Blockchain and Crypto currencies.

Samuel Mennen

# What does it do?

## What is state of the art in this technology

Originally intended for decentralised, digital currencies. Blockchain technology was first released by either an individual, or a group using the name *Satoshi Nakamoto*. Nakamoto’s white paper for Bitcoin (2008) discuss how blockchain can be developed as a secure network for making transactions, creating digital assets and proving validity based on cryptographic proof. In the case of Bitcoin, there is no centralised body responsible for the blockchain. The blockchain relies on users contributing computing power to the network through nodes. To create incentive for individuals to contribute, these nodes each compete to solve a cryptographic hash, the first to solve the hash is awarded bitcoin which is then added into circulation. This is referred to as mining. The blockchain is often referred to as a ledger and contains every previous block and every single transaction. As of the 28th of September 2020, the Bitcoin blockchain is 301.724 gigabytes (blocks-size, 2020) with a new block being added roughly every 10 minutes.

## What technological developments make it possible?

Blockchain can be considered a family of technologies used to maintain a digital leger. Encapsulating the findings of Babich and Hilary (2018), since the 1960s, databases were centralised entities and often required complex integration procedures, complex security encryption protocols and consistently face risk of obsolescence. Blockchain is often viewed as a solution to these issues due to its end-to end encryption methods and commonly open source nature. Babich and Hilary further state that there is an over-optimism towards blockchain in regard to these issues and blockchains still suffer from bugs and security breaches.

## What technological developments make it possible?

Blockchains are generally open-source and participation from its users and is democratic, provided that 51% of users accept changes in the source code and allow them to be implemented. The computing power required is referred to as hashrate and is based on the cryptographic method of demonstrating proof-of-work. This has not prevented Bitcoin from facing the threat of a 51% attack in the past. Blockchain sceptic Gerard (2017 pg. 60) writes that in June and July 2014, mining pool *GHash.io* was able to exceed a 51% hashrate on multiple occasions. A rogue employee was reportedly able to use this opportunity to double-spend against gambling services (Ibid). Other blockchain projects such as *Vechain* have added centralised elements to combat this threat*.* In the Vechain white paper v2.0 (2020 pg. 17), it is stated that *“A proper governance system, with transparency and operational efficiency, will enable continual and rapid innovation.”* To achieve this, Vechain utilises *Authority Master Nodes* which enable designated stakeholders to influence development through a voting system. Having centralised elements offers a solution to the security risks and helps more efficiently development and investment opportunities.

## What can be done now?

As of now, blockchains have become much more than an alternative for fiat currency. Further innovations and applications are being developed constantly. Blockchains such as *Ravencoin* (Fenton and Black, 2018 pg. 2) utilise blockchain for the validation of assets. Likewise, Vechain (2020 pg. 1) focuses on business activities such as *“Traceability, anti-counterfeiting, food safety, intellectual property management, product life-cycle management…”* This demonstrates how blockchain can be utilised for product and supply-chain management.

## What is likely to do be done soon (Next 3 years)?

Future application of blockchain in the medical field is also in development. Roman-Belmonte, De la Corte-Rodriguez and Rodriguez-Merchan’s findings (2018) show that blockchain is being developed to manage authorisations, share patient data and validate patient identities between healthcare partners. Furthermore, they demonstrated how blockchain can enable a *Patient Centred Electronic Healthcare system*. With potential lower risk of fraud and falsification, patients can have agency and less restricted access to their own health record (Ibid).

# What is likely impact?

## What is the potential impact of this? What is likely to change?

Typically, setting up network databases has a high cost. Blockchain provides a solution to mitigate these upfront costs and is likely to be popular with start-ups. In the early stages, start-ups release a white paper for their blockchain which not only specify the technical process but also act as marketing material for potential investors and in the case of open source blockchains, encourages developers to contribute (Park, Shin and Choy, 2020). Babich and Hilary (2018) express criticism towards blockchain. As they grow, they become more inefficient and the cost of maintaining a network becomes considerably larger than centralised network systems. Zohair’s findings (2020) indicate that bitcoin requires 332 megawatts of continuous energy consumption. As the blockchain gets larger, more resources are required to maintain it. This cost is brought upon those who decide to maintain a node. Future innovations to blockchain will most likely attempt to improve efficiency and compatibility with other systems.

## Which people will be most affected and how?

Kshetri and Voas (2018a) discuss that blockchain can benefit developing countries where there is a lack of formal institutions to store data for essential services and enforce property rights. This can reduce corruption significantly as it is extremely difficult to alter or tamper blockchained legers as all transactions are recorded and accessible from every node. In March 2018, Sierra Leone held the first electoral vote using blockchain Ksertri and Voas (2018b). Votes were stored in an immutable leger. Voters were able to do so anonymously, minimising political prosecution and help legitimise election results in a turbulent political climate. This is an example of how blockchain can be used for counter-fraud measures and proving validity.

## Will this create, replace current jobs or technologies?

Despite blockchain often being seen as solution to more traditional, centralised database systems. Due to blockchains inefficiencies, it is unlikely that blockchain will replace centralised systems entirely. Blockchain does however have potential to excel in authorisation and validation scenarios. This can simplify bureaucratical purposes. In regard to replacing current jobs, blockchains automate many administrative tasks potentially effecting jobs. However, contributing through nodes can reward tokens and crypto currencies which could be considered a source of income.

# How will this affect you?

## In your daily life, how will this affect you?

In daily life, blockchain networks will have a transparent effect and the majority of people will not be aware of the difference between centralised networks and blockchain networks in most cases. Blockchain will play a larger part in validation and financial services. Payments and transactions are perpetually available via a digital leger that anyone can access and can automate bureaucratic services for situations such as tax declarations and proof of ownership.

## What will be different for you?

If blockchains are widely accepted and implemented, many services we use daily will be different. How we receive medical care, prove identity and interact in financial matters could be potentially streamlined to a point where any service that requires any form of validation can be done in a matter of seconds without the need of a third party/ centralised body. The nature of blockchain minimises the possibility of fraudulent activity, reducing risk of scams and becoming a victim of white-collar crime.

## How might this effect members of your family and friends?

For friends and family, blockchains and cryptocurrencies allow peer-to-peer transactions and agreements. This reduces the need third party institutions, allowing faster transactions and sharing of data. Even though blockchains excel at validation, there are some concerns over privacy. Babich and Hilary (2018) express lack of privacy as one of the major disadvantages of blockchain. The nature of blockchains is that it is difficult to erase previously recorded data and creates a scenario where transactions can be accessed by anyone who has access to the blockchain. Services such as such *Bitcoin Block Explorer* (Bitcoin Block Explorer | BlockCypher, 2020)grant anyone the ability to check any block and any transaction in that block. In a time where your digital footprint defines you, users need to be aware of potential consequences of their actions and how they may affect them in the future.

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