THE RISE OF CRYPTOCURRENCIES, BLOCKCHAIN NETWORK AND WHERE BITCOIN STANDS IN TODAY'S WORLD

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Öz

Bitcoin, dünyadaki herkese anlık ödemeler sağlayan merkezi olmayan bir dijital kripto para birimidir. Bitcoin, diğer para birimlerinde satın alınabilir, satılabilir ve değiştirilebilir. Bitcoin kabul edilebilir bir düzeyde gizlilik ve anonimlik sağlar. Bitcoin kullanıcıları, operasyonlarının bitcoin ağındaki sahipliğini gizli anahtarlarıyla kanıtlayabilir ve kendi değerini harcayabilir ve yeni sahibine aktarabilir.

Bitcoin işlemleri yönetmek için eşler arası ağ kullanır. Ödemeler birkaç saniye içinde yapılır. Her 10 dakikada bir ortalama olarak, Blockchain adlı genel bir defter üzerinde yazarak bir işlem bloğu doğrulanır. Bir matematik problemini çözmek için yarışan madenciler tarafından küresel süreç defteri'ne yeni bloklar eklenir. Başarılı madenci yeni Bitcoin ile ödüllendirilir. Dolaşımdaki bitcoin sayısı, kolayca tahmin edilebilen bir eğriye göre hesaplanabilir. Araştırmalara göre, 2140 yılında 21 milyon bitcoin üretilecek. Kripto para piyasasının toplam değeri 14 milyar doların üzerindedir.

Birçok hükümet buna karşı olumlu bir tutum sergilerken, vatandaşlarına Bitcoin'in arkasında merkezi bir otorite olmadığı ve Bitcoin'in herhangi bir fiziksel varlık ile ilişkili olmadığı konusunda uyarıda bulunmaktadır. Blokzincir, bitcoin olmasa bile, belgelerin, dijital ve fiziksel varlıkların veya oylamanın sahipliğini izlemek gibi çok geniş bir kullanım yelpazesine sahiptir.

Anahtar Kelimeler: Yeni Ekonomi, Bitcoin, Blokzincir, Kripto-para.

Abstract

Bitcoin is a decentralized digital cryptocurrency that enables instant payments to anyone in the world. Bitcoins can be bought, sold and exchanged in other currencies. Bitcoin provides privacy and anonymity at an acceptable level. Bitcoin users can prove ownership of their operations on a bitcoin network with their secret keys and can spend their own value and transfer it to a new owner.

Bitcoin uses peer-to-peer network to manage transactions. Payments are made in a few seconds. Every 10 minutes on average, a block of operations is validated by writing it on a global ledger called Blockchain. New blocks are added to global process ledgers by miners aiming for solving a particular math problem. A successful miner is rewarded with new bitcoins. The number of bitcoin in circulation can be calculated according to a curve that can be easily interpreted. According to a research, 21 million bitcoins will be produced by 2140. Currently, the total capitalization of the cryptocurrency market is over 14 billion dollars.

While most governments have a positive attitude towards cryptocurrencies, they warn their citizens for the fact that there actually is no central authority behind Bitcoin and it cannot associated with any physical entity. The Blockchain has a wide range of uses, such as monitoring the ownership of documents, digital and physical assets, or voting, even if there is no Bitcoin.

Keywords: New Economy, Bitcoin, Blockchain, Crypto-currency.

INTRODUCTION

After exchange processes of goods and services such as gold, silver, commodity money, valuable financial documents, fiat money have been being used. In our changing world, money, which works as the exchange tool, continues to be abstracted in parallel with economic, scientific and cognitive developments.

Although cryptocurrencies have not yet been widely accepted in a legal sense, it has become an investment tool that attracts businesses for reasons such as high return rates, easy transfers, low transaction costs. Today, businesses can make payments or collections with crypto money and often make investments in it to benefit from the exchange rate return.

Where we stand now is hugely shaped by the dominance of Bitcoin and other digital currencies all over the world. Bitcoin can be regarded as a plenary of different concepts that explains digital monetary economy systems. It does come up with its own issues and these will be covered on the next sections of this study.

What makes this currency so unique and how can the technology behind it be used? The answer to this question is the innovation called Blockchain. Companies and organizations have become very willing to

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explore new application areas using blockchain technology for Bitcoin. Followed by financial companies, companies operating in many areas such as retail sector, public institutions and insurance companies show a great deal of interest in blockchain technology.

In today's world, efforts to develop applications on this subject are increasing. In addition to that, in Turkey, many academic studies have begun exploring on this subject and various companies have started to invest on this technology.

