

New Approach to SCM (Supply Chain Management) using Blockchain.

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Abstract: Blockchain is a relatively recent concept. Blockchain was initially used in bitcoin, But it is more than the foundation of cryptocurrency. It is used to build trust in trustless environment. It provides a secure way to transfer any kind of goods, services or transaction. Blockchain will facilitate more agile value chains, faster product innovations, closer customer relationships, and quicker integration with new technology. It enables smart contract, engagements and agreement with robust Cyber security feature. We will take a closer look to how Blockchain can help solve many solutions in supply chain management like delay, counterfeit, etc.

Keywords: *Blockchain, SCM, Bitcoin , Smart Contract, RFID, Token, Node.*

I. Introduction

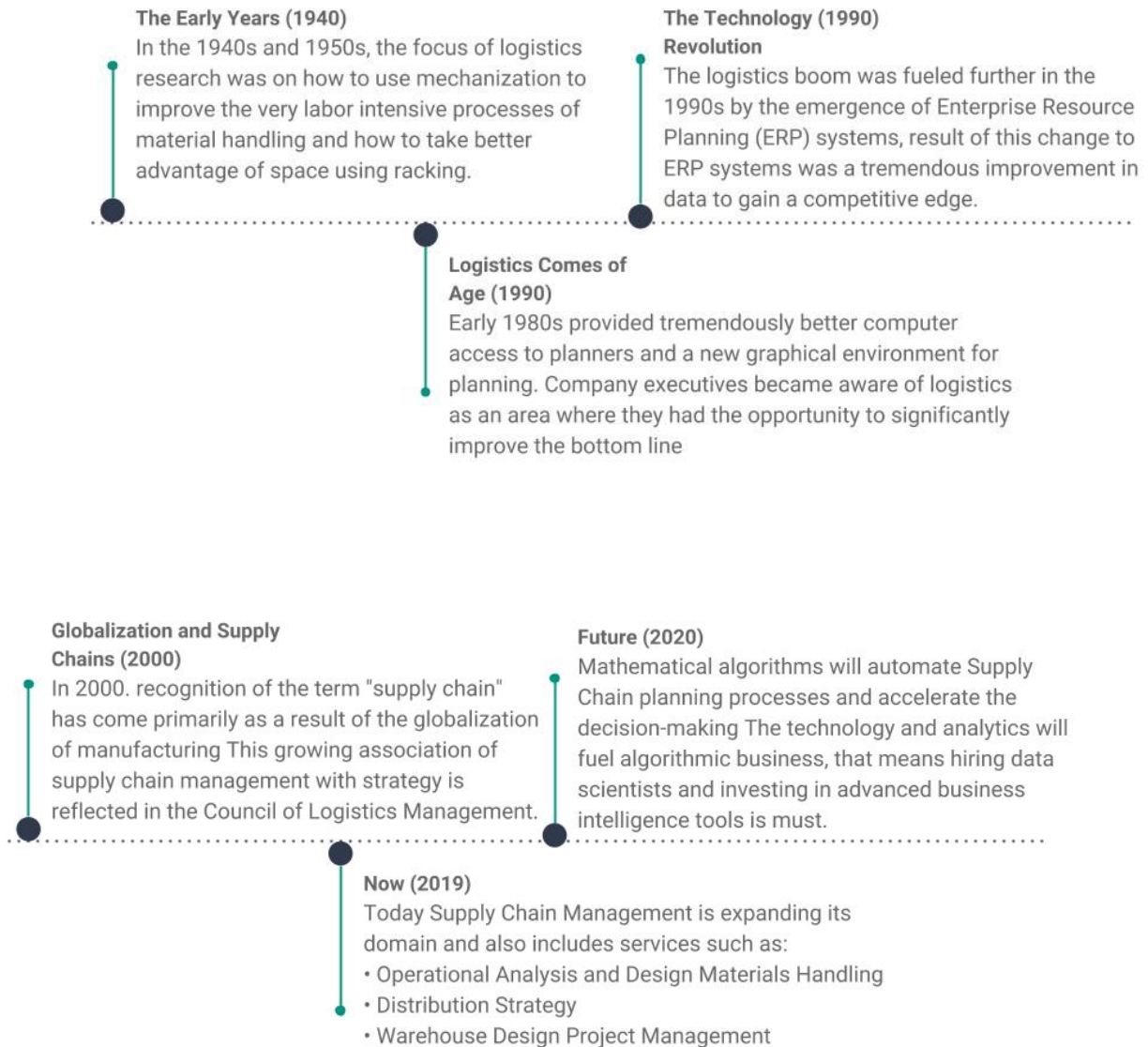
TERM	DESCRIPTION
Decentralized	The system that stores data across the

	network.
Smart contract	Encode business rules and business logic into software which executes with transactions.
Oracle	Mechanism that connects smart contract to the real world.[14]
Token	An "IOU" that can be redeemed for goods or services at a specified data in the future[14]
Node	The device in the Blockchain system.

