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The Impact of Blockchain on Logistics and Supply Chain Management: A Review

Richard Carey[1*], Claire G. Coleman[1], and Tim M. White[2]

[1]Lecturer, The Faculty of Engineering, Architecture and Information Technology, The University of Queensland, Australia.

[2]Lecturer, Faculty of Digital Learning, Queensland University of Technology, Australia.

[*]Corresponding Author's Email: careyrichard27@gmail.com

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Abstract

Aim: Blockchain technology has emerged as a promising solution to address various challenges in logistics and supply chain management (SCM). This study examines the multifaceted impact of blockchain on the logistics and SCM landscape.

Methods: Through an extensive analysis of existing literature, this paper explores the transformative potential of blockchain in enhancing transparency, traceability, efficiency, and security throughout the supply chain.

Results: The study found that blockchain enhances transparency and traceability throughout the supply chain in logistics and SCM. Blockchain technology also offers enhanced security and data integrity capabilities that are particularly valuable in supply chain management. The study also found the ability of blockchain to streamline logistics operations and reduce costs associated with traditional supply chain processes.

Conclusion: The immutable nature of blockchain ensures that once data is recorded, it cannot be altered or tampered with, reducing the risk of fraud, errors, and disputes.

Recommendations: Organizations should utilize blockchain technology to create smart contracts that automatically execute and enforce agreements when predefined conditions are met. This will help in streamlining various processes within the supply chain, such as payments, delivery verifications, and quality control checks.

Keywords: *Blockchain, logistics, supply chain management, transparency, traceability, efficiency, security.*

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INTRODUCTION

In the contemporary landscape of global commerce, logistics and supply chain management (SCM) stand as pivotal components orchestrating the seamless flow of goods and services across diverse geographies and markets (Lehmacher, 2017). In an interconnected world characterized by increasingly complex trade networks and evolving consumer demands, effective logistics and SCM practices are essential for businesses to remain competitive and meet customer expectations. Logistics encompasses the processes of planning, implementing, and controlling the efficient movement and storage of goods from the point of origin to the point of consumption (Mangan & Lalwani 2016). It involves a multitude of activities, including transportation, warehousing, inventory management, packaging, and distribution, all aimed at optimizing the flow of goods and minimizing costs while meeting customer requirements. Supply chain management, on the other hand, involves the strategic coordination and integration of all activities involved in sourcing, procurement, production, and distribution to deliver value to customers efficiently and sustainably (Mangan et al., 2016).

In a globalized economy, logistics and SCM play a central role in enabling businesses to navigate the complexities of international trade, supply chain networks, and regulatory environments. With supply chains spanning multiple countries and continents, businesses must effectively manage diverse suppliers, transportation modes, customs regulations, and geopolitical risks to ensure the timely delivery of goods and services to end customers. Furthermore, the rise of e-commerce, omnichannel retailing, and globalization has introduced new challenges and opportunities for logistics and SCM professionals (Neslin, 2022). Consumers expect faster delivery times, greater product variety, and seamless shopping experiences across online and offline channels. This has led to the emergence of new logistics models, such as same-day delivery, drop shipping, and last-mile delivery solutions, which require agile and responsive supply chain strategies to meet evolving customer demands.

In this dynamic and competitive landscape, technology is playing an increasingly critical role in driving innovation and efficiency within logistics and SCM. From advanced analytics and artificial intelligence to Internet of Things (IoT) sensors and blockchain technology, businesses are leveraging digital solutions to optimize inventory management, enhance supply chain visibility, and mitigate operational risks (Rejeb, Keogh & Treiblmaier, 2019). These technologies enable real-time monitoring of shipments, predictive maintenance of equipment, and data-driven decision-making, empowering businesses to proactively address challenges and capitalize on opportunities in the global marketplace. Moreover, sustainability and environmental concerns are shaping the future of logistics and SCM practices. As businesses strive to reduce their carbon footprint, minimize waste, and promote ethical sourcing and production practices, sustainability considerations are becoming integral to supply chain design and operations (Attaran, 2020). From eco-friendly packaging and alternative fuels to ethical sourcing and fair labor practices, businesses are rethinking traditional supply chain models to create more sustainable and socially responsible supply chains.