1. Money

1.1. The Definition of Money

Money is the ultimate exchange tool for goods and services since the very first time in history it was invented. Four functions of money can be listed as follows:

- It could be used as an exchange tool in which at least two goods must be traded upon its value. Therefore, it is always considered as a financial or a substitutionary value to exchange things.

- Capital stocks and investments based on its interchanging value depending on a territory shapes its global effect as speculations on markets.

- Correlatively, the exchange of goods are dependent on money's exchange rates.

- Lastly, its foremost use in global trades can be the fact that it being an economic tool shapes all national thrifts and therefore policies are created upon its obligatory presence.

1.2. Digital Money

Loading money on smart cards and obtaining fuel with cryptocurrencies for the purpose of protecting truck drivers and gas stations from theft has begun at the end of the 1980s in the Netherlands, as the very first example of electronic payments (Griffith, 2014)

Digital money is stored and transferred electronically. Digital money in our bank account is the representation of a conventional, paper money. In a rigid sequence; gold, paper money and the development of information technologies allowed digital currencies to be used. Since the conventional money transactions are subject to change in today's world, its ability to be stored and transferred digitally makes it a much easier tool than ever before.

David Chaum was the first person in history that ever introduced an electronic payment system, as known as Digicash. It could be encrypted uniquely by a software that he designed, which allowed users to trade anonymously. Followingly, Paypal's rise as in the manner of electronic payment system took over the place of Digicash.

Compared to what David Chaum developed, Paypal allowed users to store their money equivalent to real currencies of countries and therefore it was recognized as an official payment system (Wagner, 2014). Similarly, Liberty Reserve in USD and Euro currencies are also digital moneys founded in 2006 (European Central Bank, 2012), however both those currencies were prohibited from use due to money laundering.

1.1. Virtual Money

Compared to digital money, virtual money is a concept that lies on the fact there are no physical realities in its presence. Still there is a confusion in the literature about its actual definition. Houben and Snyers (2018) describes the virtual money as a type of digital money that is generally authorized by its developers. It can also be adopted and used by certain number of members of a virtual group.

The U.S. Treasury Department on the other hand describes it as the measure of change which could be interpreted as a tool being used in some environments although it does not contain most characteristics of real money.

1.2. Crypto-Money

Cryptocurrencies are regarded as alternative currencies, digital currencies or virtual currencies (Graydon, 2014). It is often confused with Bitcoin and its derivatives like either any of digital and virtual coins. Digital and virtual currencies, other than bitcoin and derivatives, cannot be regarded as a currency on their own. They are based on the national currency of a country that they are represented by. Thus, they can be regulated and controlled by the central authorities of a certain country. Bitcoin is a currency that cannot be controlled by any central authority (Rotman, 2014). Since there is no third parties during digital trades on the market, there is no need for endless verification steps to take a "digital" action. Yet, the secureness of any global ledgers is provided by trusted miners.

2. Bitcoin

2.1. The Definition of Bitcoin

Bitcoin can be regarded as a plenary of different concepts that explains digital monetary economy systems. Its system that is based on open source softwares can be initialized on many devices as well as computers and mobiles (Antonopoulos, 2014, 15).

Any wallet programs can be installed, bought, sold or transferred at any time. By using these wallets, Bitcoin can be exchanged any time with TRY, USD, Euro or other currencies. Also, Bitcoin users can send Bitcoin to each other using the BTC network to buy or sell products and services. Bitcoin can be bought and be exchanged (Antonopoulos, 2014, 16).

Bitcoin provides anonymity at a certain level. Bitcoin wallets are the addresses that enables transfers between its users. Its address can also be connected to an account number. Due to its transparency, anyone who holds the Bitcoin address can easily access transaction details (Brand, 2016, 16).

If we were to explain Bitcoin's network, each node can represent a single computer, therefore the connection between those nodes create its entire, decentralized global network. To obtain Bitcoin through an electric activity, the only requirement is to obtain a software and that can turn the user into a miner easily.

The bitcoin system is defined in such a way that a total of 21,000,000 Bitcoin can be produced at most. Until 2140, 4.981.425 Bitcoin will be given to miners in exchange for the new block production by miners, and Bitcoin will be provided. Since the supply of Bitcoin continues to decline and the supply of Bitcoin will not be made after 2140, it may tend to be a deflationary currency. Since there will be not enough Bitcoin, it is projected that it may gain extreme value if the demand for Bitcoin keeps increasing (Reiff, 2018). Block-chain, in other words "the global account book" of transactions since 2009 keep the records of every single action taken on Bitcoin's system. Its main purpose is to generate its value. Therefore, Bitcoin transfers can be stored anonymously. This book can be viewed by anyone, and can check the accuracy of any processes. Bitcoin is the first application of the transaction protocol, decentralized network and distributed transaction discovery. It is also the digital gold standard for other crypto-currencies. Bitcoin is a new digital monetary system that is an alternative to the reputation monetary system.

