

BLOCKCHAIN - AN AID TO SUPPLY CHAIN MANAGEMENT

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ABSTRACT:

Supply Chain management is the crucial part for every product that we use today. There is no transparency and the chances of fraud are very high. Customers get broken and ill treated products. Blockchain is the open peer to peer network that lets us see all the transactions in the network. This paper addresses the problems and how effective is the technology.

Keywords:Blockchain, Smart Contracts, Internet of Things, Traceability

INTRODUCTION:

Supply chain has been drastically changing and finding new ways to deliver the customers their products. However, the problem that still persists is the accuracy and transparency of where the product has been, what was done to it. This paper will address to those problems using the new technology Blockchain. The research includes secondary sources of data, use cases provided by the IBM, a simple survey conducted on the knowledge of the blockchain among students.

What is Blockchain? Of the survey conducted on students of 59, 35.6% do not know what it is, the difference between Bitcoin and Blockchain is not known up to 44.1% .1 According to John Cohn, a scientist from IBM, Blockchain is a shared, unalterable ledger for recording the history of transactions. It increases trust, accountability, and transparency among the business networks.

1 There are two types in Blockchain.

A Public : Anyone who has an internet connection can send transactions, it has no restrictions for the people to join.

B Private: This network has restrictions for the people to join. They cannot join unless another person of the network sends an invitation.

• Cohn,John, Genius of Things Summit, IBM

2. Another characteristic of Blockchain is Smart Contract. A smart contract is a program that is given a task, when the given conditions are met, the task is carried out. 2According to Jeff Reed, Smart contracts help you exchange money, property, shares, or anything of value in a transparent, conflict-free way while the services of a middleman. Ethereum was specially designed for Smart Contracts. It runs on a programming language called Solidity which is similar to a Java Script. For example, we have online fundraisers, when the goal is met the amount is transferred from the website to the needy. The website acts as a middle man. Using a Smart Contract this can be avoided, it can be programmed for a goal to be met and transfer the money directly to the needy. The helpers transfer the money to the contract, it holds the money until the goal is met, everyone in the chain validates it (agree on it) and then the money is transferred, if the goal is not met, a validation is taken again and the money will go back to the helper.



Reed,Jeff,(2016) Smart Contracts The Essential Guide to using Blockchain Smart Contracts for Cryptocurrency exchange.CreateSpace Independent Publishing.

Fig. 1. Devices that include Blockchain: Internet of Things (IoT) is one of them. To explain it in brief, it is the devices that are connected to each other to complete a task. For example, we can control our AC with our mobile phone. IoT offers a platform for these connected devices to have a simple and sole language to understand and communicate with each other. The devices are embedded with sensors and data is emitted from them, this data is collected in the IoT platform and analysis is performed to derive insights. This is then shared with the devices for better performance and efficiency.

3One convergence if IoT and Blockchain is known as Slock.it. It is a door lock that is connected to a Smart Contract in Blockchain that controls when and who can open it. Leveraging Blockchain for IoT offers new ways to automate business processes and build distributed autonomous service systems.

Objectives to achieve using Blockchain for Supply Chain Management:

1. Transparency
2. Traceability
3. Speed

REVIEW OF LITERATURE:

Spinach Outbreak 2006 (North America)

In the year 2006, there was a spinach outbreak in North America. The organic spinach had the presence of the dangerous bacteria called E.coli. 26 states were affected, 276 people infected and 3 deaths were caused. Farmers had to face a loss of \$74 million due to the outbreak. The reason for the outbreak was that, one farmer was leased on a cattle rear farm which had the bacteria.

3 Complexitylabs.io, <https://youtu.be/9fw8Q1Zd-mQ>

Reports also stated it can be the transportation and processing systems of the producer that spread the contamination.

This is a use case that was presented by the Vice President of Walmart at the Genius of Thing Summit IBM. Walmart and IBM go hand in hand to solve problems like these using the IBM Blockchain.

Blockchain records the transactions and creates Smart contracts for product that can be traced and find what was it conditioned with. The stores will include a barcode on the product which the customer can scan and find the information of where the product came from, where was it transported, stored, processed and delivered. At every step there is a digital signature that is signed, a hash is created turning the characters and numerics into algorithms essential in the blockchain management. Miners have to solve a complex cryptographic hash algorithm to make a change or enter a new record in the chain, they are rewarded with the bitcoin currency or anything with the respective field. Any unauthorised change that is made in the chain will be visible to all the parties who are a part of it. They can either validate it or reject it. This way fraud can be avoided and traced. Once that took days or months to trace the origin will be now in minutes using the blockchain network. This provides better products and services for everyone in a transparent environment.

Nike 1991

In the year 1991, Nike received feedbacks on the poor working conditions at the Nike Factory Indonesia. The company denied the factor that it was responsible for malpractice. The story took a lead and a boycott started all over the world. It was in 1996 that the company decided to address the problems and by 1998 it started receiving positive feedback.

One of the reason that the company might have declined the statement in the beginning might be the poor availability of accurate data. It took the company 4 years to recover its position in the market. Agreed that the technology back then wasn't coherent, this can be an example for pointing out problems in the supply chain. If the situation happened today, using blockchain we could have either avoided it or get to the solution in days than years. The network will have the data about the production process, who is doing what, which cannot be tampered with. The company can take a view at this data and using the convergence of IoT and Blockchain it could derive insights and take a decision.

Heparin Adulteration- China (2008)

In the year 2008 the Food and Drug Association of the US government made a large recall of the drug Heparin. It is usually injected to prevent blood clotting and is derived from slaughtered animal tissues.

The recall followed an alleged 81 deaths and 785 other reports of severe injuries linked to the drug. Investigations identified the contaminant as an over-sulfated derivative of chondroitin sulfate, which can be used as a dietary supplement, but not as a medicine. Worst of all, several compelling reasons led authorities to believe that the contamination was deliberate, including the fact that it imitates the effect of heparin yet is a fraction of the price.

One of the FDA's excuses was it is difficult to inspect medicine overseas. This can be solved in minutes when the drug is on the blockchain network. The drug can be traced down in minutes and we can find the cause for disruption in minutes. This faster approach can help us save more lives.

CONCLUSION:

Now Blockchain operation might be complex to understand but it is a revolutionizing technology. Once everyone opt for it, the systems can be trusted. One of the challenges that we have is the awareness of this technology. It can create a sustainable management of resources. When IoT, Analytics and Blockchain come together, we can achieve a trusting society, get to better solutions with faster approach. It is not limited to one particular field, blockchain is only a system that can be embedded into many others. Few examples include voting, health care, digital IDs, royalty protection, tax regulation and compliance.

This is a revolution for the better today and tomorrow that we must all pledge to take part in. 4 “The true value of the underlying technology -- the blockchain -- has only just begun to be explored, and potential applications to the Internet of Things and Smart Systems are vast.”

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