

Chapter 19

Transforming Sustainable Supply Chain Practices Through Harnessing Blockchain Technologies: A Theoretical Perspective

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ABSTRACT

This study undertakes a thorough examination of the ramifications of blockchain technology on sustainable supply chain practices, meticulously assessing its merits and drawbacks. Through an in-depth exploration of challenges related to blockchain adoption in SSC Practices, the research endeavors to furnish pragmatic recommendations for climbing obstacles in visibility, transparency, and tracking. The primary objective is to furnish actionable insights for organizations aspiring to capitalize on blockchain, ultimately refining and optimizing their sustainable supply chain operations. The investigation scrutinizes integration of blockchain beneficial of sustainable supply chain. the study applies it to the context of the Supply chain intermediaries, offering a comprehensive understanding of blockchain technology's influence on sustainable supply chain practices in this specific domain.

1. INTRODUCTION

Information and communication technology have grown exponentially in recent years, disrupting many company paradigms, particularly in the supply chain & logistics (Yontar, 2023). Traditionally, the primary concern for supply chain professionals was maximizing economic benefits (Tseng et al., 2019).

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However, due to the escalating environmental decline, the focus has transitioned from solely economic factors to include both social and environmental sustainability (Gupta et al., 2020).

Companies have made enormous attempts to restructure their operational models due to various complexities such as consumer demand, product quality, sustainability. As a result, demand for precision, relevance, transparency, and trustworthiness in the information flowing throughout the supply chain required extensive urgency (Behnke & Janssen, 2020a). Since increase cooperation, information sharing, and demand and supply chain integration, relationships and operational models have grown more complicated under the canvas of sustainability (Pavlić Skender & Zaninović, 2020). Such complexity also urges trust, transparency, and responsibility between supply chain participants. Sustainable practices within supply chains represent a crucial role in term of addressing current social and environmental challenges, encompassing a range of eco-friendly initiatives integrated into every stage across supply chain (Rezaei Vandchali et al., 2021). Despite these difficulties, Numerous cutting-edge technologies offer firms a distinct competitive edge (Kamble et al., 2021). Technological advancements are vast, with each innovation influencing a company's carry out green initiatives and social sustainability efforts (Pavlić Skender & Zaninović, 2020). Of all the recently developed technologies, blockchain (distributed ledger) has a profound impact on sustainability (Munir et al., 2022). Blockchain is a decentralized ledger system that enables the automatic execution of transactions, facilitating the management of expanding data (Asim et al., 2022; Saeed Banaeian Far. et al., 2023; Wu et al., 2017). Blockchain technology surfaced as a transformative breakthrough in the 2010s, swiftly gaining widespread recognition (Ozdemir et al., 2020). Experts propose that it possesses vast potential to fundamentally reshape supply chain processes (S. Saberi et al., 2019b). From an SCM perspective, blockchain has been proposed as a sustainable solution to strengthen traceability and transparency across all levels of the supply chain (Rane et al., 2020). From a supply chain management viewpoint, blockchain is advocated as a long-term solution to bolster traceability and transparency at every stage of the supply chain (Nwariaku et al., 2024).

The discipline of supply chain management (SCM) has firmly solidified over the past few decades (Yontar, 2023). In its early stages, the concept of supply chain management (SCM) was centered on optimizing the efficiency and effectiveness of the movement of funds, information, and goods or services (Muhammad Farooque. et al., 2019). One of the prevailing challenges in SCM is the information asymmetry among stakeholders, where parties lack sufficient visibility into their partners' operations (Mohammad H. Eslami. et al., 2023). This problem stems from the fact that gathered data is often restricted to a single entity or intermediary (Mohammad H. Eslami. et al., 2023). The information asymmetry is further exacerbated by external pressures from consumers and stakeholders demanding that supply chains adopt more sustainable practices (Munir et al., 2022; Pavlić Skender & Zaninović, 2020). The concept of sustainability is grounded in three core pillars: economic, environmental, and social development (M.T. Alflaieh., 2022).

The concept of sustainability is grounded in three core pillars: economic, environmental, and social development (Purvis et al., 2019). Sustainability in the supply chain is not the exclusive duty of any one organization but a shared responsibility, requiring coordinated efforts from all stakeholders involved (Gurzawska, 2020). Hereafter, we will use the abbreviation 'SSCP' to refer to sustainable supply chain practices. An increasing number of stakeholders are calling for organizations and supply chains to shift toward more environmentally and socially responsible practices and operations (Elisa Truant. et al., 2024). From the user viewpoint, Biswas et al. (2022) emphasize that an increasing contingent of consumers is seeking information regarding the environmental and social effects of products while also insisting on enhanced transparency and traceability within supply chains.

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