Bitcoin is configured as a peer-to-peer network (P2P) structure on top of the internet. The computers are in a peer-to-peer network connected with each other that there is no server, no centralized service, and no hierarchy within it.

Bitcoin can be regard as the collection of concepts and matters that implements the digital money economy in general. Low-cost processes, its ability to be run globally, its increasing use, being a safe and anonymous network make Bitcoin even more popular every single day. An extended Bitcoin network that is consisted of P2P protocols, pool mining protocols, stratum protocol and expanded Bitcoin network make other components connect with each other using its own system (Antonopoulos, 2014, 139).

2.2. Bitcoin Transactions

Transferring Bitcoins to another Bitcoin address is called "process". The input and the output sum must be equally the same. Inputs in a transaction are the outputs of previous transactions that have not yet been spent. The user who is performing a transaction digitally signs all the entries and addresses of the bitcoin to be transferred with a secret key.

Entries may be the output of multiple transactions. In addition, the output may belong to more than one Bitcoin account. When users want to transfer a Bitcoin to another user, they need to know the Bitcoin address explicitly. In the bitcoin process, inputs are called debit and outputs are called credit.

As a result of a process, Bitcoin can be sent to different addresses, meaning that there may be multiple output. However, each output can only be used as input once. When the non-spent output is spent, it is re-categorized as spent. It is also possible to determine how long it takes to transfer Bitcoins as the result of a transaction (Antonopoulos, 2014, 113).

2.3. Bitcoin Ownership

The way to step into the world of Bitcoin is to get a Bitcoin wallet first. There are many Bitcoin wallet applications for both computers, tablets and mobile phones. When these softwares are installed, they generate the sender's secret key, public key, and Bitcoin address. Integration of the existing secret key into these software is possible.

Security in a Bitcoin wallet is secured with a secret key, stealing the secret key can be likened with stealing your real physical money wallet. The secret key should be stored in a secure environment and should not be shared with anyone. To collect Bitcoin, you need the Bitcoin address and the secret key to spend Bitcoins.

Figure 1: Bitcoin electronic walle

2.4. Privacy and Security

The most important feature of crypto money is the unique encryption of each transaction. Open source wallet; when software is installed on computers, they receive a special address belonging to those people and these addresses are used in encrypted transfers. Thus, it's unknown who made the transfers. These addresses are encrypted in the databases called registry.

On a Bitcoin wallet, a secret key on the left end side of it can be noticed. Such wallets are unprotected in terms of theft, and even if the photograph of the wallet is taken by means of the square-code on it, unauthorized operation can be carried out by the owner easily.

Figure 2: Bitcoin wallet

While Bitcoin's trading volumes increase, the supply rate also increases. Due to increase in its attractiveness, some vicious actions like cyber-attacks may be initialized with the help of malwares designed by swindlers. After the confiscation of wallets or resetting passwords, the lost Bitcoins cannot be recovered and hence, Bitcoin's system is recently being questioned by several authorities regarding its safety. Since the monetary system cannot be controlled by legal authorities, this situation brings ethical concerns mainly for its lack of legal mechanism. Users can take some personal precautions against such attacks as follows:

• First, users are required to use licensed softwares. They should keep these softwares up to date and check for updates frequently.

• Wallets that offer multiple signature methods should be preferred.

• Users should use hardware-based wallets if possible and should back up these wallets.

• Users should create strong passwords and avoid any predictable passwords within the scope of social engineering.

Security algorithms in crypto money structures have been different. The basic operation of these algorithms, which are differentiated according to the principle, proof- of-work so the principle of operation of provable, a proof-of-Stake it holds so provable, that means the proof-of-activity movement (Carter, 2014).

2.5. Other Cryptocurrencies

According to Atik's study in 2015, Bitcoin can be produced theoretically by anyone; a certain amount of bitcoin is awarded as a reward to those who participate in the production process and produce the first solution to the complex process that is offered by Bitcoin's mine software to those who are called miners.

It is vivid these days how fast the number of bitcoin is being produced at a time and the total market value is grown, as well as how Bitcoin and cryptocurrencies have become a very important shareholder among traditional payment instruments (Smith, Christie and Kumar, 2017). Bitcoin in virtual wallets are created easily on the internet for all users since it can be stored and processed without any personal information (in the event of goods and service purchases, investments, money acceptances), as it is not possible to confiscate the Bitcoin accounts (Eğilmez, 2013).

