivanov, Dolgui, 2021). Existing research often focuses on the benefits of logistics innovation, while limited attention is given to the challenges and practical solutions for successful implementation. Therefore, this study aims to examine the problems and solutions associated with innovation in business logistics.

Research aim: to identify the current innovative technologies and solutions in business logistics and analyse how they can improve supply chain management.

The following **objectives** have been set to achieve the aim:

1. To assess the current trends and tools in business logistics.
2. To assess the challenges and contribution of innovation in business logistics.
3. To make recommendation to improve logistics efficiency in business logistics.

Research object and methods

Research object: innovations and solutions in business logistics.

Research methods. The study uses qualitative research approach. Systematic literature review method is used in this research in order to analyse existing data related to innovation in business logistics. Scientific articles, journals, and conference papers were selected based on their relevance to the topic. The inclusion criteria focused on recent publications (mainly from the last 5–10 years) and peer-reviewed sources to ensure reliability of the data.

In order to identify important technologies, problems, and solutions in business logistics, the gathered data was analysed utilizing descriptive and comparative analysis techniques. Since the research focuses on conceptual understanding and analysing of existing literature rather than numerical data, quantitative approaches were not used in this study.

Research results and discussion

Trends and tools in business logistics

Through the review of several journal and academic articles, it was observed that a wide variety of modern technological solutions are being widely used in logistics companies to make the processes efficient both for the company and for the customers. These technologies play a paramount role in transforming the logistics sector. These solutions help the company to better manage supply chain processes like inventory, transportation, information flow, and overall coordination. The analysis of these previous studies indicated that digital technologies and automation technologies are the primary factors behind logistics advancements.

From the articles and journals, six cutting-edge innovative tools were identified as the most used across logistics companies. The six tools that were identified are given below with the details (Table 1).

Table 1. Major innovative tools use in business logistics source (created by author following Winkelhaus, Grosse, 2020; Ding et al., 2021; Ivanov, Dolgui, 2021)

INNOVATIVE TOOLS	APPLICATIONS	BENEFITS
Cloud computing	Helps companies to exchange information with logistic partners and to save and retrieve data without losing them.	Improves data access, lowers infrastructure cost and promotes teamwork.
Internet of things (IoT)	Monitors, goods, vehicles, Equipment's with the help of real time sensors and devices.	Enhance supply chain visibility and helps in tracking shipments.
Big data analytics	Used for assessing huge amount of logistics data like cost, route optimisation and helps in forecasting of demand.	Promotes operational efficiency and helps in decision making.
Automation and robotics	Used mainly in inventory management such as picking, sorting, packing etc.	Promotes overall productivity, speeds up the whole process and reduces human errors.
Blockchain technology	Creates a safe platform to store digital transaction of supply chain and other movement of products.	Improves logistics processes like transparency, security, etc.

The above-shown table shows the most widely used technologies in modern business logistics. They play a significant role in improving overall logistics efficiency through digital technologies, automated solutions, and data analysis. The use of these technologies has drastically changed the traditional procedures into a more efficient way of managing supply chain operations. Cloud computing systems are some of the most widely used and utilized technologies. It helps companies to access and store data with the help of online platforms and helps in decision-making by providing a platform for information exchange among supply chain participants. Big data analytics helps to analyse large amounts of data, like estimation of costs, demand, and routes, and enhances the overall operational efficiency. The Internet of Things (IoT) made it possible to monitor business operations like the movement of goods while being transported and provides better visibility to the supply chain through sensors and other devices. Similar to this, warehouses particularly deploy robotics and automated technologies to carry out operations like sorting, picking, packing, etc., which helps to improve accuracy and human errors. Likewise, Blockchain provides a decentralized and unchangeable platform to store digital transaction records, which aids in providing security and transparency in logistics procedures. Overall, the logistics sector has increased productivity and efficiency as the result of the integration of these technologies. These technologies significantly boost the effectiveness of logistics and promote improved supply chain decision-making.

Challenges of applying innovative solutions

Although after using creative solutions in business logistics, there is still a number of obstacles to overcome. The high initial cost for implementing these cutting-edge technologies like automation, data analytic tools, cloud systems, and AI is one of the main challenges that businesses face. It may be necessary to make a significant initial investment in new technology, infrastructure, or procedures to implement sustainable improvements in logistics. For some firms, especially smaller ones, this can be a considerable financial strain (Winkelhaus, Grosse, 2020). Due to their limited financial resources, small and medium financially abled organizations find it difficult to implement these in their businesses; not just this, but also integrating these technologies with the current system is also a big issue (Ivanov, Dolgui, 2021). Another challenging issue is the shortage of experts and professionals who can manage and run these cutting-edge tools. Employees who are used to the traditional logistical and operational procedures will be resistant to change and may take a long period to adjust to the change (Ding et al., 2021). The effective use of these technologies might also be affected by security, system dependability, and technological maintenance. Therefore, companies must carefully tackle and address these challenges in order to successfully implement these technologies and utilize them to benefit from these cutting-edge technologies and digital solutions.

