

Chapter 9

Applications of Blockchain Technology in Supply Chain Management

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ABSTRACT

In this chapter, the authors delve into the utilization of blockchain technology within the realm of supply chain management. The emergence of blockchain technology has heralded substantial progress across diverse sectors, and the domain of supply chain management is undeniably one of them. The decentralized and immutable characteristics of blockchain present a promising resolution to endure hurdles encountered by stakeholders in supply chain management. These challenges encompass issues of transparency, traceability, and efficiency. The abstract commences by acknowledging the transformative essence of blockchain technology, underscoring its profound influence across various sectors. It subsequently narrows its focus to explore the specific applications within the domain of supply chain management. The chapter undertakes an in-depth examination of the multifaceted challenges faced by supply chain stakeholders and elucidates how blockchain technology adeptly tackles these predicaments.

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INTRODUCTION

Background and Significance of Blockchain Technology in Supply Chain Management

The emergence of blockchain technology has brought significant advancements and transformative potential across various industries, including supply chain management. This report explores the background and significance of blockchain technology in revolutionizing supply chain processes. This study investigates the fundamental principles of blockchain technology, highlighting its essential characteristics and its utilization in augmenting transparency, security, and efficiency within supply chains. Additionally, the present chapter delves into the prospective hurdles and forthcoming ramifications associated with the integration of blockchain technology in supply chain management. Historically, the realm of supply chain management has encountered obstacles like inadequate transparency, suboptimal documentation practices, counterfeiting, and restricted trust among involved parties. The challenges mentioned above can be effectively tackled through the implementation of blockchain technology, which is characterized by its decentralized nature and unalterable ledger (Tapscott & Tapscott, 2016; Ashraf et al., 2023). Blockchain, as a distributed ledger technology, enables participants to transparently and securely record and authenticate transactions (Squarepants, 2008). Operating within a network of interconnected nodes, blockchain grants each participant access to a duplicate copy of the ledger. Transactions are organized into blocks, which are sequentially and permanently appended to the chain. The decentralized structure of blockchain eliminates the necessity for intermediaries, thereby bolstering the security and dependability of transactions (Swan, 2015). By leveraging blockchain technology, transparency within the supply chain is significantly enhanced through the establishment of a shared and unalterable record of transactions. Every participant is granted access to the blockchain, enabling them to validate the legitimacy of transactions, thereby fostering trust and mitigating the potential for fraudulent practices (Iansiti & Lakhani, 2017). Furthermore, the integration of Internet of Things (IoT) devices and sensors with blockchain empowers real-time tracking and traceability of goods, enabling stakeholders to monitor the location and state of products at every stage of the supply chain (Dorri et al., 2019; Saeed et al., 2022; Ramzan et al., 2022).

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