

BLOCKCHAIN TECHNOLOGY IN SUPPLY CHAIN MANAGEMENT: ENHANCING TRANSPARENCY AND EFFICIENCY

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ABSTRACT

A major step toward improving stakeholder trust, efficiency, and transparency in supply chain management is the incorporation of blockchain technology. This study examines how blockchain technology can revolutionize supply chain operations, with a particular emphasis on how it can offer a safe, decentralized, and unchangeable ledger for transaction recording. Blockchain provides a strong defense against the weaknesses and inefficiencies of traditional supply chains by tackling important issues like data integrity, data traceability, and counterfeit protection. We start by giving a thorough introduction to blockchain technology and explaining its guiding concepts, such as decentralization, consensus techniques, and cryptographic security. The paper then explores the particular uses of blockchain at several phases of the supply chain, ranging from procurement and manufacturing of raw materials to distribution and retail. We demonstrate how blockchain enables real-time monitoring and provenance verification, therefore guaranteeing the authenticity and quality of items, using case studies and actual data.

The capacity of blockchain to provide a single, shared version of the truth that is available to all players is one of its main advantages in supply chain management. Because every transaction is tamper-proofed and time-stamped, this transparency reduces the possibility of fraud and mistakes. An essential component of blockchain technology, smart contracts automate contract compliance and execution, which further improves operational efficiency by doing away with the need for middlemen and manual oversight. The constraints and difficulties of using blockchain technology in supply chains are also covered in this article. Critical examination is given to issues including regulatory compliance, scalability, integration with current systems, and standards requirements. In order to overcome these obstacles, we provide some possible answers and approaches, stressing the significance of cross-industry cooperation and legal frameworks to enable broad adoption. To sum up, supply chain management might be completely transformed by blockchain technology, which promotes increased security, efficiency, and transparency. Blockchain technology is set to become a fundamental component of contemporary supply chains, spurring innovation and competitive advantage as more sectors learn to understand its potential. To further improve supply chain capabilities, future research should concentrate on creating scalable blockchain systems and investigating synergies with other cutting-edge technologies like the Internet of Things (IoT) and artificial intelligence (AI).

KEYWORDS: *Blockchain Technology.*