

Blockchain Technology and its Role in the Development of the Contemporary Financial System Virtual Currencies as a Model

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<p>Article history Submitted: 21 February, 2022 Revised: 04 March, 2022 Accepted: 05 March, 2022</p>	<p>Abstract Rapid advances in financial technology have attracted the use of new technologies, and in turn, have stimulated research on whether and how financial technology can increase economic and social benefits. Blockchain technology was used for the first time in 2008, i.e. after the global crisis and with the emergence of virtual currencies bitcoin that used this technology and affected the world of finance and business, and derived its strength and the confidence of dealers in it, and many people confuse between blockchain technology and bitcoin as one, and this is not true that this research paper includes the concept of blockchain technology and its most important advantages and disadvantages and its role in modern financial systems, and the reasons for choosing this technology by miners of virtual currencies (Bitcoin), noting that the blockchain technology works according to three main principles, which are the open registry, the distributed database, and mining, It can be used in the fields of money and business because of its advantages, trust and high security, and what makes the blockchain system one of the engines of the smart revolution that human life is witnessing, and makes it one of the most important tools for managing people's lives. Protection of transactions from fraud, i.e., ensuring that there is no fraud during the execution of the transaction.</p>
<p>Keywords: <i>Blockchain,</i> <i>Virtual currencies,</i> <i>Bitcoin,</i> <i>Contemporary financial system</i></p>	

1. Introduction

Blockchain technology is one of the rapidly spreading security cryptographic mechanisms to provide decentralized approaches that have replaced many current security applications. Where it operates from its name, the block chain, this field consists of a series of blocks, each containing certain information and appearing more formally as a distributed ledger. In the form of a software protocol that cannot be implemented without the Internet and consists of several components such as a database, a software application and some computers connected to each other. Although it was first used with virtual currencies such as Bitcoin and Ethereum, this technology added a lot to the science of financial transactions, because money is always cowardly and needs a safe environment, and this is what the blockchain technology approved for financial transactions in virtual currencies, which led to an increase in the number of virtual currency traders. The crypto asset markets have seen a massive influx of capital in recent years thanks to the growing interest in blockchain technology and the gradual embrace of fintech by legacy financial institutions as well as by joint stock companies. During this time, the number of cryptocurrencies available for investment has increased to nearly 2,000. The market capitalization has exceeded 1.5 billion [1], [2] All of this prompted the researcher to choose this title and learn about the work of blockchain technology, its role in the contemporary financial system and the future of virtual currencies (Bitcoin). Many thinkers seek to use this technology in many ways. from other fields of science.

Blockchain technology is one of the modern topics that have emerged with virtual currencies and what distinguishes it is its work without an intermediary, and is characterized by a kind of credibility and a high degree of security and reliable encryption, and in turn we must shed light on this technology and give a clear description of it, as it is considered one of the most important technologies of the virtual future , because of their impact on financial transactions and the adoption of smart contracts on them [3]–[5].

Using technology has become essential in all area of business, life, and education [6]–[9]. The research problem arises through the rapid spread of blockchain technology in the field of cryptocurrencies and the possibility of working with this technology in wide areas of business, financial services and real estate through the following questions?

- 1- What is blockchain technology and how does it work?
- 2- Does the future of this technology extend to other businesses, finance, education, or is it limited to virtual currencies only?
- 3- What are the most important benefits associated with the block chain in financial services?
- 4- What are the most important challenges and risks associated with the block chain in the field of finance and business?

On the other hand, the objectives of this study is to:

- 1-Identify the mechanism of the work of the blockchain technology.
- 2 highlighting the role of modern technologies in modern financial systems.
- 3-identify the areas of work of blockchain technology in other economic sectors and in corporate governance.

2. Literature Review

2-1 The concept of blockchain technology

The concept of blockchain technology is a modern terminology, in short, it is a record or a set of blocks in which the encryption process is used. One of the most important mentioned about its concept is a software protocol that allows the security and transfer of funds, assets and information over the internet without the need for a third-party intermediary such as banks or other financial institutions [10] ,[4]. If there is no consensus among users on the network to make any transaction, the network automatically rejects the entry as invalid [11]. A set of terms dealing with this technique emerged as shown in the Table 1.

