Chapter 2
Blockchain Technology and Supply Chain Resilience:
Towards a Conceptual Framework Based on a Dynamic Resources-Based View

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ABSTRACT

Globalization has increased supply chain complexity and vulnerability to disruptions. Blockchain technology offers a promising solution by enhancing transparency, security, and decentralization. This chapter aims to develop a conceptual framework that explores how blockchain technology can strengthen supply chain operational and strategic capabilities and thereby contribute to greater resilience. Based on a narrative literature review and grounded in the Dynamic RBV, the chapter identifies key constructs and theorizes the relationships between blockchain, supply chain capabilities, and resilience. The proposed model offers a foundation for future empirical studies and contributes to the theoretical advancement of digital transformation in supply chain management.

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INTRODUCTION

Globalization has significantly transformed supply chains, making them more complex and interconnected on a global scale. While this evolution has increased trade and improved process efficiency, it has also heightened their vulnerability to unforeseen events, such as economic crises, natural disasters, and geopolitical disruptions (Alabaddi et al., 2023). Over the decades, the world has faced recurring crises, and the current situation continues to reflect this reality. Growing geopolitical tensions, armed conflicts, and new health threats (such as the recent alert on the HPV virus) disrupt supply chains and underscore their vulnerability to various risks. These challenges threaten the stability and smooth operation of supply chains, highlighting the need to strengthen their resilience to ensure a swift and effective response to disruptions (Spieske et al., 2022; Huang et al., 2023).

Supply chain resilience has thus become a key strategic priority for businesses aiming to maintain competitiveness in an increasingly uncertain global environment (Peters et al., 2023; Xue and Li, 2023). It refers to a system's ability to restore its functionality after a disruption and adapt to emerging challenges to achieve or even exceed its initial performance level. Beyond simple recovery and crisis learning, it relies on continuous vulnerability assessment, proactive risk preparedness, shock absorption, and adaptability to ensure operational continuity. It is essential for maintaining stability and long-term sustainability (Simbizi et al., 2021; Huang et al., 2023; Haddar and Bouaziz, in press).

To address the challenges faced and enhance resilience, many companies are now turning to advanced technologies (Zouari et al., 2021; Birkel et al., 2023). Among these technologies, blockchain has emerged as a promising tool capable of transforming supply chain management (Pandey et al., 2024). Blockchain is a decentralised and distributed ledger that uses cryptographic algorithms to record and verify transactions in an immutable manner. This immutability ensures transparency and security. In fact, this technology relies on three key characteristics: **transparency**, allowing all stakeholders to access and audit information in real time; **data security**, where transactions are protected through cryptographic mechanisms; and **decentralization**, which eliminates intermediaries and facilitates more direct transaction management within supply chains. These three features help optimize risk and disruption management (Nandi et al., 2020; Madhani, 2021).

While blockchain's potential benefits for supply chains are well-documented—particularly in terms of traceability, data security, and process automation through smart contracts—several practical challenges hinder its large-scale implementation. Key concerns include regulatory uncertainty, high implementation costs, and technical interoperability between existing systems (Cole et al., 2019; Dutta et al., 2020; Pandey et al., 2024). These limitations raise questions about how effectively