



The Reality of Using Blockchain Technology in the Financial and Banking Sector – Opportunities and Challenges

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Abstract:

Blockchain technology is one of the latest technologies that has received widespread attention from researchers, academics, and professionals, due to the facilities it provides for completing transactions and carrying out activities in various sectors, including the banking sector. This study aims to demonstrate the reality of applying blockchain technology in the financial and banking sector by presenting a set of concepts related to both blockchain technology and the financial and banking sector, based on the descriptive and analytical approach. The study concluded that applying blockchain technology in the financial and banking sector contributes to upgrading the infrastructure of financial services and improving the quality of banking services.

Keywords: Blockchain technology; Financial technology; Financial and banking sector

Introduction

Technology is considered the fundamental and dominant feature of today's world, given the rapid development and technological digital revolution taking place in all social, political, economic, and financial fields. The latter has witnessed, within the framework of what is known as financial technology, radical developments and transformations that have cast their shadow on all transactions and stakeholders, either positively or negatively. Blockchain technology is considered one of the most important technologies of the industrial revolution achieved by the world in the modern era. It has emerged with several applications, including smart contracts, cryptocurrency transactions, as well as financial transactions, in which financial, commercial, and service operations are recorded in a secure technical manner that guarantees the transparency, accuracy, and timely availability of information to users. This technology has also succeeded in providing financial instruments beyond the control of central banks and financial institutions and has made the flow of funds between investors free, without being subject to monitoring, authority, or supervision by regulatory bodies, unlike the situation within the banking and financial sector, where all transactions are subject

to the monetary authorities of the state. However, recently, attempts have begun to use blockchain technology in the banking and financial sector in many countries around the world, particularly developed countries. In light of the foregoing, the following research problem was formulated: **How can the banking and financial sector benefit from blockchain technology?**

Importance of the Study: The importance of the study lies in highlighting the impact of blockchain technology on the financial and banking sector by demonstrating the contribution of this technology to advancing banking and financial activities, enhancing their efficiency, and improving their financial performance on the one hand, as well as the difficulties and risks of the improper use of blockchain technology, which negatively affects banking activities, particularly on the other hand.

Objectives of the Study: Through this research, we seek to:

- Identify the concepts related to blockchain technology and its basic elements;
- Identify the fields of application of blockchain in the financial and banking sector;
- Address the reality of using blockchain technology in the financial and banking sector;

Research Methodology

In order to conduct the study, we adopted the descriptive and analytical approach. We also relied in our research on certain data and statistics, which serve as support for carrying out the analysis process.

I- Theoretical Framework of Blockchain Technology

1- Definition of Blockchain: Several definitions have been provided, among which we mention:

- It is a long chain of encrypted data distributed across millions of computers and people around the world, allowing many parties to enter and verify information. Each computer or entity in this chain possesses the same information, and when one computer is hacked or becomes inoperative, this does not affect the rest of the chain. It is an encrypted, secure, and public ledger, and is also considered a strong chain of trust. In the event of failures in the central nodes of the network or the existence of vulnerabilities that could permit hacking or cyberattacks, the network is capable of correcting itself by verifying the validity of the transaction and protecting its previous data through an automatic mathematical equation called proof of work (Madaoui, 2021, p. 61).
- The Blockchain Institute in France also defines it as a technology for storing and transferring information that is transparent, secure, and operates without a central controlling authority (Mansour & Zerguine, 2022).

2- Elements Underpinning Blockchain Technology: Blockchain technology is based on a number of elements, including (Madaoui, 2021, pp. 61–61):

- **Block:** It is a set of operations or tasks carried out within the chain, such as transferring funds, recording data, and tracking status. Each block accommodates a specific amount of operations and information and does not accept more than that amount so that the operation can be completed and finalized within it. A new block

is then created and linked to it. The purpose of this is to prevent fictitious transactions from being carried out within the block, which could cause the chain to freeze and prevent it from completing or recording transactions;

