Chapter 12
How Supply Chain Resilience Mediates Between the Impact of Blockchain Technologies on Sustainable Supply Chain Performance: Evidence From Sudan

Emad Eldeen Essa Abou
http://orcid.org/0000-0002-9951-0996
Ahfad University for Women, Sudan

Mohamed Salih Yousif Ali
Prince Sattam Bin Abdulaziz University, Saudi Arabia

ABSTRACT

The pharmaceutical sector has been and continues to be challenged by unprecedented challenges in disruption, counterfeit medications, and now was pressured about higher sustainability standards. This paper evaluated the effects of Blockchain Technology Adoption (BTA) and its effects on Sustainable Supply Chain Performance (SSCP) of pharmaceutical manufacturing, through a mediating effect of Supply Chain Resiliency (SCR). The paper creates a conceptual model using Resource-Based View (RBV) That characterizes blockchain as a digital strategic asset that enhances the firm's ability to withstand shocks and create long-term sustainability. A quantitative research method was applied using data from pharmaceutical man-

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ufacturing firms to examine the proposed relationships. The data collected from non-probability sample of pharmaceutical companies in Sudan, the questionnaires distributed to managers and supervisors working in pharmaceutical manufacturing companies The results suggested blockchain technology had a significant direct effect on Sustainable Supply Chain Performance

1. INTRODUCTION

Over the past two decades, sustainability has become a strategic imperative in supply chain management and product development, closely linked to long-term organizational viability (Seuring & Müller, 2008; Kouhizadeh et al., 2021). Sustainable supply chain management follows the triple-bottom-line paradigm, which aims to balance the goals of the environment, society, and the economic factors in all levels of the chain, and thus in relation to the World Commission on Environment and Development's alternative definition of sustainable development (WORLD COMMISSION ON ENVIRONMENT AND DEVELOPMENT, 1987).

However, sourcing globalization, resource interdependence, and geographical dispersive suppliers are also challenging in terms of monitoring, coordinating, and improving sustainability performance (Grimm et al., 2016). The blockchain technology has become a promising digital infrastructure that can overcome these obstacles by enhancing the supply chain transparency, traceability, and trust (Nakamoto, 2008; Pilkington, 2016; Saberi et al., 2019). Decentralization, impossibility to change, and safe information sharing are its main attributes that can minimize information asymmetries, enhance compliance tracking, and encourage participants in the supply chain to be accountable (Yaga et al., 2018; Centobelli et al., 2022). Such qualities can be especially useful in the highly regulated industry, where quality and safety standards are a top priority, like in the agricultural-food sector, pharmaceuticals, and luxury goods, where a product provenance and integrity are of utmost importance (Costa et al., 2013; Rotunno et al., 2014; Maurer, 2017; Dey et al., 2021).

Although the application of blockchain in sustainable supply chains continues to receive growing academic and managerial attention, there is currently very little empirical data on such implementation, particularly in the developing economy and in the pharmaceutical industry (Chandra et al., 2020; Iranmanesh et al., 2021; Rahman et al., 2022). The recent geopolitical shocks and health crises across the world suggest that resilient supply chains are required that is, supply chains that sense, respond, and recover unexpectedly without affecting the continuity of their operations (Ponomarov and Holcomb, 2009; Lee and Ha, 2021). There is some emerging literature that blockchain can be used to improve supply-chain sustainability in part by increasing resilience, e.g. by facilitating digital collaboration, enhancing