Analysing the impact of Blockchain technology for Operations and Supply Chain Management

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Introduction to Blockchain

Presentation by Group 13

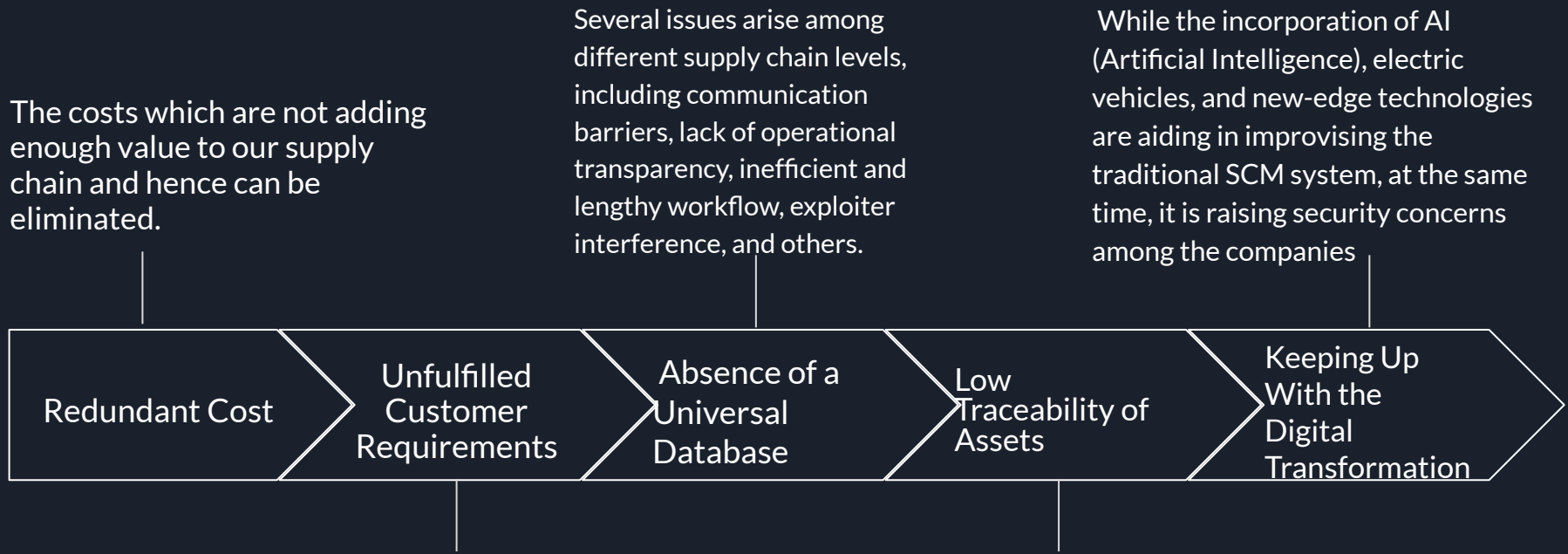
Overview

Blockchain technology was first conceptualized by Satoshi Nakamoto in 2008 and was fully validated the year after through the bitcoin system implementation. Blockchain technology can be viewed as a distributed ledger that allows a group to record and exchange information. Because it maintains transactional information and is made up of chains of interconnected blocks, the technology is known as the blockchain. Each block contains information about itself and the previous block along with a timestamp; this creates a unique ID for each block called a hash. Being an immutable technology, this protects the data from being altered and is helpful for internal information exchange. Additionally, blockchain technology uses smart contracts to validate every new information block.

Functions of Intermediaries

- The provision of relevant information to customers and suppliers; data on demand, supply and prices and trade requirements.
- Matching of supply and demand in a market.
- Act as platform providers, offering additional services on an electronic platform for customers.
- A trustworthy authority that can deliver the trust required for settling business between strangers, thus reducing risk in a business relationship.
- Provide added value such as the transportation of goods, fiduciary services, additional payment arrangements and financing options as well as consultancy.
- Ensure compliance with governance rules by providing a regulatory function between buyer and seller.

Challenges in Supply Chain Management


The costs which are not adding enough value to our supply chain and hence can be eliminated.
Several issues arise among different supply chain levels, including communication barriers, lack of operational transparency, inefficient and lengthy workflow, exploiter interference, and others.
While the incorporation of AI (Artificial Intelligence), electric vehicles, and new-edge technologies are aiding in improvising the traditional SCM system, at the same time, it is raising security concerns among the companies
Redundant Cost
Unfulfilled Customer Requirements
Absence of a Universal Database
Low Traceability of Assets
Keeping Up With the Digital Transformation
changing customer demand patterns often gets tough without a systematic approach.
This results in poor quality assets, unwanted asset replacement, unfulfilled customer requirements, and others.