- **Hash:** It is a mathematical process containing documents, images, and videos in order to form a compressed sequence of alphanumeric characters whose original content cannot be reproduced. The hash performs key functions, as it is responsible for distinguishing one chain from other chains by assigning each chain a unique hash specific to it. Through hashing, the blocks are linked to one another within the chain, whereby each block is linked to the previous hash and the subsequent hash, making it proceed in one direction from the original block to the subsequent one. It also prevents modification of the blocks that have been created;
- **Information:** This refers to the individual operation carried out within the block and which, together with other operations and information, constitutes the block itself. This information depends on the type of applications and operations in which this chain is used. It may constitute a record of sales or purchase transactions, banking settlements, or contracts;
- **Timestamp:** This is the time at which any operation is carried out within the chain. This element is associated with the hash, as the operation carried out through blockchain technology is given a distinctive time stamp that distinguishes it from others. This element, together with the preceding one, increases the security of this technology and the accuracy of the information transmitted through it, thereby increasing confidence in this technology in terms of storage, confidentiality, and security;
- **Ethereum:** It is a decentralized digital information system operating through electronic computers connected to one another and distributed throughout the world. These computers use applications through which many commands related to smart contracts are executed in a highly complex manner, requiring numerous information protocols in a manner resembling the conclusion of conventional financial contracts, so that they can be executed after being subjected to numerous conditions and requirements in a way that is difficult to imitate or manipulate.

All these digital protocols are not subject to any authority or government whatsoever, and there is no entity capable of controlling Ethereum mining or exchange operations. In 2013, “Vitalik Buterin” introduced Ethereum, which relies on blockchain technology, not merely for use as a virtual currency, but rather as a currency designed for smart contracts so that the third party could be dispensed with.

3- Types of Blockchain: Blockchain is divided into three types, each having different uses and characteristics (Fatima A., 2019):

- **First: Public Network:** It is a decentralized network that is completely open to all devices joining it. Any person or entity can use it to create and confirm transactions without having to request authorization to enter the network from a particular entity controlling it. Its applications, such as (Bitcoin) and (Ethereum), operate mainly on the basis of the idea of collective consensus in constructing the blockchain. The

public transaction ledger is updated by creating a block of transactions and adding it to the blockchain after the consensus and approval of all relevant parties, using symbolic identities and addresses to preserve the privacy and confidentiality of data, with a period of approximately 10 minutes required to complete the consensus process and confirm each transaction;

- **Second: Private Network:** It is a network in which authorization to read and update the transaction ledger is restricted to a specific entity. Its applications can be used internally within institutions to manage databases and benefit from the characteristics and advantages of blockchain in simplifying operations, eliminating data duplication, facilitating auditing, reducing costs, preserving records, and ensuring transparency. This network is characterized by greater speed compared with the public network, as the confirmation process takes approximately 100 milliseconds per transaction;
- **Third: Consortium or Alliance Network:** It is an open network, but not completely open, as authorization to create and update transactions is granted only to a specific group of authorized entities connected by a direct business relationship or an agreement requiring the confirmation of joint transactions among them, such as a group of banks, hospitals, government bodies, commercial entities, and others. An example is the (Ripple) consortium, which enables banks and financial institutions to use blockchain to complete transactions and financial transfers among themselves in a cheaper, easier, and faster manner, while benefiting from its analytical tools and features in their activities.

4- Major Fields of Application of Blockchain Systems: The use of blockchain has gone beyond merely being the technological background underlying the operation of the Bitcoin system for exchanging digital currencies to becoming a system whose numerous and advanced applications can be used in all sectors and scientific, commercial, and industrial fields without exception (Fatima A., *Trends in the Application of Blockchain Technology in the Gulf States*, 2019).

- **Internet of Things:** Providing security protection represents one of the most important challenges in the field of the Internet of Things, particularly in light of the increasing cyber threats and the need to protect the things themselves and the data they generate and collect during their operation. Blockchain technology provides security protection in the communication process by ensuring the identity of the sending and receiving devices, examining and authenticating their collected data, and recording the updates and transactions carried out between them.
- **Government and Institutional Services:** The advantages of blockchain, particularly transaction speed, transparency, and trust, can be utilized to provide and improve government and institutional services in general, such as issuing all types of official documents and for various purposes, including birth certificates, marriage certificates, university certificates, driving licenses, and others.
- **Supply Chains and Logistics:** Blockchain systems will play a vital role in expanding trade relations and overcoming obstacles to the movement of global trade in the coming years. Work is currently underway to employ blockchain in creating

logistics platforms aimed at connecting ports with commercial parties such as factories, companies, suppliers, and exporters in order to facilitate transactions among them and accelerate the processes of exporting and importing goods. These platforms, particularly ports, enable the processing and tracking of various information relating to millions of containers and their shipments, prices, invoices, production dates, and other information.