Technical terms

Wikipedia defines Blockchain as "A decentralized and distributed digital ledger that is used to record transactions across many computers so that the record cannot be altered retroactively without the alteration of all subsequent blocks and the collusion of the network." [2]

History of SCM



Blockchain is a distributed ledger which is immutable. In blockchain transactions are group together to form a block and the blocks are chained with one another in such a way that if someone radioactively tries to change any block he has to change all the subsequent block.

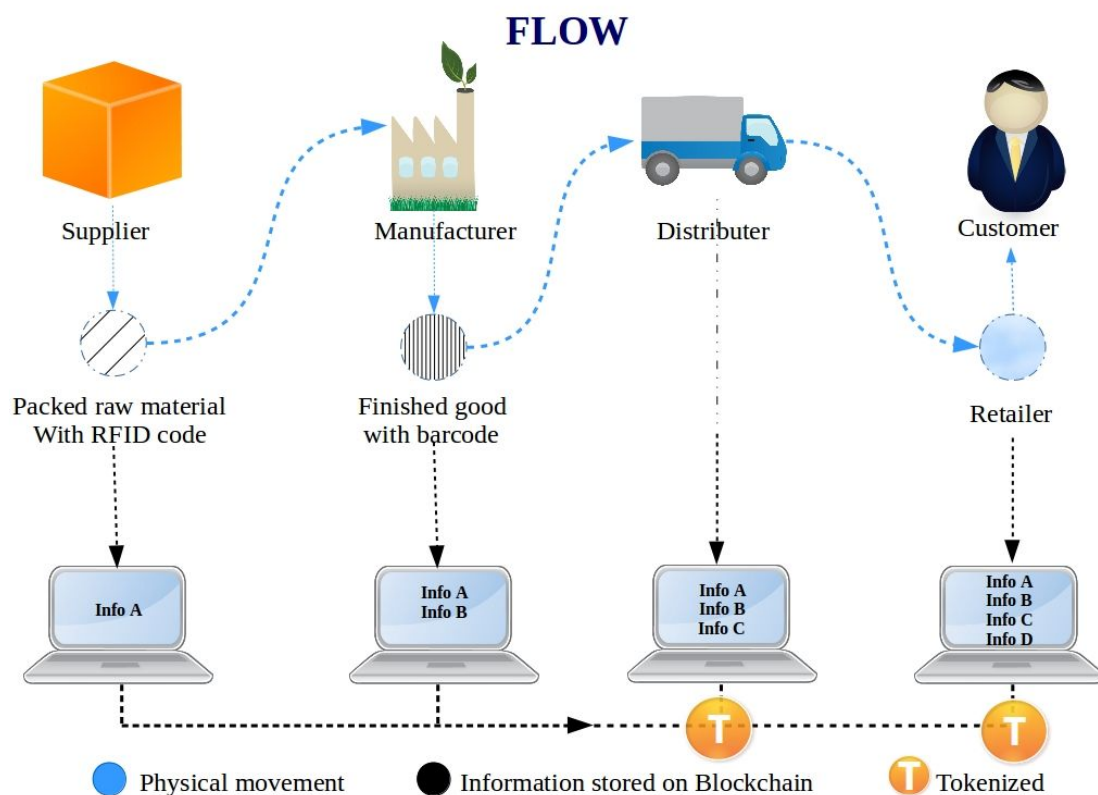
In 2008, Satoshi Nakamoto introduced Bitcoin by releasing the paper "Bitcoin: A Peer-to-Peer Electronic Cash System." [1]. Bitcoin is a peer-to-peer electronic cash payment system. It was the first implementation of blockchain.

Supply Chain Management is one of the areas where Blockchain can be used to

solve real business problems due to lack of visibility or component information as the product moves in the supply chain. Supply Chain Management is a active management of supply chain activities to maximize customer value and achieve a competitive advantage. It involves series of key activities and processes if completed in efficient and timely manner will increase productivity and product will be delivered on time. Nearly all the company in the world use ERP (Enterprise

Resource Planning). And supply chain management tools. Despite the huge investment in digital infrastructure, most company have little or limited visibility and insights about their product throughout supply chain.