According to Ateş (2016), the term Altcoin refers to all cryptocurrencies invented after Bitcoin as an alternative to Bitcoin. Most of them have no difference from the current cryptocurrency systems. Therefore, they are only seen as the derivative of Bitcoin. Today, there are more than thousands of new altcoins being involved in the circulation.

These subcoins are being traded in the markets in similar ways, their values change daily and are directly affected by Bitcoin. As of 05.01.2019, the value of 1 Bitcoin in the markets is approximately $ 3.839,35. The alternative of Bitcoin can be listed as follows as of 05.01.2019; XRP $0,35, Ethereum $156,99, Bitcoin Cash $160,66, EOS $2,68, Stellar $0,11 and Litecoin $35,61.

2.6. Use of Bitcoin in Turkey and Legal Regulations

The use of Bitcoin in Turkey can be seen frequently in different cities and in various sectors: It is possible to use Bitcoin for attorneyship, consulting, IT and contracting fees to transfer a football player to a club, from kiosks based in shopping malls, airports and to spend and book a vacation in case of an urgency. The first Bitcoin ATM in our country was opened at Istanbul Ataturk Airport and is one of the first companies in the world. It is possible to buy and sell bitcoin via Turkish Lira.

Blockchain technology will become more widespread as from today. With the development of blockchain technology, it is stated that health, postal services, banking transactions and election system will be subject to change in the near future. As a result, it is thought that the use of Bitcoin will develop in this range.

Many countries support the use of blockchain technology as Bitcoin and try to minimize their risks by making necessary adjustments. According to Çarkacıoğlu (2016), countries such as Estonia, USA, Denmark, Sweden, South Korea, Holland, Finland, Canada, the United Kingdom and Australia, which are expressed as Bitcoin-friendly countries, take their positions against innovations with different points (spreading technology, reducing costs, negative interest). In the same study (Çarkacıoğlu, 2016), the following countries were listed as enemies of Bitcoin; Thailand, Bangladesh, Bolivia, Ecuador and Iceland, most have put forward the risks and stated that the buy-and-sell of bitcoin is against their laws and regulations.

In Turkey, the public announcement has been made by relevant ministries and the general public were warned about Bitcoin's instabilities, but so far no ban is taken into action. It is stated in the law No. 6493 promulgated by the BDDK in Turkey in 2013. With this law, the necessary conditions for generating electronic money were determined and the supervision and control of the subject were left to TCMB.

The law makes it compulsory to establish a joint stock company with a minimum capital of 5 million TRY to operate as an electronic currency company (Bilir and Çay, 2016). Although it is not forbidden Bitcoin still has no legal status. There is no taxation or accounting of Bitcoin in Turkey.

Table 1: Bitcoin's legality in chosen countries (Wisniewska, 2016).

Country	Legal status
China	Legal for individuals, illegal for financial institutions
Finland	Legal (it is regarded as a commodity)
France	Legal (unregulated)
India	Legal (unregulated, but the Central Bank has warned citizens against virtual currencies)
Iceland	Ban on purchasing Bitcoin abroad and accepting Bitcoin payments (Raymaekers 2014, pp. 36)
Japan	Legal (no regulations) (tvn24bis.pl 2015)
Jordan	Illegal for banks, stock exchanges and other financial and clearing institutions
Canada	Legal (still working on its regulation)
Colombia	Considering whether to ban BTC
Germany	Legal (status of private money)
Poland	Legal (no regulations) (pb.pl 2015)
Russia	Illegal
Singapore	Legal (authorities do not interfere in accepting BTC payments) (Ah Kun Ca2014, pp. 47)
Switzerland	Legal (consider treating virtual currencies as any other currency)
Thailand	Illegal
USA	Legal (many regulations)

3. Blockchain Technology

Blockchain was firstly expressed in Satoshi Nakamoto's original Bitcoin article published in 2008. Although blockchain was not mentioned in his article as a word, the underlying technology component of crypto money was defined as series of blocks of data chained together in cryptographically (Satoshi, 2008). Bitcoin is the first online use of block chain and its innovation (Iansiti and Lakhani, 2008). It is one of the biggest steps of its spread. The first transaction from law scholars and legislators against this spread was based on how Bitcoin should be regulated (De Filippi, 2014; Shcherbak, 2014; Tu and Meredith 2015).

With the development in blockchain's technology, it no longer can be regarded as Bitcoin's system. Blockchain technology can now be applied not only as Bitcoin but also in many other areas. It is a simplified description of Bitcoin blockchain, the first application of blockhain technology derived from the Nikola Hampton (2016).

