

Supply Chain Management in Construction Using Blockchain

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Abstract: *The increasing complexity of global supply chains has underscored the need for greater transparency, trust, and traceability across all stages of product lifecycle management. Traditional centralized supply chain systems are often plagued by data silos, limited visibility, and vulnerability to fraud or tampering. This research presents a decentralized Supply Chain Management (SCM) framework developed using Blockchain and Web3 technologies, aimed at overcoming these limitations. Leveraging the immutability and distributed consensus of blockchain, the proposed system enables secure and transparent tracking of goods from origin to destination. Smart contracts, deployed on the Ethereum blockchain, automate critical processes such as shipment verification, ownership transfers, and quality assurance, reducing reliance on intermediaries and manual paperwork. A Web3-enabled frontend, integrated with digital wallets, provides seamless, permissioned access for stakeholders including manufacturers, suppliers, distributors, retailers, and consumers. The construction industry faces persistent challenges in managing its supply chain due to its complexity, involving multiple stakeholders, fragmented processes, and frequent disputes over transparency and accountability. Blockchain technology offers transformative potential to address these challenges by providing a decentralized, immutable, and transparent ledger system. This paper explores the integration of blockchain technology into supply chain management within the construction sector, focusing on its ability to enhance trust, streamline operations, and ensure real-time traceability of materials and transactions. The study highlights how blockchain can mitigate inefficiencies such as delays, fraud, and cost overruns by enabling smart contracts, secure data sharing, and automated compliance with project milestones. By reviewing current implementations, challenges, and future prospects, the paper aims to present a roadmap for adopting blockchain technology to create more resilient, efficient, and collaborative supply chain systems in construction projects. The integration of blockchain technology into supply chain management within the construction industry presents a transformative approach to enhancing transparency, efficiency, and trust among stakeholders. This research paper explores the potential of blockchain to address prevalent challenges such as payment delays, material traceability, and contract enforcement. By leveraging decentralized ledgers and smart contracts, the study highlights how blockchain can streamline processes, reduce fraud, and improve collaboration among contractors, suppliers, and clients.*

Keywords: Supply Chain Management, Blockchain Technology, Smart Contract, AWS S3

