Blockchain and Disruptive Potential
Supply Chains

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1. Identify companies/startups/ initiatives/projects that focus on applying or using blockchain technology on the chosen industry.

2. Explain fairly detailed how they aim at disrupting the industry.

3. Comparison and analysis of the companies (similarities, differences, advantages, disadvantages) of the intended application of blockchain technology.

4. Conclusions and thought about the degree of hype and what components might be valuable and most likely reality in a few years.

1. Companies/startups/ initiatives/projects that focus on applying or using blockchain technology on the chosen industry.

What is supply chain? The supply chain represents is a system of organizations, people, activities, information, and resources involved in involved in moving goods, from raw materials to the finished product that goes into the possession of the consumer.[1] Communications at ConsenSys news portal claims that supply chain is outdated structure.[2] Rebecca Migirov, Head of Communications at ConsenSys news portal claims that supply chain is outdated structure.[2] And it is not the first claim among the business players. Transferring goods from point A to point B is already outdated structure of market relationships. A lot of risks can make such process longer, more time and money consuming.[3]

Considering the above mentioned, today is an extremely increasing tendency among big companies to use blockchain technology in supply chain industry. The paradigm shift represented by blockchain can provide the transparency and auditing.[4]

There already bunch of companies which use blockchain technology for supply chain industry. **BHP Billiton**, The world's largest mining firm by market value intends to begin using the Ethereum blockchain to improve its supply

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[1] Blockchain has the potential to revolutionise the supply chain. Ben Dickson. See at: https://techcrunch.com/2016/11/24/blockchain-has-the-potential-to-revolutionize-the-supply-chain/

[2] The Supply Circle: How Blockchain Technology Disintermediates the Supply Chain. See at: https://media.consensys.net/the-supply-circle-how-blockchain-technology-disintermediates-the-supply-chain-6a19f61f8f35#.hjowrhb51

[3] Thieves manipulate retail supply chain. Bill Moak, Consumer Watch. See at: http://www.clarionledger.com/story/money/personal-finance/consumerwatch/2016/10/23/thieves-manipulate-retail-supply-chain/92422168/

[4] How blockchain can help fight cyberattacks.Ben Dickson. See at: https://techcrunch.com/2016/12/05/how-blockchain-can-help-fight-cyberattacks/

chain processes.[5] Another company from US, **Skuchain** builds blockchain based products for B2B Trade and Supply Chain Finance.[6] Finnish startup **Kuovola Innovation** is working on a blockchain solution that enables smart tendering across the supply chain.[7] **Blockverify**[8] works on improving supply chains by means of blockchain. Company has belief in he potential of blockchain technology to improve anti-counterfeit measures in different industries, also particularly in supply chain.[8] **WAVE** connects all members of the supply chain to a decentralized network and allows them a direct exchange of documents.[9] U.S. retail company, **Walmart** in cooperation with iIBM **and Tsinghua University in Beijing** decided to provide their own test of blockchain technology for supply chain management. First project is going to start in the beginning of 2017 and will last 4 months. There is a plan to leverage distributed ledger technology to track and trace pork in China and produce in the U.S. — two high-volume product categories with large markets.[10] Disrupting industry by making totally new approach with claiming transparency and traceability as a guarantee for «revolutionary» change.

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[5]World's Largest Mining Company to Use Blockchain for Supply Chain.
Pete Rizzo. See at: http://www.coindesk.com/bhp-billiton-blockchain-mining-company-supply-chain/

[6] Scuchain. Company website. See at: https://www.skuchain.com/

[7]Blockchain has the potential to revolutionise the supply chain. Ben Dickson. See at: https://techcrunch.com/2016/11/24/blockchain-has-the-potential-to-revolutionize-the-supply-chain/

