


Chapter 7

Blockchain in Supply Chain Management Prevailing in Smart Cities: Prospects and Approaches


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ABSTRACT

Supply chain enactment engages in a diversified shareholder environment and need provenance, transparency, and trust. The establishment of a decentralised infrastructure comprising several stakeholders is made possible by blockchain technology. The blockchain technology is suited for multi-stakeholder supply chain applications because of these processes. This chapter covers the elements that make up the supply chain, outlines its needs, and describes how blockchain technology might help. This chapter focuses on the use of blockchain technology to develop data and trust management. To assist the stakeholders in making an educated choice, the significance of scalability and interoperability in a blockchain-dependent supply chain is stressed. This chapter ends by downplaying the design difficulties and untapped potential of the blockchain-dependent supply chain industry.

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INTRODUCTION

Farming, communications, and manufacturing are just a few sectors that depend on supply chains. To create, store, and transport products to end users, businesses purchase goods and services from a variety of stakeholders. Organizations depend on data for realizing the stature of supply chain (SC), to make educated decisions about prospective requests, and to optimise their affairs. Companies also use data to manage regulatory compliance and auditing processes. In this product pipeline, details about the commodity, also called as “data” is traded between organizations, freight organizations, analysts, managers, and merchants.

In conclusion, supply chain (SC) information in the structure of digital data may improve the ability of the SC, but to get useful insights, the methods used by SC elements should be reliable. Blockchain technology enables ways to increase trust. A blockchain platform called Bitcoin (Huynh, 2022) offers decentralisation, durability, and clarity through a clear consolidation of a distributed ledger, cryptographic essentials, and a consensus algorithm. Later, the inception of Bitcoin, various blockchain platforms, including Ripple (Serena et al., 2022), Tendermint (Karamachoski and Gavrilovska, 2022) and Ethereum (Aziz et al., 2022) followed suit.

Various stakeholders, such as the manufacturers, retailers, investigators, shipping companies, and occasionally end users, are generally engaged in SC approaches. Owing a clear working framework supported by a decentralised framework merged with immutable ledger (Garg et al., 2022) provides vast commercial and feasible opportunities to the associates. In this case, the adoption of blockchain technology in the SC is required. This chapter describes blockchain implementations in the SC in smart cities and focus on the features and demands of SC implementations.

Features and Conditions for SC Applications

A SC is the whole process of creating and delivering commodities and benefits, starting with the acquisition of necessities and end products along with the shipment of completed commodity. This section presents an outline of key features and criteria coupled with the primary issues confronting today’s supply chain. As shown in Fig 1, a particular SC comprises of numerous shareholders and has various features and concerns.

Features of Supply Chain Networks and Applications

The features of supply chain applications are as follows.

- **Collaborative:** As seen in Figure1, supply chain applications naturally include a number of stakeholders, including producers, transporters, auditors, retailers, and regulators. Each of these stakeholders (Alam, 2022) must work together in order to successfully complete the supply chain while receiving financial incentives, run the supply chain to provide products and services to end customers. However, cooperation becomes difficult when there is no efficient method for managing and openly sharing supply chain data among stakeholders and there is a low degree of trust.

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