Each page on a blockchain is consisted of ten-minutes-records of transactions made by Bitcoin. Each page has a limited capacity to record transactions and each page is recorded along with a time stamp and a serial number. In the end, the whole page becomes a part of the ledger. If we were to regard this scenario as a whole simulation of what exactly happens on each page, we can conclude on the fact that the page blocks represent the connection between series of serial numbers. The operations represent the serial number of a page, whereas those numbers interlace with each other and make up a mathematical function to explain a chain of several operations.

Such complex system prevents any change to the serial number as well as keeping the secure connection between pages, since blockchain represents a book made of connections between pages (nodes). Those connections expand every ten minutes to create a new page. By this way, the blockchain user has more or less ten minutes to write a new page in order to rewrite a transaction history.

According to Nakamoto (2008), any blockchain consists of unique data blocks generated based on cryptographic theories. Those blocks of data provide a structure enabling individuals to check transaction histories without a need for third parties. The complete trading history is also valid in each virtual currency and can be viewed from the moment that all the virtual currencies are created. As that prevents the current records from being changed, this eliminates the need for management in the system and provides low-cost operations (Beck vd, 2016).

Figure 3. Transactions using the blockchain technology (Financial Times, 2018).

How a blockchain works
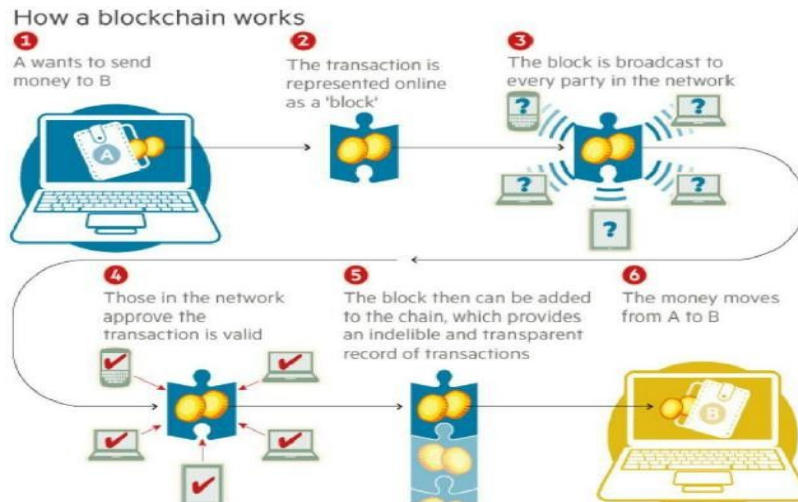
3.1. Blockchain Characteristics
3.1.1. Distributed Database

Blockchain technology has a decentralized database, in other words a structural network (Iansiti and Lakhani, 2008; Lemieux, 2016; Yli-Huumo vd, 2016; Xu vd, 2016). The structural network is distributed into nodes. Many researchers indicate that they are computers, on the other hand Lemieux and other authors consider them part of the system (Iansiti and Lakhani, 2008).

Nodes in the block-chain technology system can access the entire database, but they cannot control the data stored in the block-chain of a single node. Each new entry in the block-chain (processes) is validated by all nodes in the system without requiring any agents (Iansiti and Lakhani, 2008; Yli-Huumo vd, 2016).

3.1.2. Peer to Peer Network

A peer-to-peer network is consisted of individual nodes that pass and store information between each other uniquely. So there is not just one central structure that enables communication within the network (Satoshi, 2008; Iansiti and Lakhani, 2008; Yli-Huumo vd, 2016). Because of consensus among nodes in the blockchain system, no center is needed (Pilkington, 2016). The information in the blockchain is stored by all nodes in BitShares (Iansiti and Lakhani, 2008). Some researchers claim that a blockchain is not stored by all nodes, but can be used by all nodes (Satoshi, 2008; Yli-Huumo vd, 2016). They also indicate that new operations do not have to access all blocks, but rather that they must access the "sufficient number of nodes" in order for the operation to be included in a block over time.

3.1.3. Transparency

The concept of transparency in blockchain technologies is attained by seeing all the processes of all blocks (Iansiti and Lakhani, 2008; Yli-Huumo vd, 2016). This means that it is more transparent than a central system that is managed by a third party.

As Nakamoto states in his report, it is called the block-chain's alias (Iansiti and Lakhani, 2017). Unlike transactions made by anonymous users, Bitcoin transactions are always associated with an account. Each user has a unique address, i.e. a nickname, to identify his or her own identity and operations occur within these aliases (Iansiti and Lakhani, 2008). In blockchain technology, users are anonymous with these aliases and do not need to explain their real identity.

