

BLOCKCHAIN AS A TOOL FOR ENSURING SUSTAINABLE DEVELOPMENT IN THE TRANSPORTATION AND LOGISTICS SECTOR

Fedotova I.V., Arkhipov O.V.

Kharkiv National Automobile and Highway University, Kharkiv

Blockchain technology has emerged as a promising tool for ensuring sustainable development in various industries, including transportation and logistics. Despite limited research in this area [1, 2], its potential in revolutionizing supply chain management and logistics operations is significant. Blockchain, originally developed for cryptocurrencies like Bitcoin, is a decentralized and distributed ledger system with key features like transparency, immutability, and security, making it suitable for enhancing trust and efficiency in supply chain processes.

One of the primary challenges in the transportation and logistics sector is the lack of transparency and visibility across the supply chain. Traditional supply chain systems often involve multiple intermediaries and manual record-keeping processes, leading to delays, errors, and inefficiencies. Blockchain technology addresses these challenges by providing a single source of truth accessible to all stakeholders involved in the supply chain. By recording every transaction or movement of goods on a decentralized ledger, blockchain enables real-time tracking and traceability of products from the point of origin to the final destination. This transparency enhances accountability and reduces the risk of fraud or counterfeit products entering the supply chain. Blockchain also ensures secure and tamper-proof documentation of critical information such as product provenance, certifications, and compliance documents, essential for regulatory compliance, especially in industries where safety and quality standards are paramount. Additionally, blockchain streamlines various logistics processes, including inventory management, warehousing, and transportation, through the use of smart contracts. These self-executing contracts automate contractual agreements between parties, resulting in cost savings, faster transactions, and reduced dependency on intermediaries. The decentralized nature of blockchain reduces reliance on centralized authorities or intermediaries, democratizing access to information and resources within the supply chain. This decentralization fosters collaboration, innovation, and trust among stakeholders, ultimately paving the way for more sustainable and inclusive supply chains.

While research on the application of blockchain in the transportation and logistics sector is still evolving, its potential to drive sustainable development and transform traditional supply chain practices is undeniable. As organizations increasingly recognize the benefits of blockchain technology, it is expected to play a significant role in shaping the future of logistics towards greater sustainability and efficiency.

References:

1. Koh L., Dolgui A., Sarkis J. Blockchain in transport and logistics – paradigms and transitions. *International Journal of Production Research*. 2020. Vol. 58(7). Pp. 2054–2062. doi: <https://doi.org/10.1080/00207543.2020.1736428>
2. Perboli G., Musso S., Rosano M. Blockchain in Logistics and Supply Chain: A Lean Approach for Designing Real-World Use Cases. *IEEE Access*. 2018. Vol. 6. Pp. 62018-62028. doi: 10.1109/ACCESS.2018.2875782.