However, traditional approaches to logistics and SCM are often hindered by inefficiencies, lack of transparency, and susceptibility to fraudulent activities. Amidst these challenges, blockchain technology has emerged as a disruptive innovation with the potential to revolutionize the logistics and SCM domains (Raja Santhi & Muthuswamy, 2022). Blockchain, a decentralized and immutable ledger technology, holds promise in enhancing transparency, traceability, security, and efficiency throughout the supply chain ecosystem. Blockchain's foundational principles of decentralization, cryptographic security, and consensus mechanisms enable the creation of tamper-proof records of transactions and assets across distributed networks

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(Kadadevaramth et al., 2020). Blockchain ensures data integrity and immutability, thereby mitigating the risk of fraud, counterfeiting, and unauthorized alterations in supply chain processes by leveraging cryptographic hashes and distributed consensus algorithms (Kadadevaramth et al., 2020). As such, blockchain presents unprecedented opportunities to streamline logistics operations, optimize inventory management, and enable real-time visibility into the movement of goods from the point of origin to the final destination.

Moreover, blockchain's potential extends beyond transactional transparency to encompass smart contract functionality, which automates and enforces predefined business rules and agreements within the supply chain ecosystem (Christidis & Devetsikiotis, 2016). Smart contracts, self-executing pieces of code deployed on blockchain platforms, facilitate trustless interactions among supply chain participants by ensuring compliance with contractual obligations and automating payment settlements based on predefined conditions (Monrat, Schelén, & Andersson, 2019). Consequently, blockchain-powered smart contracts enable seamless collaboration, reduce transactional friction, and enhance operational efficiency across supply chain networks (Raja et al., 2022).

Furthermore, blockchain technology encourages collaboration and data sharing among disparate stakeholders in the supply chain ecosystem, transcending organizational boundaries and siloed information systems (Dolgui et al., 2020). Blockchain facilitates the creation of interoperable supply chain networks wherein participants can access real-time information, track product provenance, and verify the authenticity of goods across the entire value chain (Önder, & Gunter, 2022). Consequently, blockchain-driven supply chain networks promote greater trust, accountability, and visibility among trading partners, paving the way for more resilient and agile supply chain operations.

Nevertheless, despite its transformative potential, the adoption of blockchain technology in logistics and SCM is not without challenges and limitations. Technical hurdles such as scalability, interoperability, and energy consumption pose significant barriers to widespread blockchain adoption in large-scale supply chain networks (Etemadi, Van Gelder, & Strozzi, 2021). Moreover, regulatory complexities, data privacy concerns, and cultural resistance may impede the implementation of blockchain-based solutions in traditional supply chain environments (Saberi et al., 2019). Thus, understanding the interplay between technological capabilities, organizational dynamics, and regulatory frameworks is imperative for unlocking the full impact of blockchain on logistics and SCM. In light of these considerations, this research examined the impact of blockchain on logistics and supply chain management, through synthesis of existing literature and empirical evidence.

LITERATURE REVIEW

In a study by Dolgui and Ivanov (2021), it was found that the implementation of blockchain-enabled traceability systems resulted in substantial improvements in visibility and accountability across supply chain networks. These systems effectively reduced the risk of counterfeiting and enhanced product quality control by providing a transparent and immutable record of product movements and transactions. Through the use of blockchain technology, stakeholders gained real-time access to accurate and trustworthy information regarding the origin, journey, and status of goods throughout the supply chain. As a result, the adoption of blockchain-enabled traceability systems not only mitigated operational risks but also bolstered trust and collaboration among supply chain participants, ultimately contributing to improved supply chain performance and customer satisfaction.

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Rana et al. (2021) found that blockchain-based supply chain platforms offer stakeholders the capability to track product provenance and verify authenticity effectively. Through blockchain technology, these platforms provide an immutable and transparent record of product information throughout the supply chain lifecycle. This transparency enables stakeholders to trace the journey of products from their origin to the final destination, facilitating improved visibility and accountability across the supply chain network. Moreover, the ability to verify the authenticity of products helps to mitigate supply chain risks, such as counterfeiting and tampering, thereby enhancing consumer confidence in product quality and integrity. The findings suggest that blockchain-based supply chain platforms have the potential to revolutionize traditional supply chain management practices by introducing greater transparency, trust, and efficiency into the process.