3.1.4. Irreversibilities of Records

Blockchain technology uses computational algorithms and approaches to ensure that records stored are not returned (Iansiti and Lakhani, 2008). However, in a report published by Nakamoto (2008), he claimed that "conversion is not practical for computation" rather than being impossible.

The chronological order of transactions are created as a record joins another eternally and makes up the "chain" (Iansiti and Lakhani, 2008). The blockchain stores all the information in itself and cannot be subject to vulnerability of changing an information stored in a single block rather than corrupting the entire chain in case of a disruption to a single node.

3.1.5. Computational Logic

Because the blockchain technology covers the digital environment, the logic of calculation may depend on the processes in the block chain.

Any operation in a certain blockchain are triggered by programmed algorithms and rules used by nodes (Iansiti and Lakhani, 2008). Each set of operation can be programmed to harbor information.

3.2. Blockchain Limits

There are limitations that blockchain techonology sometimes is limited when dealing with technical challenges such as delay issues, bandwidth problems, security gaps, vast amount of resouce consumption, its availability, version and so forth (Yli- huumo et. al.)

While the limitations imposed by Yli-huumo and his colleagues are considered to be a concern for the adoption of blockchain technology, these limitations are mainly based on Bitcoin implementation.

- Business volume: While the current blockchain technology can perform seven operations in one second, VISA has a structure that allows 2000 operations per second.

- Delay: Each transaction by cryptocurrencies take approximately 10 minutes. That duration is sufficient to create a new block in its blockchain; however, it causes delays in financial transactions.

- Size and bandwidth: A bitcoin blockchain's size may reach over 100 GB. Since, a block that is approximately 1 MB is added every ten minutes to the blockchain system, it is regarded as a bandwidth infrastructure problem causing latencies due to the processing capacity.

- Security: An attack on 51% of a blockchain can cause vulnerability, authenticity, or cryptography issues.

- Resource consumption: It takes enormous amount of electricity consumption and causes a faster consumption of raw materials needed to create its virtual environment. Furthermore, its ever-increasing use leads to more expensive demands.

- Usability: Generally speaking, Bitcoin applications do not possess a developer- friendly interface and therefore it can be challenging to do programming.

- Multiple chains: As each node is consisted of different codes, it may cause compatibility issues.

- Privacy: The unowned structure of the blockchain can be damaged. And by analyzing experimental findings, processes and metadata, Bitcoin can access IP addresses along with blockchain addresses (Yli-Huumo vd, 2016).

Technically, there are cultural, organizational and behavioral concerns besides these limitations. Khaqqi and others (2018) listed these concerns as management support, organizational policies and cultural adaptation to the blockchain. In addition to these concerns, Mendling and others (2017) have added state support and employee expertise as possible limitations.

Table 2: Comparing ledgers with the blockchain (Institute of Development Studies, 2017)

Ledgers of intermediaries e.g. Bank account	Blockchain e.g. Bitcoin
Centralised: Single owner such as a bank makes these ledgers vulnerable since they have a *single point of failure* that can be hacked.	Distributed: Nobody/everybody owns it. Because it is distributed across millions of users it has *no single point of failure* making it especially difficult and economically unfeasible to hack.
Opaque: Only authorised users can view them or have access to them.	Transparent: Anyone can view or access the entire ledger, which is updated in near real time.
Alterable: Errors can be corrected by (internal) users with overriding privileges.	Immutable: Transactions cannot be reversed.
Subject to identity theft. Accounts are often hacked.	Encryption and pseudo anonymity: This makes it very difficult to hack blockchain.
Time lag: Can take days or even weeks to complete transactions.	Near real time: Transactions completed in ten minutes (on average).
Borders: Varying international and conversion fees that can cost up to 20 per cent.	Borderless: Same low fee everywhere (usually a few US cents).

3.3. Blockchain Types

Blockchain is divided into three different parts according to access types.

- Public: Public blockchains are large distributed networks such as Bitcoin. Anyone can join these networks at any level. It has open source codes.

- Consortium/ Permissioned: These are the systems that can control the permissions of the activities that can be carried out in the network by the people who are going to join the chain. It has a controlled design. According to the structure it can be based on open source codes.

- Private: It is smaller than other blockchains. They are used by organizations that rely on users in their network and contain confidential information.