Applications of Blockchain in Supply Chain

Blockchain improves Supply Chain Management Process: Maersk

Business Challenge

The Danish shipping company Maersk is the world's largest container carrier and accounts for 18% to 20% of the market. Maersk uses the solution to track its shipping containers around the world with attributes like GPS location, temperature, and other conditions . For many years, Maersk had been looking for a better way to trace the goods it ships worldwide. For Maersk, the key problem was the "mountains of paperwork" required with each container.

Initiative

The chairman of IBM Europe, Erich Clementi personally pitched blockchain to the top technology executive at Maersk. Maersk and IBM started working on a version of its software that would be open to everyone involved with every container.

Results

- When customs authorities signed off on a document, they could immediately upload a copy of it with a digital signature.
- If there were disputes later, everyone could go back to the record and be confident that no one had altered it in the meantime. The cryptography involved would make it hard for the virtual signatures to be forged.

Blockchain eases trade finance: Marco Polo Network

Business Challenge

For both exporters and importers, international trading can be risky. When an importer pays in advance for goods, the exporter may collect the cash without sending the goods. However, if the exporter agrees to receive payment after delivery, the importer may refuse to pay after receiving the products. To overcome this problem, traders collaborate with third parties, such as banks, that employ instruments like letters of credit, which guarantee payment once goods are delivered to the importer.

Initiative

- Marco Polo Network utilizes blockchain technology to provide a platform for exporters and importers to transparently share delivery data by integrating with supply chain ERP systems and creating an immutable contract for parties that guarantees the exchange of money and goods under specified conditions.
    - Initiative potentially eliminates the need for third-party existence that solves the “trust issue.” However, third parties also involve and benefit while they are using Marco Polo Network’s solution since the platform increases transparency.

Results

- Enhances working capital cycle for both buyer and seller.
- Automates transaction settlement process.
- Reduced complexity by digitizing documents.

Blockchain improves compliance: Renault

Business Challenge

The automotive sector is highly regulated. Renault, for example, deals with 6,000 regulatory and quality characteristics relating to:

- Safety regulations
- Geometric features
- Material quality
- Environmental concerns

A vehicle must meet specific internal and external compliance criteria to be offered on the market. A change in regulations needs to be communicated downstream to suppliers and suppliers of suppliers to ensure that they all build according to the new specifications. Therefore, Renault needed a platform throughout the ecosystem in a transparent manner to ensure compliance.

Initiative

Renault and IBM collaborated to create the automotive industry’s first extended compliance end-to-end distributed blockchain platform for the traceability of components' internal and external regulatory compliance.

Results

- Reduces expense of non-compliance by half.
- The initiative reduces the cost of managing non-quality/non-compliance by 10%.
- Renault wants to invest more in blockchain technology for the visibility of product carbon footprints and recycling operations due to the initiative's success, aligning with the company's ESG and circular economy ambitions.

Blockchain optimizes the power grid: Tennet

Business Challenge

TenneT, situated in the Netherlands and Germany, is an energy transmission operator. Because energy demand and supply are not always in balance, electricity distribution is difficult. Energy productivity of sustainable energy supplies varies instantly depending on the state of the weather. Wind turbine electricity generation, for example, differs depending on the wind conditions of the day. Similarly, electricity demand varies within the day. Thus, optimizing electricity distribution becomes a challenging issue.

Initiative

To optimize the power grid, Tennet cooperated with IBM and Sonnen. IBM deployed blockchain Sonnen, a producer of home energy storage systems provides an opportunity for interaction with minor energy producers and consumers.

Energy storage systems are linked to Tennet's power grid database via blockchain. Thanks to blockchain's distributed ledger, inaccuracies in the demand and supply of electricity are transparently shared with various stakeholders. The initiative enables the connected energy storage units to collect or release additional electricity as needed in a couple of moments, reducing grid transmission inefficiencies

Results

- Elevated curtailment and re-routing operations became unnecessary, so the initiative saved millions of dollars.
- A significant step toward the transformation towards renewable energy sources has been taken. Because the initiative provides a way of management for the significant supply volatility of renewable energy sources.
- Support local energy producers like homeowners or farmers who deploy solar plants or wind turbines and lower their electricity expenses and as carbon footprints.