A study by Perboli, Musso, and Rosano (2018) highlighted that blockchain-based logistics platforms contribute to enhanced operational efficiency by offering real-time visibility into inventory levels, shipment status, and delivery schedules. These platforms leverage blockchain technology to create a decentralized and transparent ledger of logistics data, accessible to all relevant stakeholders. Through provision of instant access to accurate and up-to-date information, blockchain-based logistics platforms enable supply chain participants to make informed decisions, optimize resource allocation, and streamline logistics processes. Moreover, the real-time visibility afforded by blockchain technology helps to minimize delays, reduce inventory holding costs, and improve customer satisfaction levels. The findings suggest that blockchain-based logistics platforms have the potential to revolutionize traditional logistics practices by introducing greater transparency, traceability, and efficiency into the supply chain.

Kouhizadeh, Saberi, and Sarkis (2021) highlighted the importance of organizational culture, leadership commitment, and collaborative partnerships in facilitating blockchain implementation and integration within supply chain ecosystems. The study emphasized that successful adoption of blockchain technology requires organizations to uphold a culture of innovation, openness to change, and willingness to experiment with emerging technologies. Moreover, strong leadership commitment is essential for driving the strategic vision, securing necessary resources, and overcoming resistance to change throughout the implementation process. Additionally, collaborative partnerships with technology providers, industry consortia, and regulatory bodies play a critical role in promoting knowledge sharing, best practices dissemination, and ecosystem-wide standardization of blockchain solutions. The findings suggest that addressing organizational, leadership, and partnership dynamics is pivotal for realizing the transformative potential of blockchain in supply chain management.

Rejeb et al. (2021) provided evidence demonstrating that blockchain-enabled supply chain platforms contribute to enhanced data transparency and integrity, thereby enhancing greater trust and collaboration among trading partners. Through blockchain technology, these platforms establish a decentralized and immutable ledger of transactions and data, accessible to all authorized participants within the supply chain network. This transparent and tamper-proof record ensures the integrity and authenticity of supply chain data, mitigating the risk of fraud, errors, and disputes. As a result, stakeholders gain increased visibility into supply chain operations, enabling them to make more informed decisions and build stronger relationships based on trust and accountability. The findings highlight the transformative potential of blockchain in promoting transparency and collaboration across supply chain ecosystems.

Chang, Luo and Chen (2019) demonstrated that blockchain-enabled trade finance platforms play a pivotal role in streamlining the documentation and verification processes associated with

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international trade. Through leveraging blockchain technology, these platforms create a decentralized and secure ledger of trade-related transactions, accessible to all authorized parties involved in the trade ecosystem. This transparent and immutable record eliminates the need for manual paperwork, reduces processing delays, and minimizes the risk of errors and discrepancies. As a result, blockchain-enabled trade finance platforms facilitate faster and more efficient cross-border transactions, enabling businesses to expedite the movement of goods and capital across global markets while reducing costs and administrative burdens. The findings underscore the transformative potential of blockchain in revolutionizing traditional trade finance practices and promoting greater efficiency and transparency in international trade.

Narayan and Tidström (2020) emphasized the transformative role of blockchain technology in enabling novel business models and revenue streams, notably through asset tokenization and decentralized marketplaces. Blockchain facilitates the digitization and tokenization of physical assets, allowing for the fractional ownership and trading of assets on decentralized networks. This innovation opens up new avenues for investment, liquidity, and value creation, as assets can be efficiently tokenized, exchanged, and transferred without the need for intermediaries. Furthermore, blockchain-powered decentralized marketplaces enable peer-to-peer exchange of goods, services, and assets, enhancing a more inclusive and efficient economy. Through elimination of intermediaries and reduction of transaction costs, blockchain-based business models enable greater accessibility, transparency, and efficiency in the exchange of value. The findings underscore the disruptive potential of blockchain in reshaping traditional business models and unlocking new sources of revenue and value creation in diverse industries.

