**Blockchain and crytocurrencies**

Blockchain is a growing list of records, called blocks, that are linked using secure communication called cryptography. Each block contains a mathematical algorithm that maps data of the previous block, a time stamp, and transaction data. Blockchain uses a distributed ledger, which is usually managed by a peer-to-peer network collectively adhering to a protocol for inter-node communication and validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks, which requires consensus of the network majority (Decuyper, 2017) (Lantz, 2016) (Rubin, 2016).

Blockchain should not be confused with cryptocurrencies, such as Bitcoin, which use blockchain to operate. The first cryptographically secured chain of blocks was described in 1991, however, blockchain really took off from the yet unidentified ‘Satoshi Nakamoto’ in 2008, when launching Bitcoin (Decuyper, 2017) (Rubin, 2016).

Blockchain uses a decentralised, distributed and public digital ledger system where there are many holders of ledgers and depending on the set up of that blockchain protocol anyone can hold a ledger. Blocks hold batches of valid transactions that are encoded. Blocks can be produced concurrently, creating a temporary fork (Rubin, 2016). In Bitcoin, blocks are given to the holders of ledges who typically try and solve a mathematical problem, which on average takes about 10 minutes by cycling through many different combinations (in the billions) to solve the problem. When a computer solves the problem it sends the solution to the other holders of the ledgers. If a consensus of the majority (more than 50%) of the holders of the ledgers agree with the solution the block from the block from the computer that first solved the problem is added to all the ledgers and a new math problem is for the new blocks is attempted to be solved by all the holders of the ledgers (Rubin, 2016). The computers that try to solve the math problems in bitcoin are called miners and are financially rewarded (currently 12.5 bitcoins, which is close to $150,000 USD) (Bitcoinblockhalf.com, n.d.) each time they are the first to solve the problem (BitInfoCharts, n.d.). This process is a proof of work system and makes bitcoin and blockchain difficult to manipulate or double spend currency (Tech Tips, 2014).

This makes blockchain both secure and very trustworthy as the diffuse nature of the network ensure events are without bias and are resistant to attack by even a relatively large number of bad actors. The record of transactions and balances remains secure as long as a simple majority (51 percent) of nodes remains independent.

At its very core, blockchain is a distributed ledger system with verifiable transactions. Through every subsequent transaction, the ledger is encrypted and verifiable throughout the chain. If there is a ledger with 100 transactions, for instance, each transaction is verifiable through its previous and subsequent transaction. In short, blockchain can provide anonymity and trust to verify and audit any activity (Zahreddine, 2018).

Currently, blockchain has been predominately focused on cryptocurrencies such as Bitcoin and Ethereum. The idea of cryptocurrencies is to create a currency that is decentralised and therefore not interfered with by a government, easy to transfer, trustworthy and in most circumstances does participants can remain anonymous. It is expected that cryptocurrencies will continue to grow, however, are unlikely to replace government backed currencies. This is because more and more transactions are taking place online and e-commerce, is expanding. Given cryptocurrencies were developed for online transactions it is natural that they too will expand and been more common for everyday use. Furthermore, cryptocurrencies will provide appealing alternatives to fiat currencies in the inevitable event of a market correction for example they will be seen as place to store value like gold. When other currencies falter, people may turn to blockchain to safeguard their savings and move money across borders, strengthening the technology’s footprint while the wider economy struggles (Wintermeyer, 2018). It is still unclear as to how the job market will be impacted by cryptocurrencies (Pawłowski, n.d).

However, blockchain has been expanding to other areas such as smart contracts. Smart contracts are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code. The code and the agreements contained therein exist across a distributed, decentralized blockchain network (Decuyper, 2017(Frankenfield, 2019).

Smart contracts permit trusted transactions and agreements to be carried out among disparate, anonymous parties without the need for a central authority, legal system, or external enforcement mechanism. They render transactions traceable, transparent, and irreversible. In a normal world process for getting a court-registered document as a proof, you would need to go to a lawyer, give them money in turn of their services and wait till you get the document that you need. Smart contracts can eliminate this need as they become a trusted source (Pratap, 2018).

Blockchain is also developing further into the finance sector (Lantz, 2016). An example is the Australian Securities Exchanges (ASX) is undertaking a project that intends to replace the current CHESS share trading platform into a blockchain version. The ASX has given the following reasons why they are undertaking the project (Asx.com.au, n.d.):

* Operate for the benefit of issuers and end investors
* Take future needs into account
* Accessibility
* Ease of integration and global interoperability
* Availability, reliability and performance
* Privacy and security
* Operational efficiencies

Another development is using blockchain in a supply chain to guarantee that the proper process and correct manufactures were used, for example to make sure that a fraudulent activity has not occurred within a pharmaceutical supply chain which can have life threatening effects. This will make auditing of supply chains more readily available, more efficient and harder to compromise. It make the supply chain more safe and secure. (Lo, 2017)

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