

## Blockchain- a Disruptive Technology for Existing Enterprises

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**Abstract**— Every online transaction is at a great risk of attacks by hackers who attempt to steal bank details provided online by the customers. These digital money transactions have led to the invention of various crypto-currencies. These crypto-currencies work on the principles of blockchain technology. Blockchain acts as public ledger for all such crypto-currency transactions in a de-centralized manner. It verifies all the online transactions using peer-to-peer network of computers without any third party interventions. Blockchain database contains the complete history of all the transactions done in the past. It is shifting the entire financial industry from trusting people to trusting math and may be a disruptive technology for existing enterprises by changing the existing business models. This paper discusses about blockchain and its disruptive capabilities for today's society and industries.

**Keywords** — Blockchain, security, trust, business model, digital currency, financial industry.

### I. INTRODUCTION

The concept of Blockchain was proposed by a person or a group of persons using the name Satoshi Nakamoto in 2008 through the article "Bitcoin: A Peer-to-Peer Electronic Cash System". Nakamoto invented an electronic currency in the name Bitcoin which was based on the decentralized P2P system design. The basic purpose of this digital currency was to resolve the problem of trust between two parties [1]. Bitcoin was not just a concept but was given as an open source code which made money transfers without involving bank as a trusted third party and through its distributed design; Bitcoin obtained the properties of permissionless network [2, 3]. From then it has become the most revolutionary invention of the internet and is still revolutionizing the financial industry today as digital currency. This new technology forms the backbone of the internet by permitting digital information to be distributed among nodes rather being copied. Initially formulated for the digital currency, Bitcoin, people have been able to find many other potential uses for this technology.

Don & Alex Tapscott define Blockchain as "An incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value" [4]. In simple terms, Blockchain can be defined as a time-stamped series of immutable data managed by millions of independent

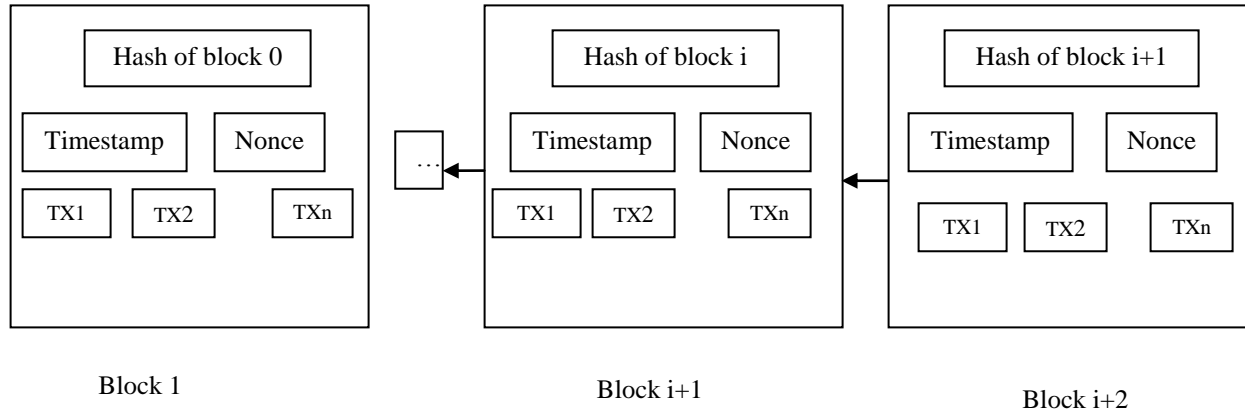
computers. These blocks of data are secured and are linked together in a list called chain.

The research paper is structured as follows: section 2 discusses about blockchain functionalities. Section 3 elaborates on building trust and security in blockchain technology. Section 4 talks about the disruptive capabilities of this technology for today's business model in detail. Finally we conclude in section 5.

### II. BLOCKCHAIN FUNCTIONALITIES

The working of Blockchain technology can be better understood from figure 1[5].

A Blockchain comprises of a chain of blocks which store information regarding multiple transactions, TX1-n. Each block also contains hash value of the previous block, a timestamp and a nonce which is a random number used for verifying the hash. The uniqueness of hash values help in preventing any kind of fraud as any change in a block would immediately change the respective hash value. Also adding a new block to the chain is not that easy. Majority of the nodes in the network have to agree on the validity of the new block, and then only the block can be added to the chain.