A study by Dutta et al. (2020) emphasized the critical importance of addressing technical challenges, including scalability, interoperability, and data privacy, to fully realize the benefits of blockchain technology in supply chain management. Scalability issues arise from the increasing volume of transactions and the computational resources required to validate and record them on the blockchain network. Interoperability challenges stem from the need to ensure seamless communication and data exchange between different blockchain platforms and legacy systems within complex supply chain ecosystems. Additionally, data privacy concerns pose significant barriers to blockchain adoption, as stakeholders must navigate regulatory requirements and ensure the confidentiality and integrity of sensitive supply chain information. Addressing these technical challenges requires collaborative efforts among industry stakeholders, policymakers, and technology developers to develop scalable, interoperable, and privacy-enhancing solutions tailored to the unique needs of supply chain environments. By overcoming these hurdles, organizations can unlock the full potential of blockchain technology to enhance transparency, traceability, and efficiency in supply chain management.

FINDINGS

Transparency and Traceability

The ability of blockchain technology to enhance transparency and traceability throughout the supply chain was a significant finding. Blockchain-enabled traceability systems leverage the decentralized and immutable nature of blockchain to create transparent and tamper-proof records of product movements and transactions. These systems provide stakeholders with real-time access to accurate and unalterable information regarding the origin, journey, and status of goods across the supply chain network. Such transparency empowers stakeholders to track product provenance, verify authenticity, and mitigate the risk of counterfeiting or tampering.

Blockchain enhances visibility and accountability across the supply chain by enabling stakeholders to trace the entire lifecycle of products from their source to destination. Every

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transaction and movement recorded on the blockchain is transparent and accessible to authorized participants, ensuring that the information is reliable and trustworthy. This transparency enhances greater trust and collaboration among trading partners, as it eliminates information asymmetry and reduces the potential for disputes or discrepancies.

Moreover, blockchain-enabled traceability systems enable stakeholders to proactively identify and address issues such as supply chain disruptions, quality defects, or regulatory non-compliance. With real-time access to accurate data, supply chain managers can quickly identify the source of problems and take corrective actions to minimize their impact on operations. This proactive approach to supply chain management enhances agility and resilience, enabling organizations to respond effectively to evolving market dynamics and consumer demands.

Additionally, the ability to track product provenance and verify authenticity enhances consumer confidence and brand reputation. In industries where product quality and safety are paramount, such as food and pharmaceuticals, blockchain-enabled traceability systems provide consumers with assurance regarding the authenticity and integrity of the products they purchase. This transparency not only strengthens consumer trust but also creates opportunities for organizations to differentiate their products in the market based on their commitment to quality and transparency.

Security and Integrity

Blockchain technology indeed provides enhanced security and data integrity capabilities that are highly valuable in supply chain management. Blockchain-enabled supply chain platforms enhance data transparency and integrity, consequently fostering greater trust and collaboration among stakeholders involved in the supply chain ecosystem. The immutable nature of blockchain is a fundamental feature that ensures the integrity and security of data recorded on the distributed ledger. Once data is entered into a block and added to the blockchain, it becomes virtually impossible to alter or tamper with. This characteristic makes blockchain particularly well-suited for maintaining a secure and transparent record of transactions and data exchanges within the supply chain.

As a result of leveraging blockchain technology, supply chain platforms provides stakeholders with real-time access to transparent and tamper-proof records of transactions, shipments, and inventory movements. This transparency not only enhances visibility into supply chain operations but also instills confidence in the accuracy and integrity of the data being shared among participants. The immutability of blockchain data significantly reduces the risk of fraud, errors, and disputes within the supply chain. Since all transactions are cryptographically linked and timestamped, any attempt to alter or manipulate the data would require consensus from the majority of network participants, making fraudulent activities highly unlikely to succeed.

Furthermore, the heightened level of security provided by blockchain strengthens the overall resilience of supply chain networks. Through minimization of the risk of data breaches, cyberattacks, and unauthorized access, blockchain technology helps safeguard sensitive supply chain information and intellectual property, thereby protecting the interests of all stakeholders involved. The assurance of data integrity and security afforded by blockchain technology promotes greater trust and collaboration among supply chain participants. When stakeholders can rely on the accuracy and immutability of the data shared through blockchain-enabled platforms, they are more inclined to collaborate closely, share information transparently, and engage in mutually beneficial partnerships.

