CASE STUDY OF BLOCKCHAIN
IN SUPPLY CHAIN

Overview

Supply chain is a linear economy model that directly or indirectly fulfils supply needs. But this model has some disadvantages, such as the relationships between the members of the supply chain or the lack of information for the consumer about the origin of the products. In this paper we propose a new model of supply chain via blockchain. This new model enables the concept of circular economy and eliminates many of the disadvantages of the current supply chain model. In order to coordinate all the transactions that take place in the supply chain a multi-agent system is created for this paper.

What are the drawbacks of supply chain?

·Large scale management: The current supply chain model works hand-to-hand which make it extremely difficult to manage and scale.

·Lack of coordination: As the supply chain management grow and scale via hand-to-hand model, makes it difficult to coordinate multiple departments besides a worker's sentiments which can lead a delivery getting delayed or even misplaced.

·Trust: The whole system of the current supply model works on reliance because it's impossible to provide the proof of payment for every transaction on supply chain.

How blockchain can solve the issues?

·Blockchain can solve the traceability issue in supply chain which

ensure the client to track their product easily using the time-stamps generated when the order is validated by different participants in the blockchain.

·The implementation of blockchain also allows to lower loses from grey market trading.

·It can reduce the paper work which is one of the hectic parts of supply change thus reducing the administrative cost.

·Increases trust due to the transparent nature of the blockchain.

Use Cases:

General:

· Opportunity to reduce control structures of centralized databases.
· Process enhancement through decentralization by information sharing with a change of competencies.
· Automated data transfer under one umbrella.

Trust Level:

· Decision-based on a democratic majority.
· Smart contracts as a self-execution procedure.
· Technical feasibility aspects easy to implement.
· 'Trust factories' as the end product of decentralization.
· Self-generating audit trails.
· All SC participants are known, tracked and certified properly.

Transparency:

- Visible tracking activities.
- End-to-end visibility according to permission levels.
- Customers gain loyalty and knowledge with product transparency.
- Regulators' opportunity to monitor properly.
- Purposeful targeting of customer consumption enabled
- Reduction of the bullwhip effect.
- Zero-knowledge proofs for data sensitivity improvement.

Data security:

- Digital certificates instead of paper ones mitigate the risk of physical loss.
- Uniquely identification of data enhances its security level.
- Data correctness improves the comprehensiveness of SC.
- Data integrity at low cost through a guarantee of participants identities.
- Permissioned system.

Traceability:

- Optimization of time schedules.
- Real-time information for customers on origin and product life cycle.
- Identification of grey market activities.
- Comprehensible data flows generate customers' willingness to pay premiums.
- Higher responsiveness to global trends and movements enabled.

Irreversibility:

- All participants with the same information.
- Reduction of communication and data transfer errors.
- History of network activities improves trust issues within manufacturers.
- Immutability of data boosts the legitimacy of complex supplier networks and favours products on blockchain-based solutions.