Table 1 shows the most important terms related to (Blockchain) technology

Term	Concept	Source
Blockchain	Blockchain is a record that records every transaction in the form of blocks and is distributed among all users, as its data is difficult to manipulate, and it is not under the control of one person.	[12], [13]
Collective Intelligence	Collective intelligence (CI) is a common or collective intelligence that arises from cooperation, efforts, and competition among many individuals, and appears in unanimous decision-making.	[14], [15]
Hash	It is a hash function that can be used to set fixed-size data, and is used in data storage and retrieval applications to get to the data in a very short, almost constant time for each retrieval.	[16], [17]
Peer-to-Peer (P2P)	Peer-to-peer is a distributed application architecture that divides tasks or workloads between peers. Peers enjoy equal privileges and equal participants in the application. It is said to form a network of peer-to-peer nodes.	[18]–[20]
Reputation systems	Reputation systems are programs or algorithms that allow users to rate one another in online communities in order to build trust through reputation. Some common uses of these systems can be found on e-commerce sites such as eBay, Amazon.com, and Etsy	[21], [22]

In light of the foregoing concepts mentioned above, it is possible to refer to six main trends that revolve around the concept of blockchain technology, which are as follows:

- 1- There is no central authority that controls this technology, so we see most governments have no desire yet to implement blockchain technology.
- 2- Any transaction or transaction that takes place between two people in any field is subject to the approval of all subscribers on the network.
- 3- It is difficult to hack or tamper with any account that exists within this technology, and this provides the nature of security in use and financial transactions.
- 4- Working in this technology is not limited to virtual currencies only but can be applied in all areas of life.
- 5- Blockchain technology is considered a recent development within the technologies of the modern era in the digital world, as the technology of Internet networks has passed through many stages and is considered among them.

6- Blockchain technology provides confidentiality, security and confidence in dealing, and this is what gave a huge demand for virtual currencies, especially the currency (Bitcoin), which is the most famous and most widely traded currency.

2.2 blockchain technology arose

I started thinking blockchain technology in 1991, which put forward its idea of a group of researchers and was supposed to be used to document documents, where they cannot change the content and date of Origin just like a notary certificate, and did not receive any attention, and in 2009 appeared under the name of virtual currencies (bitcoin), its owner (I will bank, from any transactions between people and that the process occurs in seconds without cost [4], [5], [23]. This technology makes anyone who owns a virtual currency such as bitcoin or a bitcoin wallet save and record all transactions, making it impossible for a person or entity to hack all people's accounts, and to protect the data and review any error that may occur, the founders of Bitcoin make any ordinary user with a computer solve mathematical equations, which are transactions that get from the sale and exchange of bitcoins [20]–[22]. From the above, I see that the emergence of cryptocurrencies is not just about excluding the broker, there are much deeper reasons.

2.3 Blockchain technology work

We address this part of the research to explain the working mechanism of the blockchain technology in a concise and understandable manner, and the problems that this technology solves. The following figure No. (1) shows the work of this technique.