[8] Blockverify company website. See at: http://www.blockverify.io/
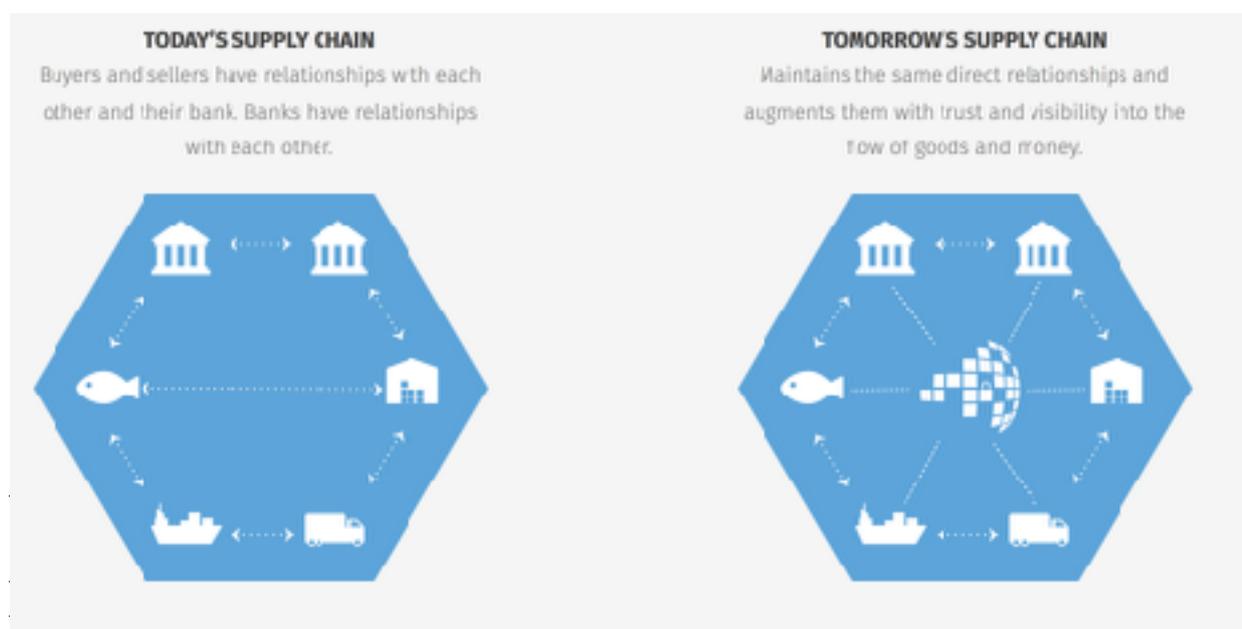
[9] Wave company website. See at: http://wavebl.com/

[10] Walmart Testing Blockchain Technology for Supply Chain Management. See at: https://bitcoinmagazine.com/articles/walmart-testing-blockchain-technology-for-supply-chain-management-1482354996

2. Explain fairly detailed how they aim at disrupting the industry

BHP Billiton, the largest mining company in the world, announced it plans to improve its supply chain operations using Ethereum with help from BlockApps, a Blockchain startup, whom helped to develop the solution.[11] With multiple vendors and production facilities scattered across geopolitical boundaries, a supply chain is the perfect use case for a global technology. The standardization and immutability of a blockchain ensures that critical data can be shared without the risk of tampering.[12] Basically company will allow for partners to track material movements throughout the system. Thus, on the company's website there is no information about using the Blockchain Technologies. After the consideration can be concluded that such project is now exist on the planning stage and not implemented yet.

Skuchain is US company that builds blockchain based products for

TODAY'S SUPPLY CHAIN	TOMORROW'S SUPPLY CHAIN
Buyers and sellers have relationships with each other and their bank. Banks have relationships with each other.	Maintains the same direct relationships and augments them with trust and visibility into the flow of goods and money.

[12]BK: BHP BILLITON TO USE BLOCKCHAIN IN ITS SUPPLY CHAIN.Brian Kelly. See at: http://tickerdistrict.com/2016/09/26/bk-bhp-billiton-to-use-blockchain-in-its-supply-chain/

Picture 1

B2B Trade and Supply Chain Finance.

