**Introduction**

In today’s globalized world, staying competitive is directly related to the success, reliability and robustness of a company’s supply chain. Whereas a fully functioning supply chain can lead to a striving business, it has as well the power to force a company to its knees. All this because of an increased complexity, variety of stakeholders and interdependencies of different events caused by human or nature around the globe, within companies supply chains. (Abeyratne and Monfared 2016; Francisco and Swanson 2018)

Therefore, one way of reducing complexity and increasing reliability could be the usage of blockchain, a technology ensuring data integrity and immutability in a decentralized transaction system without a dependency of a centralized system. (Tribis et al. 2018)It is therefore the aim of this paper to determine the impact of blockchain on supply chains.

**Key elements in supply chain**

The amount of goods produced and further processed around the globe is incredibly high. This of course poses a challenge for companies of not losing track about different type of information such as, where is the good originating, how has it been transported and has it reached its destination in a proper state. These and many other key information to companies, are currently not available. In addition to this, many products like pharmaceutical goods are heavily affected by the distribution of illegally reproduced drugs, which are of course not only affecting a pharmaceutical company’s profit, but are also posing health and safety risks for consumers. (Abeyratne and Monfared 2016; Scott et al. 2018) Therefore, it can be summarized that the main goal of a fully functioning and transparent supply chain is to maximize the value creation all along.

**Definition of blockchain**

Blockchain technology can simply be described as a subsequence of information blocks following a strict order. Every information added to the chain will as well transmitted to the next block. While basically everyone being part of the blockchain can add information, no one without proper administrator rights can delete any kind of information. Hence, an unchangeable piece of history will be created of all network activities recorded. As a result of this, stakeholders along the supply chain can securely exchange a variety of information in a trusted environment and therefore, being independent of any third party. (Abeyratne and Monfared 2016)

The key technological benefits can therefore be summarized as:

Durability – Automatically created redundancy by using decentralized sources instead of centralized sources.

Transparency – Real time inspection of different pieces of information leads to true transparency of the information flow. As each node has at all time a complete copy of the whole chain saved, no piece of information can be changed or manipulated.

Immutability – A high degree of confidence is achieved by the immutability due to validation need of other nodes in case a piece of information will be changed.

Process integrity – open source protocols are per definition exactly executed as written. Therefore, users can rely on the exact execution as described without any need of human interaction.

(Abeyratne and Monfared 2016)

Blockchain technology itself can be considered as applicable where the supply chain and its efficiency are depending on reliable information, immutable information and as well robust information in terms of availability and redundancy.

**Impact of blockchain technology on the supply chain industry**

Blockchain can offer a broad variety of benefits in supply chain such as secured way to handle supply chain information more efficiently, unchangeable data and access for different stakeholders independent of location. In addition, governmental inspections can rely on trustable information and data security can be guaranteed within the blockchain.

From a finance point of view, blockchain can establish a less complicated and safe way for commercial transactions between different companies and financial institutions. Key information like legally binding agreements or claims are verified by the network and real-time monitoring of moving funds is enabled between different parties such as contractors, customers and financial institutions. (Tribis et al. 2018)

For big companies like Maersk, it costs a huge effort of paperwork to be filled out and stored, in order to maintain traceability of shipped merchandises. Therefore, it is no surprise that such companies have started looking into new technological opportunities like blockchain to solve this problem. Together with IBM, Maersk looked into a version of its software, so each stakeholder can access container related information. A copy of signed off documents by customs were immediately uploaded and provided with a digital signature. By this, Maersk, authorities and other parties involved were immediately able to see what has been completed and what not. Moreover, the cryptography used, makes it almost impossible to counterfeit any stored information. Meaning, if some stakeholders required different type of information, or even had an argument about information, it is accessible, safely and immutably stored in blockchain. (Kshetri 2018)

Even though blockchain has clearly identified benefits to improve the efficiency and robustness of a supply chain, it still faces some difficulties. One of these can be clearly identified as globalized supply chain ecosystem, different stakeholders involved and of course being compliant with multinational regulations, laws and institutions. These are only some among few which make the implementation of blockchain an extremely complex task.

From theoretical point of view, blockchain is offering undeniable potential regarding supply chain traceability but the technology needs to be examined at bigger scale and performance, which is expected if to be integrated into supply chain applications. Promising proof of concepts did not lead to successfully implemented applications yet but still, many articles are foretelling growth in the adaption of blockchain while also, on the contrary, disputing blockchain as predicted industry disruptor.(Kshetri 2018; Scott et al. 2018)

Publication bibliography

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