Solution for improving business logistics

Implementing creative solutions that solve and tackle the technological issues and operational inefficiency is very important in order to improve the overall performance of business logistics. Integrating these cutting-edge technologies like cloud computing, automation, robotics, etc., is a significant solution to provide real-time visibility, data collection, and analysis and also help in making better decisions, providing better supply chain visibility, improving coordination between

supply chain employees, speeding up, and improving overall tasks like processing, packing, and inventory handling with the help of automation and robotics, which will hence enhance warehouse operations (Winkelhaus, Grosse, 2020).

Another significant solution is the establishment of skilled human resources. In order to guarantee this, the organization should mandatorily provide proper training and assistance to employees to make sure they are fully capable of working with these technologies. It will also be a plus if supply chain partners improve transparency and visibility to make sure proper information flow is occurring, which can help to reduce operational delays and speed up the entire operations (Ivanov, Dolgui, 2021). Adopting sustainable practices can also lower operational costs and enhance environmental performance. Therefore, modern business logistics can greatly increase its efficiency, transparency, dependability, and customer satisfaction with the proper utilization of these technical innovations.

Table 2. Innovations and the challenges they address (created by author following Drissi et al., 2024; Ghode et al., 2025)

INNOVATIONS	CHALLENGES THEY ADDRESS	IMPROVEMENTS IN LOGISTICS
Cloud computing	Issues with system integration and lack of real time data access.	Facilitates integrated data storage and also enhances information flow between supply chain partners.
Internet of things (IoT)	Insufficient visibility in supply chain management.	Enhances logistics activity monitoring and enhances real - time tracking of goods and commodities.
Big data analytics	Poor demand forecasting and decision making.	Aids in the analysis of big data sets and hence increasing the efficiency of pricing, planning in logistics.
Automation and robotics	Operational inefficiency and high labour cost.	Speeds up and improves the accuracy in warehouse operations like packing, picking and sorting which results in reduced error, saves time and increases overall efficiency.
Blockchain technology	Transparency and credibility issues in supply chain transactions.	Enhances security, transparency and credibility.

The above-shown table presents important technical advancements and the problems they solve in business logistics. It shows how technologies like blockchain, cloud computing, IoT, big data analytics, and automation may help solve certain operational problems. These remedies aid in overcoming operational issues and enhancing logistics performance.

Conclusions

1. The study identified major technologies and tools like Cloud computing, big data analytics, IoT, Automation and Blockchain which help in boosting overall supply chain efficiency.
2. The study also found obstacles associated with the adoption of these technologies like high cost of implementation, shortage of experienced labour, and resistance to change which may restrict their application in logistical operations.
3. The study at last suggests that enhancing logistics performance requires strategic investment in digital technologies, employee training, and improved coordination among supply chain partners, alongside the implementation of sustainable and innovative practices. In conclusion, companies looking to attain long-term efficiency, resilience, and competitiveness in a dynamic global market must strategically implement cutting-edge logistics solutions.

References

1. Amling, A., & Daugherty, P. J. (2020). Logistics and distribution innovation in China. *International Journal of Physical Distribution & Logistics Management*, 50(3), 323–332. <https://doi.org/10.1108/IJPDLM-07-2018-0273>
2. Ding, Y., Jin, M., Li, S., & Feng, D. (2021). Smart logistics based on the Internet of Things technology: An overview. *International Journal of Logistics Research and Applications*, 24(4), 323–345. <https://doi.org/10.1080/13675567.2020.1757053>
3. Idrissi, Z. K., Lachgar, M., & Hrimech, H. (2024). Blockchain, IoT and AI in logistics and transportation: A systematic review. *Transport Economics and Management*, 2, 275–285.
4. Ivanov, D., & Dolgui, A. (2021). A digital supply chain twin for managing disruption risks and resilience in the era of Industry 4.0. *Production Planning & Control*, 32(9), 775–788. <https://doi.org/10.1080/09537287.2020.1768450>
5. OpenAI. (2026). ChatGPT (GPT-5.3 version) [Large language model]. Available at: <https://chat.openai.com/>. Query: “Assistance in academic writing on business logistics innovations” (accessed on 09.04.2026).
6. Pandian, A. (2019). Artificial intelligence application in smart warehousing environment for automated logistics. *Journal of Artificial Intelligence and Capsule Networks*, 1(2), 63–72.
7. Queiroz, M. M., Fosso Wamba, S., & Telles, R. (2020). Smart production systems drivers for business process management improvement: An integrative framework. *Business Process Management Journal*, 26(5), 1075–1092. <https://doi.org/10.1108/BPMJ-03-2019-0128>
8. Radivojević, G., & Milosavljević, L. (2019, May). The concept of logistics 4.0. In *4th Logistics international conference* (pp. 23–25).

9. Sodero, A., Jin, Y. H., & Barratt, M. (2019). The social process of big data and predictive analytics use for logistics and supply chain management. *International Journal of Physical Distribution & Logistics Management*, 49(7), 706–726. <https://doi.org/10.1108/IJPDLM-01-2018-0041>
10. Winkelhaus, S., & Grosse, E. H. (2020). Logistics 4.0: A systematic review towards a new logistics system. *International Journal of Production Research*, 58(1), 18–43. <https://doi.org/10.1080/00207543.2019.1612964>
11. Zhang, R. (2020). Digitalization in transport and logistics services: A case for data flows. *World Trade Organization*. https://www.wto.org/english/res_e/reser_e/ruosi_zhangs_presentation_data_flow_in_transport_and_logistics_services.pdf