Table 3: Types of Blockchains (Patientory, 2017)

|	**Public (eg. Bitcoin)**	**Private**	**Consortium/ Permissioned (eg. EHRs)**
Network type	Decentralized	Partially decentralized	Partially decentralized - hybrid between public and private blockchains
What is it?	Anyone anywhere in the world can read and write on the network. Data is validated by every participant ("node") in the network, thus making it very secure.	Permissions to read and write data onto the Blockchain are controlled by a single "highly trusted" organisation - the owner of the blockchain.	Permissions to verify, read and write on the blockchain controlled by a few predetermined nodes. The choice of predetermined nodes can be different for every entity on the blockchain.
Benefits	-Secure as the entire network verifies transactions -Transparent as all transactions are made public with individual anonymity	-Efficient as verification is done by just owner of the blockchain -Private as the owner can control who has access to read or write on the blockchain	-Efficient as relatively lesser nodes verify transactions -Private as read and write access can be controlled by the predetermined nodes -No consolidation of controlling power
Challenges	Inefficient as all nodes need to verify the transaction	-Controlling power is consolidated to a single organization -Difficult to align many organizations to use the same blockchain	

3.4. Blockchain Applications

Blockchain technology was recognized for its first popular application via virtual money (Bitcoin). It has been discovered that blockchain technology can be used in many different areas. Depending on the development and recognition of technology over time, it can be said that application areas will be diversified in the future.

- Digital Ids
- Know Your Customer – KYC
- Global Payment Systems
- Meeting the needs of Entrepreneurship for Capital
- Fundraising and Management
- Property and Accident Insurance Compensation Process
- Syndicated Loan
- Automated Adjustment Mechanism
- Voting by Proxy
- Supply Chain Management
- Copyright Registration Systems
- Land Registry Systems

- Public and Health Records with Tenders
- Military Command Chains
- Copy Product Protection
- Notary Public Application

Figure 4: Blockchain technology (Venkat, 2018)
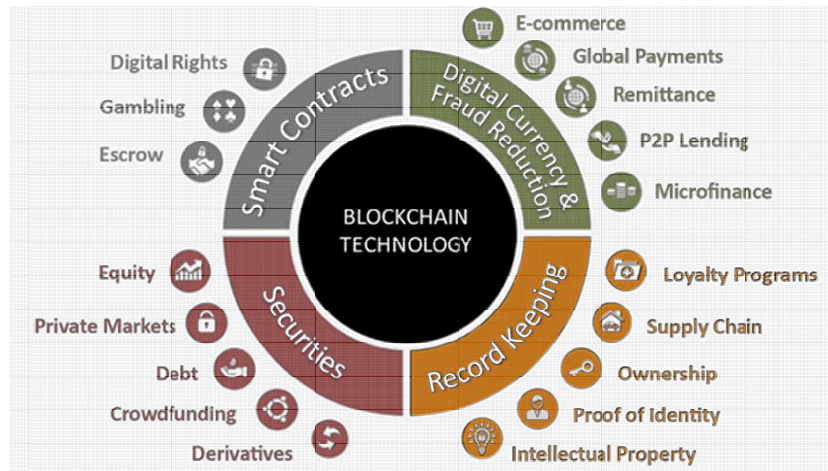
3.5. Blockchain Operation Mechanism

The mechanism of any blockchain acquires a chain structure based on data that has the records of any action taken on each page of it. The first entry of any information initiates the beginning of records and there is no limitation on its magnitude. Since people are interconnected to each other based on each one of their systems, the data begins to be recorded once a single action is made and users can initiate the beginning of loading relevant information to project it to their systems. Whenever a user joins any particular system on a blockchain, it generates a new code which later on is added to the primary chain of the system, known as the longest one that keeps all data cumulatively.

3.6 The Future of Bitcoin and Blockchain

The use of Bitcoin as currency, currency transfer tool and digital payment system is defined as "Bitcoin 1.0". In the near future, using blockchain technology, the creation of all financial and economic applications such as t-bills, bonds or loans is described as "Bitcoin 2.0". "Bitcoin 3.0" is depicted as the creation of applications that create added value and make life easier in all areas of health, culture, science and art by using the blockchain infrastructure in the future.

Even many financial institutions that do not accept that Bitcoin will be a viable currency in the future have begun their research to realize their internal systems through a blockchain system. With Bitcoin and Blockchain versions 2.0 and 3.0, applications will be much more diversified, all kinds of digital data, such as digital videos, copyrights, digital insurance, not just transactions in blocks, can be sent between the parties (Swan, 2014).