- **Financial Transactions:** The financial sector is considered the sector most and fastest affected by blockchain and other technologies that have brought about radical transformations in the structure and systems of financial services. The decentralized nature of blockchain is currently being utilized by individuals and institutions in instant payment services and in the direct and secure trading of currencies and digital assets between individuals or parties without the need for an intermediary from the financial market or banks. In addition, blockchain is used to execute banking transfers, particularly international transfers, and settlements with correspondent banks and financial institutions instantaneously, thereby reducing the steps and time required to conduct transfers and lowering the costs associated with them.
- **Healthcare:** Blockchain is utilized in the healthcare field to establish a platform for recording healthcare data according to international medical standards and measures, while taking patients' privacy and data into consideration, in order to provide the information necessary for conducting healthcare analyses, studies, and research, and to support the work of hospital staff, financial institutions, health insurance providers, supply and pharmaceutical entities, and others authorized to access the healthcare records ledger.
- **Protection of Intellectual Property Rights:** Blockchain technology enables the creation of platforms for registering and documenting research papers, studies, and collections of literary and artistic works, including books and publications, films, musical pieces, visual and fine arts, and others, with the aim of protecting intellectual and financial property rights. It can be used to verify compliance with the provisions and rules governing citation of published scientific sources, control production, and guarantee publication and distribution rights in any field.
- **Smart Contracts:** This means automating the contracting process, whereby contractual promises can be executed, performed, and monitored without human intervention, which contributes to reducing the costs of managing trade, minimizing human errors, accelerating the completion of contracts, and securely documenting them, thus constituting a revolution in the world of contracts and agreements. These contracts are carried out through many platforms, including the open-source Ethereum platform (Mounir, 2019, p. 134).

5- Benefits and Advantages of Using Blockchain Systems in Transactions: There are several benefits that can be obtained from using blockchain systems, such as increasing operational efficiency and developmental, innovative, and competitive capabilities in countless fields, through the following advantages (Fatima A., *Trends in the Application of Blockchain Technology (Blockchain) in the Gulf States*, 2019):

- **Eliminating Intermediary Parties:** Blockchain systems enable transactions and value exchanges between parties to be completed directly without the need to resort to a third-party intermediary, such as banks, for example, to guarantee trust and security in transactions and complete them. This leads to increased trust, faster transaction completion, and lower costs.
- **Decentralization:** Blockchain systems operate on a decentralized database in which a copy of the public ledger is stored on every device connected to the network, unlike centralized databases whose storage and management are restricted to a particular entity. This facilitates and accelerates cooperation and work among parties and entities and reduces the susceptibility to hacking, loss, alteration, or storage of data, as this would require the simultaneous hacking of more than 50% of the network's devices.
- **Transparency and Trust:** Blockchain systems enhance the level of transparency in transaction records compared with current record-keeping systems, as all changes occurring in the public transaction ledger can be viewed by all devices connected to the network and can only be made with the approval of all relevant parties. Transactions cannot, under any circumstances, be deleted after being recorded in the blockchain system, which raises the level of transparency and increases trust to a greater extent than in current transaction systems.
- **Information Security:** Data in blockchain systems remains fixed and immutable after a block is created and added to the chain, while allowing subsequent blocks to be added after consensus among the parties. All linked blocks and their variables can also be read and historically tracked, which means that auditing and detecting and monitoring transaction details can be carried out easily and quickly, thereby reducing the likelihood of tampering or fraud occurring in the public transaction ledger موجود in all network devices.
- **Reducing Costs and Increasing Transaction Speed:** Blockchain systems contribute to reducing costs because there is no need for an intermediary party to complete transactions, since the public transaction ledger is distributed among all devices connected to the network. Any party can access and settle the transactions relevant to it and audit them immediately and directly, which means increased transaction-processing speed and elimination of additional expenses paid to intermediary parties that work to complete transactions, such as the need to use banks as an intermediary party to authenticate financial payment operations.

6- Future Concerns and Threats of Blockchain Technology: (Hussein, p. 26):

- **Elimination of Intermediary Institutions:** The blockchain system threatens intermediary institutions and jobs in the finance, administration, and business sectors, as reliance on this system will lead to the disappearance of a large number of jobs, just as technological developments have previously changed the pattern of demand for skills and jobs in industries, businesses, and crafts. Banking and supervisory jobs may be able to survive if they succeed in developing themselves to accommodate this new technology;

- **Regulation of Illegal Activities:** Blockchain technology may be used to organize illegal activities such as drug and arms trafficking and human smuggling, thereby threatening social peace and harming individuals' interests;
- **Theft of Individuals' Data:** Individuals' personal data may be seized after they join the chain, and such data may be exploited to manipulate their property, sell it, harm their employment, or expose them to other risks;
- **Threats of Denial-of-Service Attacks:** Blockchain systems may experience denial-of-service attacks despite the system being designed to prevent such attacks by limiting the size of blocks. However, this remains a possible risk and may result in the chain being stopped from operating;
- **Possibility of Hacking:** Although hacking the chain is extremely difficult because it requires hacking all those present on the chain and those carrying out the mining process, it remains a possible risk in chains with few participants and limited use that do not attract a large number of miners.