The modern challenges that the companies face can easily be tackled using blockchain. Blockchain can provide more visibility, trust, better insights and cost reduction through the use of smart contract, oracles, cryptograph



II. Supply Chain Solution

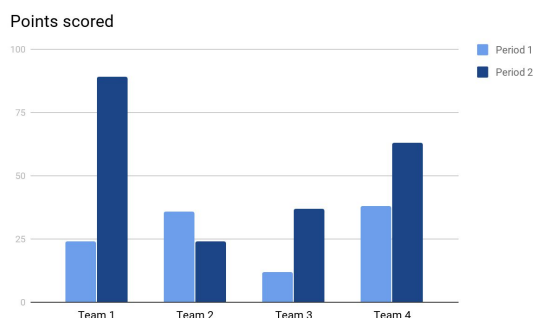
Different nodes in the system would interact with the blockchain and enter the product detail at that particular time with the use of DApp (Distributed Application). Different IOT sensors or oracles will also capture the data such as humidity, temperature wherever required. The

product ownership will be then transfer to different owners throughout the product journey this data will also be stored in the block through smart contract. Consider a sample life cycle of the product A. The Manufacturer order the raw material for the product A. The supplier than packs all the raw material needed along with a RFID code that the supplier will enter this detail

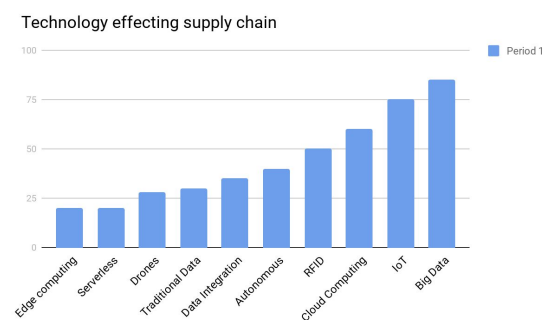
in the blockchain and transport it to the manufacturer. Manufacturer after receiving the product will confirm the package and enter the necessary details in blockchain. After the product have been Finished a unique number (QRcode, Barcode ,RFID code) would be assigned to the product and product would be tokenized to the Distributor. The distributor after the Transportation of the product will tokenize it to the retailer.

This system will form a network of trust through shared ledger, as neutral participants maintains a distributed, permissioned ledger with copies of document filings, relevant supply chain events, authority approval status, and full audit history, every change results in a new, immutable block. Cryptography will enable permissioned access only to the participating parties in a particular transaction. All the documentation and authority approvals will be pre-programmed into the blockchain with the help of smart contracts. Documentation filings and authority approvals can only be changed if endorsed by the parties taking part in the shipment, This will create trust as full audit history is maintained on the Blockchain.

III. Analysis



According to the survey done by McKinsey, “Lean and Mean – how does your supply chain shape up?”[9], Most of the cost and time of many supply chain lurks ignored and unmanaged in outbound logistics and behind the closed doors of distribution center. Upto 10% of overall cost of the product is due to supply chain costs, Companies can save 20-50% in warehousing and up to 40% in transportation if we can effectively manage the supply chain process.



The next chart[8] shows the technology affect the supply chain. Blockchain equipt with such technology while greatly impact the Supply Chain Industry

IV. Challenges

There are various challenges that a blockchain based system needs to tackle. The ecosystem needed for blockchain is still in progress but the widespread acceptance will quickly join the dots. Blockchain technology require technical support, the staff must be trained and more people are needed to be hired. Initial cost of implementing such a system is very costly but it provides long term benefits, efficiency, timeliness and reduced costs. This are few of the many challenges that such a system needs to tackle.

V. Conclusion

Blockchain is a distributed digital ledger which is immutable. Blockchain build trust in trustless society with the help of technique such as smart contract, cryptography etc. Blockchain is an emerging technology with many application such as supply chain. Blockchain alone is not so effective if we combine it with outer technologies such as RFID, Machine Learning, IoT, etc will greatly improve the Supply Chain Management process.

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In-dept transformation of supply chain will not happen overnight. However supply chains can already start using blockchain for small portions of the operations. "Smart contracts" can help eliminate cost delays and waste currently due to manual handling of paperwork. Lastly, Business and brands need to embrace Blockchain technology well in time so that they can reap its reward and get better with time.

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