Bitcoin can be taken, spent and stored just in the Bitcoin system. However, in Bitcoin 2.0 debt is given, interest is taken and various rights are acquired in financial products. There is also a huge potential for blockchain and Bitcoin in the field of electronic commerce. In the current situation, many sensitive document agents are given to institutions to prove their identity and the intermediary institutions store this information on their central computer. In later versions of Bitcoin, it is thought that virtual identification cards can be created and sensitive information can be prevented from being used (Antonopoulos, 2014, 108).

Blockchain technology, stakeholder management, corporate governance and the use of traditional theories and practices related to firm management, such as strategic management, or emerging in recent years, can lead to the transformation of the concept of "new economy". The interaction of the individual with all other individuals, groups, organizations, capital, government institutions, entrepreneurs, in other words, with all the environmental elements will differ. As blockchain technology is actively used, the "management and individual" relationship will be the basis for the emergence of a completely different paradigm (Şen, 2018, 885).

Conclusions

Although it has been a long time in progress blockchain technology has increased its popularity with Bitcoin. In other words, Bitcoin has increased the recognition of blockchain technology. However, it would not be right to explain blockchain technology only as crypto money. It has a variety of features by its development purpose and applications. The most important of these features are decentralized structure, anonymity, controllability and sustainability. Blockchain technology demonstrates that it has the potential to radically transform traditional business understanding.

Bitcoin, Litecoin, Ethereum, whichever cryptocurrency aforementioned so far in our recent past years, there is a radical change in trade systems all over the world and they are all important tools of such transformation period. Blockchain on the other hand, does not rely its succession on cryptocurrencies' ever-changing rates, yet the system itself. In addition to that, blockchain technology is a source of new projects in terms of future projections. This technology should not be compared with bitcoin, and the future benefits of its features are mentioned. In addition, the challenges and risks of this technology are discussed and the current blockchain applications are listed. This study is aimed at defining and raising awareness both in terms of today and in terms of the future.

It is known that such technology attracted millions and went down well with its users' expectations. There certainly is a positive tendency for its legal use as such technologies take over the conventional, monetary systems. If all the risks are assessed and incentive arrangements are made, it may be possible to generate income from the Bitcoin market.

In the future, blockchain technology is predicted to affect businesses too much, while Gartner says it is a gradual process that requires time and patience. Most traditional businesses will be interested in blockchain technology, but will not take any action on the use of blockchain technology. This is because traditional businesses need more adaptability and conversion to blockchain distribution than newly emerging businesses (Marcell Gogan, 2018).

New processes and systems are emerging with the expansion of blockchain technology. For this reason, entrepreneurs are investigating which market has a gap in this technology.

As an example, blockchain affected three sectors. There are three basic principles for effective logistics in supply chain management, transparency and traceability.

First, this technology has created a way for customers to see what happens during transport. For instance, VeChain has cooperated with companies such as PwC and DNV GL and has been producing solutions to the logistics problems of the sectors such as wine, car spare parts and pharmaceuticals.

Second, researches show that gaining a new customer is five times more costly than keeping the current customer. Is it possible to increase the profit ratio by providing customer satisfaction with the blockchain? Points systems are used as the most common tactics. BitRewards works as a blockchain-based loyalty platform. After shopping, the stores reward their customers with bit crypto money. Blockpoint is another platform that combines the points system of many stores. It is also possible to purchase a gift card through this site. Aside from operational difficulties, even if a large amount of customers want to use points at the same time, it can be technically a disaster.

Third, advertising to the customer directly without the intermediary institution. Businesses complain that most advertising costs go to brokerage houses. In addition to this, the biggest problem is the sharing of user data, privacy and security violations. Blockchain-based advertising and marketing platforms deliver a better return, reducing costs and increasing data security. By establishing a direct link between the advertiser and the publisher, both parties can better look at their options and choose the right one. All transactions are enriched with open voting systems, while transparency and recycling are maximised. Qchain is a digital registry (ledger) application that can sell and buy digital ads, including local ads. AdHive is also a blockchain project that places more efficient and time-saving local ads. Adex aims to detect only valid clicks and eliminate counterfeiting actions in the field of advertising. (Sanal para, 2018).

The Blockchain Project prepared by the Stock Exchange Istanbul IT department, Takasbank İstanbul and Central Registry the information contained in İstanbul's customer database regarding the electronic application was synchronized. In the project prepared with the concept of Know Your Customer (KYC), new customer information will be added to the specified database, change the existing information and document management will be realized through the blockchain network. Thus, a fast, reliable and transparent platform was created to prevent possible errors in the data access to the database.

The Blockchain Ecosystem in the public and private sectors will transform the processes of operations and also will affect all the economical and administrative structures. The technological improvements and the results of digital economy will be the basis of the new economical systems and structures.

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