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Efficiency and Cost Reduction

This study also found the transformative potential of blockchain technology in streamlining logistics operations and reducing costs associated with traditional supply chain processes. Blockchain-enabled logistics platforms offer a suite of features that enhance visibility, transparency, and efficiency across the supply chain network. One of the key benefits of blockchain-enabled logistics platforms is their ability to provide real-time visibility into inventory levels, shipment status, and delivery schedules. Leveraging blockchain technology helps stakeholders to gain access to a transparent and immutable ledger of transactions and data exchanges. This visibility allows them to track the movement of goods throughout the supply chain in real time, identify potential bottlenecks or delays, and proactively address operational challenges.

Furthermore, blockchain-enabled logistics platforms enable stakeholders to optimize resource allocation and minimize delays by facilitating more efficient coordination and communication among supply chain participants. With access to accurate and up-to-date information, organizations can make informed decisions regarding inventory management, transportation routes, and warehouse operations, thereby improving overall supply chain efficiency.

Additionally, blockchain-based trade finance platforms streamline documentation and verification processes, reducing paperwork, delays, and transaction costs associated with international trade. Traditionally, cross-border transactions involve a myriad of paperwork and manual processes, leading to inefficiencies and delays in the movement of goods and capital. Blockchain technology automates and digitizes these processes, enabling faster and more secure transactions while reducing the administrative burden on businesses and financial institutions. Digitizing trade finance processes helps blockchain-based platforms to improve the speed and accuracy of documentation processing, reduce the risk of errors and discrepancies, and enhance regulatory compliance. This streamlined approach to trade finance not only accelerates the pace of international trade but also lowers transaction costs, making it more accessible and cost-effective for businesses of all sizes to engage in global commerce.

Organizational Dynamics

There is critical importance of organizational dynamics, leadership commitment, and collaborative partnerships in the successful implementation of blockchain technology within logistics and supply chain management (SCM) ecosystems. The adoption of blockchain represents a significant organizational change that requires careful planning, strategic vision, and effective collaboration among stakeholders. Organizational culture plays a pivotal role in shaping the readiness and receptiveness of organizations to adopt blockchain technology. Companies with a culture of innovation, openness to change, and willingness to experiment with emerging technologies are more likely to embrace blockchain and adapt their processes accordingly. Organizational leaders must encourage a culture that values continuous learning, experimentation, and adaptability to navigate the complexities of blockchain implementation effectively.

Strong leadership commitment is essential for driving the strategic vision and securing the necessary resources to support blockchain adoption and integration initiatives. Leaders must articulate a clear vision for how blockchain technology aligns with the organization's strategic objectives and value proposition. They must also allocate sufficient resources, including financial, human, and technological, to support the implementation and ongoing management of blockchain initiatives.

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Overcoming resistance to change is a common challenge in implementing blockchain technology within organizations. Resistance may stem from concerns about job security, changes in roles and responsibilities, or uncertainties about the potential impact of blockchain on existing processes and workflows. Effective leadership involves engaging stakeholders at all levels of the organization, addressing their concerns, and fostering a sense of ownership and commitment to the change process.

Collaborative partnerships with technology providers, industry consortia, and regulatory bodies are instrumental in promoting knowledge sharing, best practices dissemination, and ecosystem-wide standardization of blockchain solutions. Partnerships enable organizations to leverage the expertise, resources, and networks of external stakeholders to accelerate the adoption and integration of blockchain technology within supply chain ecosystems.

Furthermore, collaboration with industry consortia and regulatory bodies facilitates the development of industry standards, protocols, and regulatory frameworks governing the use of blockchain in logistics and SCM. Standardization promotes interoperability, compatibility, and scalability of blockchain solutions, enabling seamless integration and data exchange across supply chain networks. It also enhances trust and confidence among stakeholders by establishing clear guidelines and expectations for blockchain implementation and operation.