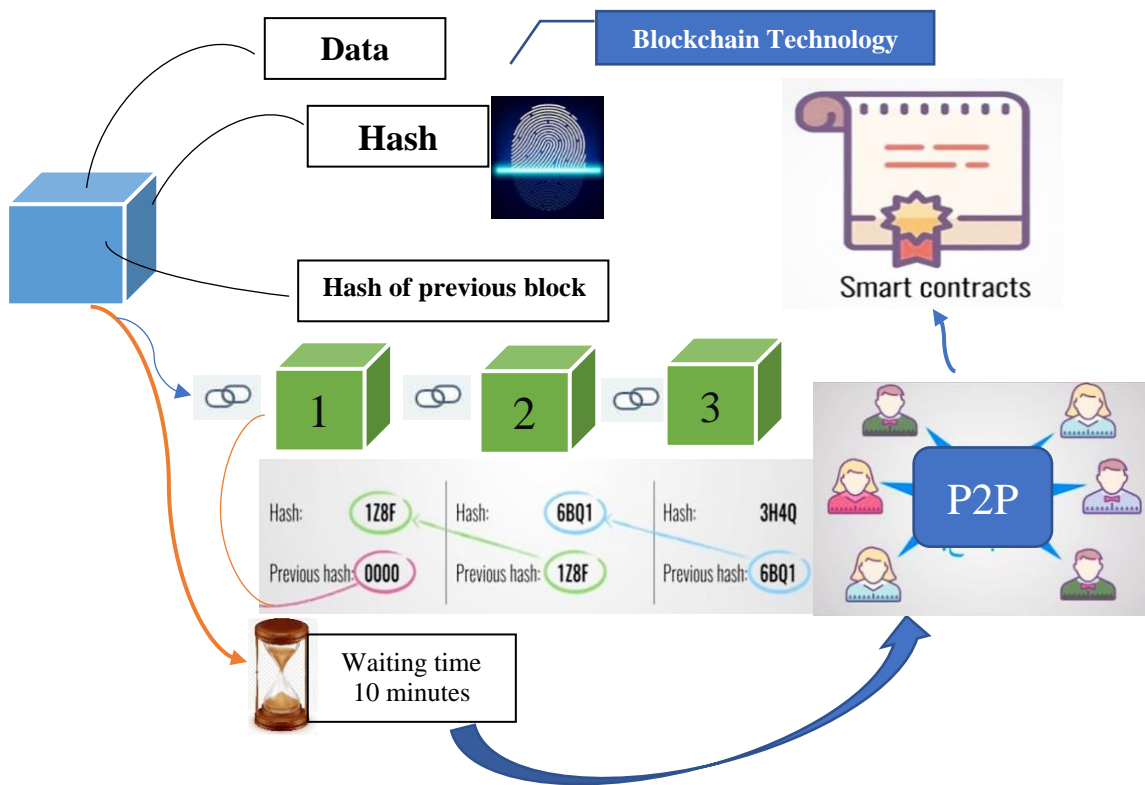


Figure 1: Blockchain Technology

The source was prepared by the researcher based on [24].

2.3.1 Block

It is clear from Figure No. (1) that the block chain works in an intelligent manner and with high accuracy of encryption to ensure the protection of the properties of its users, as it works in the form of open and distributed records, and when writing data, it is difficult to change it. Let's look at all A block, which is divided into three parts, namely:

Data: It is the user's information stored in this section of the block, for example, the Bitcoin block chain stores transaction details, such as the emitter address, the receiver address, and the amount of the currency [18], [20], [25], [26].

The hash: As for the second part of the block, it can be compared to a fingerprint, and it is always a unique number that does not repeat and is unique like a fingerprint. When a block is created, its unique hash number is calculated based on

the encryption system of Bitcoin and any change leads to a change in the hash. The usefulness of a hash is to know any change in the block system. Is this enough to make this technique work?

However, this technology so far is not enough and there is a loophole for it in the tampering process, and the reason for this is that computers are highly efficient and can recalculate thousands of operations from hashes within seconds, which can calculate and change the previous and subsequent blocks. To avoid this loophole, the blockchain technology found a solution through what is called (Proof of Work).

2.3.2 Proof-of-work

Proof-of-work is a process in which there is a delay in the manufacture of new blocks, for example in virtual currencies Bitcoin, it takes ten minutes to add the new block chain [4], [14], [15], [21]. A system that requires no small but feasible effort in order to deter frivolous or malicious uses of computing power, such as sending unsolicited email messages or launching attacks on service sites. The concept was later adapted to secure digital money by Hal Finney in 2004 through the idea of a "reusable proof of work" using the SHA-256 hash algorithm [2], [5], [10]. So, the block chain security feature works in an innovative way to protect blocks from tampering through hashing and proof of work.

2.3.3 Peer2Peer

The block chain technology was not satisfied with the process of proving contracts to protect its contents from tampering, as another idea was added to make it more secure. Peer-to-peer (P2P) is the management of trust between completely decentralized environments, where there is no central data (the data is available to everyone) [3], [22], [23]. As the block chain is distributed randomly and decentralized like the Internet, as the blockchain technology uses (p2p), which allows any party to join in the block chain, when adding a new block, all those on the network will get a complete copy of the block chain and its validity is verified Its safety and health Its validity is unanimously approved, voted on, and then added [1], [16], [17], [19].