On the Picture 1 is shown view of company about transactions in supply chain and how they can be improved/disrupted using blockchain technology. Their mission is to achieve maintaining of the same direct relationships and augments them with trust and visibility into the flow of goods and money. Company claims that it's own solution will lead to transformation of supply chain industry. It includes the following elements:

• It facilitates lending by Financiers against well known trade instruments such as PO's, Invoices, Inventory Assets and Payment Obligations, and allows the resulting loans to become collateralized assets whose performance can be assured through automated release of funds triggered by real-world events.

• It provides a real-time, reliable view of transaction state bringing significant transparency for all participants and helps them build a more trustworthy and stable supply chain ecosystem.

• It enhances liquidity of the collateralized assets in marketplaces, improves upon most currently used "Trade Finance" instruments such as Factoring, PO Financing, Vendor Managed Inventory Financing etc. and creates the opportunity for Deep Tier Financing.

Concerning smart tendering across the supply chain, it is about Finnish startup, **Kuolova Innovation.** Process is developing in the following way. Pallets equipped with RFID tags publish their need to get from point A to point B on the ledger. Carrier mining applications will then place bids to win the move. The RFID will then award the job to the bidder with the most suitable conditions and the transaction will be registered on the blockchain. The shipment will be progressively tracked as the tag moves down the supply chain. Kouvola has recently received a grant from the European Union

development fund to finance a proof of concept on how this technology could be used to build robust and secure transportation execution and visibility. IBM is a key partner in this endeavor.[13]

Kouvola Innovation Ltd is a dynamic development company owned by the City of Kouvola.[14] Startup tries to coach and engage entrepreneurs, enabling smart trending across supply chain. Active in social networks which boost the local economy onward and upward. Not a lot of information about details of approach is provided on the company's website.

Company **Blockverify** claims that new approach with usage of blockchain technology enable providing transparency to the supply chains. There is a provided service, where companies (purchasers) are in power of verifying. Basically they can create their own register of products, and monitor the supply chains. Another sphere of implementation is Pharmaceuticals. Blockverify pretends to own solution to track pharmaceuticals throughout the supply chain and to ensure the consumers receive an authentic product.

Unique disruptive features, claimed by company are following. The process a product goes through to ensure authenticity. Each product is verified along the supply line. Supply chain becomes transparent to the extent we want it to be. Each product is labelled with Block Verify tag. When the consumer purchases a product he/she is able to verify that the product is genuine and activate it. Company claims they ensure that each product is validated and recorded prevent even companies from counterfeiting their own goods. Further, retail locations can use mobile devices for verification. They can be assured that the goods they receive are genuine. Each product has a

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[13] Will Blockchain Technology Revolutionize Supply Chain Applications?. Steve Banker. See at: https://logisticsviewpoints.com/2016/06/20/will-blockchain-technology-revolutionize-supply-chain-applications/

[14] Kuolova Innovation company website. See at: http://www.kinno.fi/en/about-us

recorded history permanently recorded in the blockchain. Company can provide verified history for each product respectively.

Company **WAVE** connects all members of the supply chain to a decentralised network and allows them a direct exchange of documents. WAVE's application manages ownership of documents on the blockchain eliminating disputes, forgeries and unnecessary risks. Company claims that it supports the entire supply chain with the cost effective solution. Meaning that servise is «affordable». In such way disruptive potential aims to shape the future of international trade.

Talking about technology, there are following specifications. Wave has created a peer-to-peer and completely decentralized network that connects all carriers, banks, forwarders, traders and other parties of the international trading supply chain. Using decentralized technologies, all communication between these parties will be direct and will not pass through a specific central entity. Due to its decentralized nature, the Wave network will not have any single point of failure and will not rely on any single entity.

One more interesting project, that was mentioned in the previous division — a collaboration between Walmart, IBM and Tsinghua University in Beijing. Blockchain technology that Walmart will use was created for Linux Foundation, Hyperledger fabric. Architecture of the of the platform consists of elements which enable using smart contracts, membership and consensus services. In September, IBM unveiled a collaboration with Bank of Tokyo-Mitsubishi UFJ (BTMU), which leverages the same technology to automate and streamline business transactions.[15] Basically the aim is to create more secure supply chain. Food safety claimed by project participants — one of the most important areas that the world is focusing on.

