

Supply Chain Management Using Blockchain : A Review

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Abstract:

This paper is focused on various algorithms which have been used to implement Supply Chain Management using Blockchain. Blockchain Technology assures immutability and integrity of data, also guarantees a transparent and decentralized transaction system. In recent studies, various centralized technologies used to implement supply chain management have difficulties in resolving problems such as lack of trust in supply chain, information asymmetry of production process. There have been various frauds in the supply of products due to lack of integrity. Blockchain is a promising technology to address these problems.

Keywords: Blockchain, Supply Chain, Hash, Counterfiet

Introduction:

The contiguous emergence of counterfeit of products and products' quality scandals has revealed the importance of supply chain management. The manufacturing companies face a great loss of due to their negative influences on downstream supply chains, including loss of market share. To solve these counterfeiting problems in supply chains has become a key issue in acquiring manufacturing power. Although there have been many related research projects and studies, to resolve the series of problems arising from lack of trust is still a difficult problem for the technologies used nowadays.

Blockchain is a decentralized transaction and data management technology firstly designed by, Satoshi Nakamoto . Based on the literature, blockchain definition was synthesized as a distributed database, which is shared among and upon peer-to-peer networks. It consists of a linked sequence of blocks , holding timestamped transactions that are secured by public-key cryptography and verified by the network community. Once an element is appended to the chain of blocks, it cannot be altered, turning blockchain into an immutable record of past activity . Trust and decentralization are identified as two key Blockchain technology features, which are closely connected and interconnected.

The *Economist* called Blockchain technology the 'Trust Machine' since a ledger most fundamentally represents a trustworthy record of business activity. Trust is a key ingredient in business relationships for inter-company supply chain collaboration. Consequently, Supply chain management is seen as a major application of Blockchain technology.

SCM covers major tasks such as, planning, implementing and controlling of primary activities that create and deliver value for the ultimate customers. While in Blockchain, given a shared ledger of transparent and immutable records. Blockchain provides to trace assets back to their origin. This is how by merging Blockchain with Supplychain management ,SCM attempts to solve counterfeiting of goods.

Literature Survey:

Food and Drug Counterfeiting in the developing nations has the objective to study the anti-counterfeit technology solutions to include all drugs and food counterfeit to ensure a long lasting and effective preventive measure to reduce and eventually stop food and drug counterfeiting especially in the developing nations. [1]

Strategies to detect and reduce counterfeiting activity is having the main aim to detect and reduce counterfeiting activity via a plan which consists of four steps : a.developing early warning signals of counterfeiting; b. budgeting to monitor,deter and remove counterfeits; c. using demand-side strategies to detect counterfeiting; and d. using supply-side strategies to detect counterfeiting.[2]

Understanding and fighting the medicine counterfeit market has the main objective to point out the intricacy of medicine counterfeiting so that a better understanding can provide solutions to fight more efficiently against it.[3]

Blockchain applications , effects and challenges in Supply chain published in International journal of Information Management, in which The main effects observed in the study cases analyzed show the ability of blockchain to overcome the currently main issues in supply chain management, enabling to reduce cost, enhance supply chain efficiency and increase customer value.[4]

A Blockchain-based Supply Chain Quality Management Framework published in Eighteenth International Middle East IEEE, in which It provides a foundation to develop theories about information resource management in distributed, virtual organizations.This framework will be applied to design intelligent Supply Chain Quality Improvement system for a real-world application.[5]

Merging Supply Chain and Blockchain Technologies published in Eighteenth International Middle East IEEE,in which Supply Chain Processes could be easily transformed to meet the blockchain architecture.Blockchain and supply chain merging will be promising and beneficial for certain scenarios such as Data Transparency and Resource Sharing.The overall performance of Supply Chain Management will be enhanced.[6]

Reducing Counterfeit Products with Blockchain published in IEEE International Conference on e-Business Engineering, in which Multiple approaches to reduce counterfeits were focused on,changes to the existing system were considered and their impact on reducing counterfeits evaluated. The concept and implementation to reduce counterfeits in the humanitarian supply chain management is still under development.[7]

Understanding Blockchain Technology and how to get involved published in International Scientific Conference e-Learning and Software for Education, in which Blockchain technology enables the creation of a decentralized environment, where the cryptographically validated transactions and data are not under the control of any third party organization.[8]

Block-supply chain: a new anti-counterfeiting supply chain using NFC and blockchain published in Block-supply chain: a new anti-counterfeiting supply chain using NFC and blockchain, in which Current anti-counterfeiting supply chains rely on a centralized authority to combat counterfeit products. Blockchain technology has emerged to provide a promising solution for issues such as single point processing,storage and failure.[9]

An agri-food supply chain traceability system using blockchain published in IEEE International Conference on e-Business Engineering, in which Food safety has become an outstanding problem in the past years. With traceability and immutability features of blockchain, it has been a great advantage to the performance of supply chain.[10]

Proposed Methodology:

Our primary work is to provide integrity and provide customers the complete details about the whole transaction right from the manufacturer to the customer with the help of hash generated for every transaction using blockchain.

Login/Signup is for system admin. Admins have the authority to add products, manufacturers, distributors, retailers and customers. Further Manufacturers can assign themselves to manufacturers of a products. Customers can assign themselves to retailer of a product . Blocks will be added at each level of the product .

When a product is added, Blockchain is initiated and genesis block i.e first block is started. When manufacturer assigns a product to itself then another block is added where details regarding manufacturer is added to the data of the block . When distributor assigns a product manufactured by a manufacturer to itself, another block is added alongwith the details of the distributor. When the retailer assigns a product distributed to it, another block is added. When the customer finally purchases a product , another block is added. The chain gets terminated once product has been sold to customer.

Conclusion:

It has been discussed that there have been various Supply chain management systems previously developed which lack transparency ,detection of frauds and errors, trust between consumer and manufacturer.

It has been attempted to fight counterfeiting using blockchain in SCM . Using unique identifiers, physical goods have linked to a blockchain , where every transaction of the item is stored. This allows for perfect traceability, combined with the fact the data cannot be tampered, and that in case of a system failure, the data is still available. Using Public blockchains, trust in the system can be increased, which adds an extra benefit, especially if there is no central trust into authority.

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