2.3.4 Smart contracts

Blockchain technology is in constant development as it is a newly used science and this technology has been used in the financial fields only at a rate of 90% so far, although it can be used in multiple fields. In short, the concept of smart contracts is just software that is stored on the block chain and can be used to transfer currencies based on meeting the conditions of special cases that are programmed in advance. (Cong, L. W., & He, Z. 2019). It is the validation process between the three entities of the sender, receiver and algorithm in the blockchain. (Chaudhari, R., and others. 2019). All of the above gives an explanation of the Blockchain technology and its role in achieving safety for users, individuals, companies or governments at all levels, financial, commercial and service, as this technology can be used in multiple fields.

3. The role of blockchain technology in financial systems.

Blockchain technology has an active role in the current and future financial system because of the security it provides in transactions, as we know that money is cowardly and always needs a safe environment at all times and eras. Despite being quite a modern technology, global investments in virtual currencies are constantly growing, with a market share of \$945 million in 2017, with an expected increase of about 81.2% by 2021, Europe is the second most important geographic region for investments: in 2017 About \$400 million has been spent and is expected to reach over \$3.5 billion in 2022, even if currently only 4% of European companies have a blockchain project [13], [24]. In order to understand how the blockchain technology affects the financial system, we must address the following:

3.1.1 Types of financial system risks

There are five types of financial system risk [27]–[29].

- 1- Credit risk.
- 2- Market risk.
- 3- Liquidity risk.
- 4- Macroeconomic risks.
- 5- Emerging market risks.
- 6- Interest rate risk.
- 7- Exchange rate risk

Countries always seek to assess the risks of the global system as a whole, and this is done through a map of global financial stability by the International Monetary Fund. Figure (2) shows the characteristics needed to assess the risks of global financial systems.

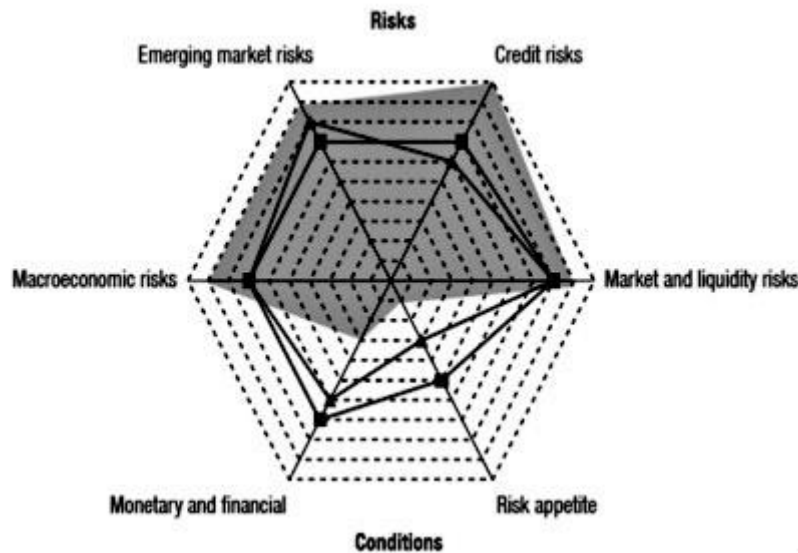


Figure 1 Global financial stability map

Actual monitoring of these indicators does not eliminate risks. It may provide guidance for preparing an economic policy. This policy should assume that current risks will increase, and imbalances will eventually increase. The financial system allows government and central bank policy to implement fiscal policy, monetary policy, and foreign economic policy, and to achieve economic policy objectives in general. In order to stabilize the global financial system and further develop it, we must find modern techniques to protect the financial system from these risks, without the intervention of central governments that control the central bank. She was striving for this. The development of the digital asset market and the declining popularity of physical cash among economic entities in developed countries requires central banks not only to formulate their position on this phenomenon but also to identify trends to support digitalization processes. One area of this support is the issuance of digital central bank currencies that are powered by blockchain technology.