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[15] Walmart Testing Blockchain Technology for Supply Chain Management. See at: https://bitcoinmagazine.com/articles/walmart-testing-blockchain-technology-for-supply-chain-management-1482354996

3. Comparison and analysis of the companies (similarities, differences, advantages, disadvantages) of the intended application of blockchain technology.

Similarities. First and the most obvious similarity that all companies are using blockchain technology in the supply chain industry. Second similarity is that each of them claims revolutionary transformations in industry. Third is that commonly accepted centralised industry is going to be decentralised with the help of each studied company. Tracing of goods and documents is the next similar feature that all companies are planning to use or already using. In all cases transactions are going to be registered in blockchain. All companies are claiming transparency, ability of verification and security.

Differences. Companies are different in their type and size, from startup to the global company. Some of companies use their own funds, some, as Kuolova Innovation, receive support from external sponsors (e.g. European Union development fund, IBM). Some companies plan to label each product (Block Verify tag), some are silent about labelling. WAWE claims avoiding specific central entity in transaction process. Other companies are silent about public bodies. Thus, lack of information on the companies' websites creates a lot of not answered questions.

Advantages. Among advantages should be mentioned global supporters, partners of such technology in supply chain (Walmart, IBM, European Union development fund). The validation of any recording on the blockchain isn't centralised, so there is a possibility or need for third party to intermediate. There is an irrevocable trail of all the transactions that have ever been made, which makes attempts of hacking or fraud unsuccessful.Using of smart contracts which nobody controls and seems everybody can trust. Participants seems can be sure that they share true validate originals. Ability to create

decentralised architecture of supply and permanent history of a product, from manufacture to sale.

Disadvantages. Can be changing of supply chain management. It can be viewed similar to view on glass halfway full with water, some can see is as advantage, some as disadvantage. Disruption of the established and for long time functioning system again can have two sided view. Risk of put such distributed database network in so called «bad hands». Further lack of understanding of the process for all game players can be a big disadvantage. Technology is new and there is no enough awareness about firstly, how it works and secondly, about possible outcomes. Workers are not educated in blockchain technology in order to deliver value to customers, basically help them.

4. Conclusions and thought about the degree of hype and what components might be valuable and most likely reality in a few years

Blockchain technology can help in overcoming diverse delays and errors. It can result in more streamlined and efficient supply chain management. It Technology claims to ensure primarily protection and automation. As explained in a recent Distributed article titled "How Blockchain Technology Is Reinventing Global Trade Efficiency," the supply chain sector represents billions of dollars in enterprise revenue, but is fraught with losses and inefficiencies resulting from risk, fraud or anachronistic manual paperwork delays.[16]

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[16]Walmart Testing Blockchain Technology for Supply Chain Management. Giulio Prisco. See at: https://bitcoinmagazine.com/articles/walmart-testing-blockchain-technology-for-supply-chain-management-1482354996

In overall, supply chain sector represents billions of dollars in enterprise revenue. Thus it can be loaded with losses and inefficiencies resulting from risk, fraud or anachronistic manual paperwork delays.

From the report by the UK Government Chief Scientific Adviser we can read predictions for decentralised ledgers and block chains. Adviser claims that private block chains are being used in closed commercial communities to support digital trust mechanisms, under their own rules. These are noninteroperable and cannot scale to support supply chains.[17]

Disruption also is an issue of participation. For long time certain people, let's say traders have experience to participate in trading business inside the supply chain. Connections, human relationships are established. The most of the value are taken by big brands and labels. And now creators of blockchain technology are willing to enter the market and concur it.

Which kind of more disruptive picture we can imagine? How to predict results is a job of analysts. Definitely is going to be a fight for the «places under the sun» New blockchain technology holds huge potential to disrupt the industry. By efforts to create more prosperous world where people get to participate in the value that they create.

Lack of education should be stressed out, and teaching should be provided to workers of companies, because seems the main attention is to implementing the new technology. Human factor should be taking into account more serious in order to achieve higher success.

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[17] Distributed Ledger Technology: beyond block chain. Report by the UK Government Chief Scientific Adviser. See at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/492972/gs-16-1-distributed-ledger-technology.pdf