7- Growth of Blockchain Size in the Markets

Investment in blockchain technology is growing annually, and investment companies in this field are experiencing significant cost reductions, with relative estimates as follows: a 50% reduction in costs in the field of Business & Central Operation, 70% in Central Finance Reporting, and 50% in Compliance. This has prompted major countries around the world to recommend the application of this technology in the government sector, as mentioned previously. A large number of banks around the world have also entered into agreements with companies developing this technology, and it has been introduced into many fields, such as energy, education, supply chains, and banking (Global Blockchain Market, 2017). The following figure illustrates the growth of the global blockchain market during the period 2018–2025, showing the increasing growth of the blockchain market at the global level.

Figure (01): Growth of the Global Blockchain Market during the Period 2018–2025

[image]

Source: Prepared by the researcher based on data from the website <http://www.satatista.com>. Based on the preceding figure, and according to the study published by the Statista Research Department concerning the size of the global blockchain technology market during the period 2018–2025, it indicated that global blockchain technology revenue is expected to witness tremendous growth in the coming years. The market size is expected to exceed USD 39 billion by 2025, and the banking sector was one of the fastest sectors to invest in blockchain, accounting for approximately 30% of the market value of investment in this field.

II- The Reality of Using Blockchain Technology in the Financial and Banking Sector

1- Motives for Moving toward the Use of Blockchain Technology in the Financial and Banking Sector:

There are several motives behind the emergence of blockchain technology, which can be highlighted through two problems (Ahmed M., 2020, pp. 8–9):

- **First Problem:** The first problem essentially lies in the fact that the payment process through a bank may take several days, and in the event of a malfunction, the transaction execution time increases, which always constitutes a major challenge for business owners,

institutions, and even individuals. Despite the emergence of instant transfer service providers such as “Western Union,” “MoneyGram,” and other institutions, a number of financial transactions require the approval and regulation of local banks, which means that transaction delays are always possible. Centralized systems in banks and financial institutions sometimes experience technical or security failures, usually requiring the intervention of the bank or financial institution to repair them, which may suspend the institution’s services for hours and perhaps an entire working day and delay financial transactions for individuals and institutions.

- **Second Problem:** The second problem consists of the violation of the privacy of individuals and institutions through the ability of bank employees to examine the transaction records of each individual and access their purchases, the funds they hold in banks, traditional transactions, and monthly income, as there are no guarantees that the employee will not disclose them to one of their relatives or friends. Consequently, their financial transactions become accessible to people who have no relationship with the bank. Hence, blockchain technology comes to preserve users’ privacy. This does not at all mean that transactions carried out through it are completely confidential, as anyone can still track them while maintaining anonymity, of course. The clearest evidence of this is that cryptocurrency transactions can be tracked, and the actual time, addresses of the wallets sending and receiving the funds, the amount of money, and the number of currency units can be seen without knowing the identities of the parties involved. This constitutes one of the most important features of this technology.

2- Applications of Blockchain in the Financial Sector: There are numerous activities and fields in which the financial and banking sector can benefit from blockchain technology, including (Mohamed & Mohamed, 2022, pp. 161–164):

- **Financial Markets:** Global stock exchanges seek to benefit from blockchain technology in executing and recording trades in securities markets in order to reduce costs, simplify procedures, and increase the speed of trading and settlement operations securely. In this regard, Nasdaq, one of the world's largest stock exchanges, adopted blockchain technology in 2015 to enhance the performance of the Nasdaq Private Market platform for trading shares of private companies prior to their initial public offerings, which was launched in 2014. In addition, the London Stock Exchange has recent plans to develop a blockchain-supported platform through which digital issuance of shares of small and medium-sized enterprises can be carried out. Overall, the use of blockchain technology can help global stock exchanges save between USD 50 and 60 billion annually in operating expenses and information systems;
- **Trade Finance:** Blockchain systems will play a vital role in expanding trade relations and overcoming obstacles to the movement of global trade in the coming years. Work is currently underway to employ blockchain in creating logistics platforms aimed at connecting ports with commercial parties such as factories, companies, suppliers, and exporters in order to facilitate transactions among them

and accelerate the processes of exporting and importing goods. These platforms, particularly ports, enable the processing and tracking of various information concerning millions of containers, their shipments, prices, invoices, production dates, and other information, as well as the adoption of electronic copies of documents and bills of lading. This eliminates procedural complexities and reduces shipping and paperwork costs, in addition to increasing security and transparency and protecting against counterfeit goods and price manipulation.