**Figure 1: Example of Blockchain**

The above architecture of Blockchain exhibits the following characteristics over central database and can thereby be very useful for organizations:

- Cost drop- Lots of money is spent on maintaining security of centralized databases e.g. banks as they become easy target spots for potential hackers.
- Data records- Blockchain is an ever growing archive which makes possible to check history of any transaction at any moment of time.
- Validation of data- New data to be entered in a block is validated by each node in the network instead being processed by a central unit. This process takes time but guarantees high data security and validity.

### III. BUILDING TRUST USING BLOCKCHAIN

Blockchain technology ensures security and trust in many ways. Each new block is always added to the end of the blockchain in a linear and chronological manner. Once the block is appended to the end, it is very difficult to modify the contents of the block. This is possible because each block contains not only its own hash but also store the hash of previous block. If that information is edited in any way, the hash code changes as well. So to make change possible, the hacker needs to change every previous block on the blockchain. Recalculation of all hashes not only consumes enormous computing power but also good amount of time. Thus it is nearly impossible to edit or delete any block on a blockchain.

To build trust, computers who want to join or add blocks to the blockchain network have to prove themselves through a test called 'consensus test'. Most common example of consensus test is 'proof of work' used by Bitcoin. Computers have to prove themselves by solving complex mathematical problem. On solving one of these problems computers become eligible to add new blocks to blockchain. As reported by BlockExplorer, a well known blockchain news site, the odds of solving one of these problems on the Bitcoin network were about 1 in 5.8 trillion in February 2019 [6]. So adding new blocks to the blockchain is not a trivial to ask. Computers require high computation power to solve such complex problems.

Hackers, if plan to attack on blockchain then they too have to solve same complex mathematical problem at same odds just like all other computers on the network. The cost incurred in such an attack will undoubtedly overshadow the benefits. This is how security and trust is maintained in blockchain technology.

### IV. BLOCKCHAIN A DISRUPTIVE TECHNOLOGY

Let us know try to understand why Blockchain is considered a disruptive technology for industries even when it is so secure. Consider for instance, a railway company. Passengers buy tickets either using railway portal on web or through mobile app. During this transaction, the third party i.e. credit card companies charge their share as a processing fees. Now what if we move the entire ticketing process to the blockchain? No third party is required as the trust factor can be built by utilizing the characteristics of blockchain. The ticket is now a block, which will be added to a ticket blockchain. This makes ticket a unique and unfalsifiable record. The key factor here is that the process takes place at no cost.

Blockchains are not only capable of transferring and storing money but can easily replace business models which charge fee for transactions. The economy giant Fivver which is an online marketplace providing platform for freelancers to offer services to their customers across world charges about 0.5 dollars on every 5 transactions between individuals for buying and selling services. Using blockchain technology the transaction will get free and companies like Fivver and more will not exist. Even new companies like Uber and AirBnB are in danger due to this technology. The customer is required to encode the transactional information for a car ride and disrupt the business model of these companies by removing the fee processing middle party [7].

The financial industry has always been considered as a primary user of blockchain technology. It has been observed number of times that over a long chain of changing buyers of financial assets it often becomes challenging to retrace ownership. E.g. Bear Streams, US bank was completely acquired by JP Morgan Chase in 2008 at the shockingly low price of \$2 per share as the later acquired larger shares than the shares outstanding in the books of Bear Streams [8].

Thus, middle party plays a vital role in verifying ownership of assets and processing of transactions. This middle party solution is not only time taking and expensive but also is at high risk in case it fails. The blockchain technology can overcome these critical aspects by removing the human involvements required. Atzori claims in the coming year's blockchain might be able to reorganize the entire society and politics [9].

## V. CONCLUSION

The blockchain technology seems to have many application fields particularly in areas where third party is involved to ascertain a certain amount of trust. This disruptive technology will change many existing business models in forth coming years and conquer entire industries. Therefore, good research is necessary for amalgamation of technology, industries and their business models.

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