3.1.2 Virtual Currencies (Bitcoin, Ethereum)

Two concepts in particular stand out due to their prevailing popularity and future prospects. One of them is Bitcoin (BTC), the undisputed prominent crypto currency with the largest asset capitalization with a market capitalization (\$879,300,219,426). The other is Ethereum (ETH) with a market capitalization (\$459,859,077,456). In December 2021, measured by the equation (Market Cap = Current Price x Circulating Supply.), BTC and ETH represent approximately 66% of the entire crypto space. <https://coinmarketcap.com/> Despite fundamentally different structures, objectives and functions, BTC and ETH remain the most liquid paths for digital asset investors and therefore enjoy the most interest from traders and institutions for speculative activities. Moreover, not only are these assets traded the most on different exchanges, but studies show a clear influence relationship between most crypto assets – including BTC and ETH [2], [3], [25], [26].

To overcome the scarcity of Bitcoin, if it turns into a global currency in the future, as some economists expect, whoever invented it made it divisible into small particles called (satoshis). Each Bitcoin contains (100) million satoshis, which allows the total value to reach any number. In order to meet the world's needs of electronic money to avoid inflation [27], [28].

3.1.3 Blockchain users

In this part, we discuss the details of the blockchain technology users in the world, as Figure (3) shows the preparations for the period from 2015 to 2021 at the world level, showing the quarterly increase in the number of users using the blockchain registry.

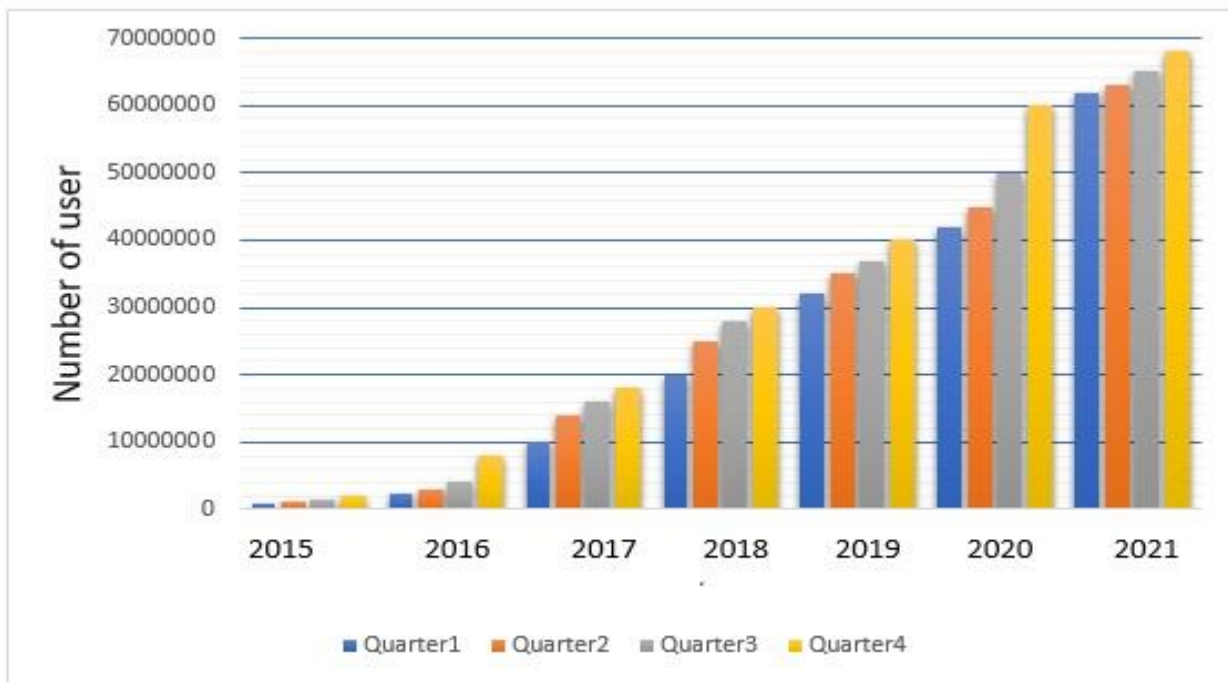


Figure 2 Statistics in terms of increase in number of users of blockchain wallet.

