Chapter 17
The Impact of Blockchain Technology and Decentralized Supply Chain on Production

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ABSTRACT

In this chapter, the authors will examine blockchain technology and decentralized supply chain and their impact on production. Despite significant research, supply chain management has many years to solve issues such as product supply, product life cycle, transportation history, etc. Therefore, blockchain technology in various industrial sectors as a support technology shows that it is a decentralized and distributed which enables all secure transactions and transactions without intermediaries and provides a permanent and anti-tampering record of transactions so that all data can be accessed and confirmed by anyone who has access to the network. In fact, blockchain technology is considered to improve the functionality of the decentralized supply chain and is used to increase the level of security and supply chain services so that all product assets registered by blockchain technology are untamperable.

1. INTRODUCTION

Blockchain, as a distributed data infrastructure, provides the possibility of secure data exchange (Pilkington, 2016). Blockchain as a technology can affect the way organizations are run and the structure of supply chain relationships (Kosba et al., 2016). Considering that the development and dissemination of blockchain technology is in its early stages and the impact of blockchain technology on the supply

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chain is being investigated, its benefits are uncertain and its destructive effects are unpredictable. Studies show that blockchain has the potential to cause both positive and negative disruption in the supply chain (Wang Yingli., 2019). Blockchains increase the accuracy and security of data and increase transparency and reduce fraud in the supply chain. Studies also show that they are looking for how blockchain can create integration and cooperation throughout the supply chain (Pszewczyk et al., 2019). Blockchains allow individuals and organizations to permanently record information without a central authority and provide the infrastructure for a democratic digital economy (Yluo et al., 2021). Blockchain technology can direct the economic market as a web 3.0 network and bring new businesses into the market and accelerate digital, decentralized and automated markets and can be a permanent source of innovation and economic growth (Chen, 2018).

Due to the complexity of the supply chain's multifaceted nature, blockchain can create integration and cooperation in different parts of this network (Mire, 2018). According to the connection between different parts of the supply chain, including logistics - transportation - production and retail, blockchain estimates the integrity of the entire network. Due to the complexity of the supply chain and the cost of related factors and the delay in payment between the manufacturer and the supplier or the customer and the seller, this network can be balanced with blockchain asset management (O Byne, 2017).

On February 1, 2018, the European Commission, with the support of the European Parliament, launched a two-year project, including the Blockchain Observatory and Forum, which will strengthen European engagement with multiple stakeholders involved in blockchain activities (European Commission Launches, 2018).

Black chain technology creates a high level of security and traceability in online economic transactions. Given that blockchain technology is expected to affect digital services and business models such as health care - insurance - finance - energy - logistics - management of intellectual property rights or government services, and create changes Review the current situation The global supply chain and the application of blockchain is the subject of some projects of the European Union Blockchain Observatory (Lyons, 2019).

The complexity of the supply chain is constantly increasing and the rapid transformation of the product to the end customer is of great importance. An independent company as a logistics provider is necessary to create a supply chain plan. A decentralized supply chain is proposed to minimize the sharing of information between the manufacturer and the logistics provider (Hosang Jung et al., 2007).

In the decentralized supply chain network, organizations try to maximize their profit despite their common goal, which leads to an increase in the profit of the entire network. Since the mid-1990s, the concept of collaborative agent has increasingly emerged in the field of computer programming (Adacher-Agnetis & Meloni., 2000). An agent-organization always tries to maximize its profit and reduce its costs, and in the meantime, a decentralized supply chain network is necessary to maintain private information and privacy (Lee & Kim., 2002).

The existence of blockchain technology with decentralized data archiving in supply chain processes estimates the security of big data and helps the optimal performance of data (Javid Ghahremani et al., 2022).

Blockchains can be used to improve payment processing in the supply chain. Where buyers use a Supply Chain Financing (SCF) platform to pay their suppliers' invoices (Nozari et al. 2021). Achieving customer satisfaction requires integration and cooperation throughout the supply chain (suppliers - manufacturers - retailers - logistics service providers - banks - regulators) (Szmelter – Jarosz., 2022).