Chapter 97
Factors Influencing Blockchain Diffusion in the Supply Chain: An Empirical Investigation

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ABSTRACT

The literature concerning supply chain management (SCM) and blockchain integration is scarce, and organizations and decision makers still have a limited knowledge about blockchain solution diffusion in SCM. Under these circumstances, studies aimed to improving the understanding of the main blockchain diffusion factors are fundamental. This chapter is a contribution to bridging such gaps, as it aims to unlock the driving factors of blockchain diffusion in the SCM environment. Based on the emerging literature on blockchain, supply chain management, expectancy theory, and diffusion of innovations, a model was developed and validated, considering data from India's supply chain management professionals. The data was analyzed using partial least square structural equation modeling (PLS-SEM). The results indicated that IT deployment capability, compatibility, and trading partner pressure are factors that affect blockchain diffusion significantly. Also, the results bring essential managerial and theoretical implications regarding the blockchain diffusion in the SCM.

INTRODUCTION

The Blockchain Technology is a highly disruptive cutting-edge technology that is already bringing tremendous changes in a wide array of business models (Fosso-Wamba & Queiroz, 2018). Blockchain typically consists of a distributed ledger, in which the transactions are organized in blocks and linked to

DOI: 10.4018/978-1-7998-5351-0.ch097

each other in a chain. That is, it operates in a peer-to-peer network, where the transactions are validated and recorded by consensus (Y. Chen, 2018). As a formal definition, Blockchain refers to:

A fully distributed system for cryptographically capturing and storing a consistent, immutable, linear event log of transactions between networked actors (Risius & Spohrer, 2017, p.386).

Originally, Blockchain technology emerged as a technology to perform cryptocurrency transactions in the financial market (Nakamoto, 2008; Prybila, Schulte, Hochreiner, & Weber, 2017). In this landscape, Blockchain applications have reached a relative maturity in the financial market, however it is only recently that they have aroused the interest of other areas, such as Supply Chain Management (SCM) field (Fosso Wamba *et al.*, 2018; Kamble, Gunasekaran, & Arha, 2018).

Thus, the blockchain concept can be understood as being associated with transactions disintermediation, that is, without a central authority to validate and offer transactions credibility. This feature implies some impacts on SCM, involving aspects such as member relationships, collaboration, trust and change in the role-based operations model for cloud agility, among other consequences.

Moreover, Blockchain is a buzzword and has aroused the interest of several scholars and practitioners. In this outlook, it has been studied in many contexts (supply chain, IoT, product traceability, healthcare systems, cybersecurity, among others). Specifically in the area of SCM, Blockchain technology can improve the traceability performance (Lu & Xu, 2017) while generating closer and trustworthy relationships (Aste, Tasca, & Di Matteo, 2017) not only between organizations and their suppliers but also through the entire SCM.

In addition, the steady emergence of blockchain technology as the next game changer in the supply chain, has positioned them among the ten top technology trends that are predicted to deeply transform business operations across industries. However, very few empirical studies have been conducted to assess the real potential of these technologies in transforming supply chain processes. A recent review study on bitcoin, blockchain, and Fintech in the supply chain found that only 5% of identified articles used a survey method approach (Fosso Wamba et al., 2018). Despite the numerous potential benefits of Blockchain, its diffusion is still at the first stages, and all its potential remains unclear. The challenges about how managers can ensure that Blockchain adds value to their organizations, and how the diffusion's enablers look like in SCM, remains unanswered.

Therefore, this study is an initial attempt to fill this knowledge gap in the literature. It seeks to draw on the emerging literature on blockchain (Fosso Wamba *et al.*, 2018; Kamble *et al.*, 2018), the diffusion of innovations (Rogers, 2003), expectancy theory (Vroom, 1964) and SCM (Choi & Dooley, 2009; LeMay, Helms, Kimball, & McMahon, 2017) to investigate the driving factors for Blockchain diffusion. The research question that guides this study is: What are the enablers of Blockchain diffusion in the Supply Chain? In order to answer this question, the aforementioned literature was explored to develop a research model. Thus, a conceptual model was validated using PLS-SEM approach (Akter, Fosso Wamba, & Dewan, 2017) with data collected from India's Supply chain professionals.

Regarding the main contributions, this chapter will shed more light on the literature on blockchain-enabled SCM, with a model that can generate valuable insights to advance this research stream. In the managerial perspective, this study will bring robust insights to practitioners and all other stakeholders of any disruptive digital business models, especially in the SCM context. In addition, a brief description of the chapter structure is provided herein. In the next section, a background is presented, focusing on supply chain management, Blockchain, expectancy theory and diffusion of innovations. Then, the