Blockchain ensures instant claims processing: Etherisc

Business Challenge

Etherisc is an insurtech startup that was looking for ways to speed up the claims processing. Traditional claims processing comprises five processes. Though the time it takes to settle a claim varies by insurance company and type, it usually takes weeks. However, according to Ernst and Young, nearly 90% of insureds choose an insurer based on the quality and speed of claims processing.

Initiative

To automate claims processing Etherisc uses blockchain technology which enables smart contracts that enforce the agreement when the certain conditions specified on the contract are met.

Etherisc employed third-party data providers to determine if the payment arrangement terms were met or not . Therefore, after alerting the insurance provider, Etherisc evaluates the initial claim investigation and policy check processes in real time, increasing its claims processing efficiency.

Results

After implementing Blockchain echnology Etherisc is able to:

- Build decentralized insurance applications.
- Make the purchase and sale of insurance more efficient.
- Enable lower operational costs.
- Increase transparency and fairness of insurance.

Disadvantages

1. **Blockchain Cannot Go Back — Data is Immutable**

One of the main disadvantages of blockchain technology is the immutability of data. It benefits financial and supply chain systems. Immutability can only exist if network nodes are fairly distributed. A blockchain network is vulnerable if one entity owns at least half the nodes. Another concern is that data once written, cannot be erased. If someone uses a blockchain-based digital platform, he can’t erase its record.

2. **Blockchain is not a Distributed Computing System**

Blockchain is a network that relies on nodes to function properly.This means that it is not a distributed computing system where the network doesn’t depend on the involvement and participation of the nodes. Blockchain might be a distributed network, but it lacks the features that make a distributed computing system

Disadvantages

3. Not Completely Secure

Blockchain technology is more secure than other platforms. However, this doesn't mean that it is not completely secure. There are different ways the blockchain network can be compromised.

4. Maturity

Blockchain technology is only a decade old. This means that it is a new technology that requires time to mature. That means Blockchain technology is still in developing phase. Thus we cannot disintermediate completely.

5. Interoperability

It can only be operated from a particular place at a particular time. In case any problem occurs whole system will suffer.

In addition, due to the high volume of transactions in supply chain, having a permissionless aspect of a blockchain solution could be costly, since transaction fees would need to be paid to fund the work performed by the miner nodes to create the blocks.

Considering certain supply chains execute millions of transactions a day, the method in which blockchain technology is implemented must be thoughtfully approached with an eye towards scalability.

CONCLUSION

Q.1. Does blockchain technology lead to the removal of intermediaries in supply chains and thus to disintermediation, or does reintermediation occur?

- Some of the major intermediate roles, such as delivering the necessary information about supply and demand and matching supply and demand, can be performed by blockchain or electronic marketplaces, thus eliminating the need for middlemen.
- However, replacement of the intermediary's expertise and knowledge of the market and the industry is practically impossible. Disintermediation can not only occur as a whole, whereas partial disintermediation is possible.
- Reintermediation is described as a situation in which a growth in blockchain technology on electronic distribution channels initially replaces an existing intermediary, which is thereafter replaced by new central agents or intermediaries.
- Because of increased digitalization, the tasks intermediaries have changed dramatically in many marketplaces. An existing intermediary may modify its position depending on experience and market knowledge and participate in the business model in a new capacity. Hence leading to reintermediation.

Q.2.Which of the tasks of an intermediary in a supply chain are replaced by the blockchain or become superfluous?

- Verification and auditability of any transaction flow is easier by the blockchain technology in supply chain management
- Transactions in blockchain are so correct and secure that companies blindly trust the transactions.
- No new blocks are created or changes made without this agreement. This means that all parties know when a change is being made and agree to that change.
- The major feature used in the supply chain is provenance i.e getting to know the origin. Blockchain technology allows you to know exactly where raw materials or products originated and where they are in the supply chain.
- The use of blockchain in the supply chain makes it extremely difficult to fabricate a payment transaction, inventory records, delivery times, etc.

Q.3. What effect does disintermediation or reintermediation have on a supply chain?

- Disintermediation is the process of cutting out one or more middlemen from a transaction, supply chain, or decision-making process.
- The usual reasons for disintermediation are to reduce costs or increase delivery speed.
- A retailer orders directly from a manufacturer rather than a sales representative for a distributor which on the other hands saves time.
- However, the process doesn't always work because it requires additional staffing and other resources to replace the services supplied by an intermediary
- As discussed earlier, the intermediary’s expertise and knowledge of the market and the industry plays a key role in a supply chain which is not possible through electronic marketplaces or blockchain technology.

THANK YOU!