It is evident from Figure No. (3) the continuous increase over the past seven years, which is not a long period, and this technology has achieved outstanding progress in the number of users, reaching at the end of 2021 more than 63,000,000 users, an increase rate estimated at 50% annually. Although many banks are so far in the process of studying the use of blockchain technology in their financial systems, it is expected that \$20 billion will be spent annually on blockchain technical services. At the end of 2024, 90% of American and European banks have studied the possibility of working with this technology because of its high potential. Financial institutions alone have spent around \$552 million on blockchain-powered projects. More than 20 countries have adopted or at least researched the concept of a national cryptocurrency. (<https://2u.pw/pMuZb2021>) Besides recording financial transactions, Blockchain is versatile as it can be used to store medical records, enter into binding agreements, track the flow of goods, store personal credit records, trace the source of artwork, and verify payments from Throughout the supply chain, and much more so the use of this technology is constantly increasing and multiplying.

4. Challenges of using Blockchain technology in the contemporary financial system.

Although blockchain technology provides many financial services, especially financial payment and settlement systems, its adoption by banks is still limited, and it is necessary to overcome its challenges to achieve integration. Perhaps the most prominent challenge or lack of acceptance by banks is the low profit margin, despite the fact that the use of this technology by banks leads to many lower costs, and we mention some challenges, including: (Xu, 2016).

Cyber Security: The number of cyber-attacks has tripled over the past decade. Financial services are still the most targeted. Attacks on information and communication systems are on the rise globally, peaking in mid-2017 with about 1,800 cyber breaches then declining in 2018 and then rising again in 2019. MtGox, once the largest Bitcoin exchange based in Tokyo, was hacked in March 2014. \$700 million worth of bitcoins stolen.

Regulation and Law: With the absence of central authority and independence through the feature of distributed assembly, block chains may eliminate the administrative functions of government agencies, leading to chaos as criminals can exploit judicial gaps between countries.

Relatively scarcity of specialists in this field: Blockchain technology is multidisciplinary as it includes operating system, network communications, cryptography, mathematics, and so on. Its development research is mainly focused on programming languages such as Go, JavaScript, C and C++ and others, which are still completely controlled by the states.

Identity theft: Although the blockchain maintains anonymity in the field of privacy, access security depends on the protection of the private key, which is a form of digital identity. In the event that someone's private key is obtained or stolen, no third party can retrieve it [1], [19], [21].

Cryptocurrencies do not fulfill all the functions of financial assets as a store of value or measure of value as they are highly volatile, and it is better to use digital money approved by central banks [13]–[15].

5. Discussion and Recommendation

Building the review and compliance mechanism for smart contracts, as well as adjusting and studying the relevant policies, laws and regulations in the blockchain, by exploring the mechanisms for their supervision. Directing individuals, institutions and governments to learn the blockchain technology objectively and rationally, through a full awareness of the importance of this technology in building trust mechanisms and information transfer. Although the blockchain technology depends on decentralization, governments must adopt it because it is a new transformation in the field of electronic governance. Arab governments should speed up the introduction of blockchain technology, as did the United Arab Emirates, which is now using this technology because of its future in the world of technology. Whether cryptocurrencies are adopted, or digital currencies are issued by central banks and are recognized, they must be used through blockchain technology.

6. Conclusions

The increase in the spread of new financial technologies such as digital platforms and virtual currencies, led by blockchain technology, will lead to expanding participation in cross-border financing and accelerating capital flows and will create enormous opportunities, leading to changes in the global financial system as a whole. Blockchain technology will encourage global competition as it accelerates the performance of international payments, increases its profitability, and opens the doors to access to capital markets for new participants, in addition to financial inclusion and innovations. Blockchain technology contributes to increasing the efficiency of payment and settlement processes by reducing costs and eliminating intermediaries, in addition to changing the method of holding assets, storing data and information, and increasing reliability in dealing. Evidence indicates that central banks and financial institutions are receptive to the use of blockchain technology, but significant challenges remain. The road to widespread adoption will be long. It is considered a safe technique in transferring and dealing with financial assets, and it can be used in many other non-financial fields. Cryptocurrencies provide a cost-effective option for people who need to get around government restrictions in the banking sector, as well as store wealth in a store of value that is not subject to government inflation.

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