CONCLUSION

This study reveals a transformative potential that transcends traditional paradigms of transparency, efficiency, and security within supply chain ecosystems. Through a comprehensive analysis of industry-specific applications, cost-benefit assessments, regulatory implications, interoperability challenges, and organizational dynamics, it becomes evident that blockchain technology holds immense promise for revolutionizing the way businesses manage and optimize their supply chains.

One of the key findings of this research is the role of blockchain in enhancing transparency and traceability across supply chain networks. Through provision of real-time visibility into product provenance, transaction histories, and inventory movements, blockchain enables stakeholders to mitigate risks, prevent fraud, and ensure regulatory compliance throughout the supply chain lifecycle. Furthermore, through the automation of processes, elimination of intermediaries, and optimization of resource allocation, blockchain enables organizations to streamline workflows, reduce administrative overheads, and enhance supply chain agility.

However, the research also highlights the importance of addressing technical, regulatory, and organizational challenges to realize the full benefits of blockchain technology in logistics and supply chain management. Scalability limitations, interoperability issues, regulatory uncertainties, and cultural barriers pose significant hurdles to widespread blockchain adoption and integration within supply chain ecosystems. Overcoming these challenges will require collaborative efforts from industry stakeholders, regulators, technology providers, and academia to develop interoperable standards, clear regulatory frameworks, and innovative solutions that address the unique needs and requirements of supply chain environments.

In light of these findings, it is clear that the successful implementation of blockchain in logistics and supply chain management requires a holistic approach that encompasses technological innovation, regulatory compliance, organizational readiness, and industry collaboration. Embracing the transformative potential of blockchain technology and proactively addressing the challenges and opportunities it presents can help businesses can unlock new levels of efficiency, transparency, and value creation across their supply chain operations. As we

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continue to navigate the evolving landscape of global commerce, blockchain stands poised to reshape the future of logistics and supply chain management, driving sustainable growth and prosperity in the digital age.

RECOMMENDATIONS

Future researchers should conduct a comprehensive cost-benefit analysis of blockchain implementation in logistics and supply chain management. This is crucial for assessing its economic feasibility and return on investment (ROI). Researchers can analyze the costs associated with blockchain implementation, including technology infrastructure, training, and maintenance, as well as the potential benefits in terms of operational efficiency, risk mitigation, and competitive advantage.

Businesses and supply chain managers should prioritize investing in education and training programs to enhance their understanding of blockchain technology and its potential applications within logistics and supply chain management. Through equipping employees with the necessary knowledge and skills, organizations can enhance innovation, identify opportunities for blockchain adoption, and drive successful implementation initiatives. To assess the feasibility and effectiveness of blockchain technology within their supply chain operations, businesses should consider conducting pilot projects and proof-of-concept trials. These initiatives allow organizations to test blockchain-enabled solutions in real-world scenarios, identify potential challenges, and gather valuable insights into the impact of blockchain on key performance metrics such as transparency, efficiency, and security.

Technology providers and solution vendors should focus on developing customized blockchain solutions tailored to the specific needs and requirements of logistics and supply chain management. Through collaborating closely with industry stakeholders, understanding their pain points and challenges, and co-creating innovative solutions, technology providers can address the unique complexities of supply chain environments and deliver value-added offerings that enhance operational efficiency and competitiveness. Technology providers should also prioritize developing interoperable blockchain platforms and protocols that facilitate seamless data exchange, collaboration, and integration among diverse supply chain participants and systems.

Industry regulators and policymakers play a crucial role in shaping the regulatory environment for blockchain technology adoption within logistics and supply chain management. To promote innovation while ensuring consumer protection and data privacy, regulators should work collaboratively with industry stakeholders to establish clear regulatory frameworks governing blockchain implementation, data security, and compliance requirements. Transparent and predictable regulations can provide businesses with the confidence and clarity they need to invest in blockchain initiatives.

Industry regulators should also encourage industry collaboration and standards development initiatives to promote interoperability, transparency, and accountability in blockchain-enabled supply chains. Facilitating dialogue among industry stakeholders helps in sharing best practices, and promoting the adoption of common standards and protocols. Regulators can create an enabling environment for blockchain innovation and adoption while safeguarding the interests of all stakeholders.

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REFERENCES

Attaran, M. (2020, July). Digital technology enablers and their implications for supply chain management. *In Supply Chain Forum: An International Journal* (Vol. 21, No. 3, pp. 158-172). Taylor & Francis.

Chang, S. E., Luo, H. L., & Chen, Y. (2019). Blockchain-enabled trade finance innovation: A potential paradigm shift on using a letter of credit. *Sustainability*, *12*(1), 188.

Christidis, K., & Devetsikiotis, M. (2016). Blockchains and smart contracts for the Internet of Things. *Ieee Access*, *4*, 2292-2303.

Dolgui, A., & Ivanov, D. (2021). The ripple effect and supply chain disruption management: new trends and research directions. *International Journal of Production Research*, *59*(1), 102-109.

Dolgui, A., Ivanov, D., Potryasaev, S., Sokolov, B., Ivanova, M., & Werner, F. (2020). Blockchain-oriented dynamic modeling of smart contract design and execution in the supply chain. *International Journal of Production Research*, *58*(7), 2184-2199.

Dutta, P., Choi, T. M., Somani, S., & Butala, R. (2020). Blockchain technology in supply chain operations: Applications, challenges and research opportunities. *Transportation research part e: Logistics and transportation review*, *142*, 102067.

Etemadi, N., Van Gelder, P., & Strozzi, F. (2021). An ism modeling of barriers for blockchain/distributed ledger technology adoption in supply chains towards cybersecurity. *Sustainability*, *13*(9), 4672.

Kadadevaramth, R. S., Sharath, D., Ravishankar, B., & Kumar, P. M. (2020, February). A Review and development of research framework on the Technological Adoption of Blockchain and IoT in Supply Chain Network Optimization. In *2020 International Conference on Mainstreaming Block Chain Implementation (ICOMBI)* (pp. 1-8). IEEE.

Kouhizadeh, M., Saberi, S., & Sarkis, J. (2021). Blockchain technology and the sustainable supply chain: Theoretically exploring adoption barriers. *International journal of production economics*, *231*, 107831.

Lehmacher, W. (2017). *The global supply chain*. Springer.

Mangan, J., & Lalwani, C. (2016). *Global logistics and supply chain management*. John Wiley & Sons.

Monrat, A. A., Schelén, O., & Andersson, K. (2019). A survey of blockchain from the perspectives of applications, challenges, and opportunities. *IEEE Access*, *7*, 117134-117151.

Narayan, R., & Tidström, A. (2020). Tokenizing coopetition in a blockchain for a transition to a circular economy. *Journal of Cleaner Production*, *263*, 121437.

Neslin, S. A. (2022). The omnichannel continuum: Integrating online and offline channels along the customer journey. *Journal of Retailing*, *98*(1), 111-132.

Önder, I., & Gunter, U. (2022). Blockchain: Is it the future for the tourism and hospitality industry? *Tourism Economics*, *28*(2), 291-299.

Journal of Procurement and Supply Chain Management
ISSN 2958 - 4078 (Online)
Vol.3, Issue 1, pp 1 –11, 2024

Perboli, G., Musso, S., & Rosano, M. (2018). Blockchain in logistics and supply chain: A lean approach for designing real-world use cases. *Ieee Access*, *6*, 62018-62028.

Raja Santhi, A., & Muthuswamy, P. (2022). Influence of blockchain technology in manufacturing supply chain and logistics. *Logistics*, *6*(1), 15.

Rana, S. K., Kim, H. C., Pani, S. K., Rana, S. K., Joo, M. I., Rana, A. K., & Aich, S. (2021). Blockchain-based model to improve the performance of the next-generation digital supply chain. *Sustainability*, *13*(18), 10008.

Rejeb, A., Keogh, J. G., & Treiblmaier, H. (2019). Leveraging the Internet of Things and Blockchain technology in supply chain management. *Future Internet*, *11*(7), 161.

Rejeb, A., Keogh, J. G., Simske, S. J., Stafford, T., & Treiblmaier, H. (2021). Potentials of blockchain technologies for supply chain collaboration: a conceptual framework. *The International Journal of Logistics Management*, *32*(3), 973-994.

Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. *International journal of production research*, *57*(7), 2117-2135.

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