In this field, the Society for Worldwide Interbank Financial Telecommunication (SWIFT) announced an initiative to explore the use of blockchain in trade finance involving seven major European banks (Digital Trade Chain, KBC, Deutsche Bank, HSBC, Natixis, Rabobank, Société Générale). DTC allows authorized parties to track the progress of these transactions to manage accounts opened for domestic and international trade transactions from the beginning of the transaction until settlement.

- **Customer Identification:** Completing the Know Your Customer (KYC) process usually takes between 30 and 50 days, and inconsistent and slow “Know Your Customer” systems around the world impose a significant financial burden on banks and government institutions, apart from the delays involved. However, blockchain technology can easily solve this problem through its benefits. Storing KYC documents on the blockchain reduces delays and saves the funds involved in the entire process. Other banks can also use KYC statements stored on the blockchain without having to request them from customers again. One example of use cases is that Mastercard recently filed a patent describing a system for using a private or semi-private blockchain to store customer data, such as first name, surname, and tax identification number.
- **Financial Payments:** Money transfers are among the most prominent financial services that have already begun to benefit from blockchain technology on a large scale. It has become possible to transfer funds instantly across borders at a relatively low cost and within a period not exceeding a few minutes. This technology can contribute to increasing the volume of global remittances, as global remittances in 2016 were estimated at more than USD 601 billion using traditional remittance channels.
- **Supporting Financial Inclusion:** On the other hand, blockchain is relied upon to support financial inclusion, as both mobile phones and blockchain are considered highly promising solutions for providing financial services to billions of financially underserved people. These technologies could generate banking revenues estimated by the World Bank at approximately USD 380 billion in 2020, including USD 270 billion resulting from providing financial services to small and medium-sized enterprises and USD 110 billion resulting from providing financial services to financially underserved individuals.
- **Monetary Transfers:** In the current situation, there are many intermediaries in the payment and money transfer system, but blockchain could eliminate the need for many of them, which means increased security and reduced costs for banks in

processing payments between organizations and their customers and even between banks themselves, as well as transferring money between users in developing countries. Among the examples of blockchain applications in the payment system is Taipei Fubon Commercial Bank in Taiwan, which is the first bank to apply blockchain technology to the payment system for restaurants and commerce.

- **Applications for Interbank Securities Settlement:** The clearing and settlement system here operates according to an application focused on digital currencies based on blockchain technology, including central bank digital currency, whether retail or wholesale. This application aims to develop delivery-versus-payment systems between banks, enabling rapid interbank clearing and instantaneous settlement of securities against cash, whereby the two parties exchange the asset for cash instantaneously at the moment the transaction is executed (Ayman & Wafaa, 2022, p. 115).
- **Insurance:** Blockchain technology is attracting the attention of major stakeholders in the insurance sector. Many authorities have suggested that the insurance sector will be one of the sectors most affected by blockchain technology in the near future. Among the insurance fields in which blockchain technology can be used, according to the global accounting firm (KPMG), are personal accident insurance, record keeping, digital identities, surety insurance, and peer-to-peer insurance, which are mentioned as follows (Ayman & Wafaa, 2022, p. 115).

3- The Reality of Using Blockchain Technology in the Financial and Banking Sector: (Mohamed & Mohamed, 2022, pp. 160–161)

The financial sector is considered the sector most and fastest affected by blockchain and other financial technologies that have brought about a radical transformation in the structure and systems of financial services. The decentralized nature of blockchain is currently being utilized by individuals and institutions in instant payment services and in the direct and secure trading of currencies and digital assets between individuals and parties without the need for an intermediary in the financial market or banks, in addition to its use in executing banking transfers, particularly international transfers, and settlements with correspondent banks and financial institutions instantaneously, thereby shortening the steps and time required to conduct transfers and the costs associated with them.

According to the study conducted by the Arab Monetary Fund through its website on 12/06/2019, there are many reasons behind the growing global interest in blockchain technology, including the fact that the broader use of blockchain technology will, according to international estimates, contribute to achieving global economic gains estimated at approximately USD 3.1 trillion by 2030. With regard to the banking sector, blockchain can contribute to a large-scale reduction in the costs of providing banking services, including the costs of operations, compliance, disclosure, and Know Your Customer systems, by rates ranging between 30–70 percent of the cost of these operations. The resulting savings are estimated at between USD 8 and 12 billion annually for major investment banks. Accordingly, a number of banks are seeking to invest in these technologies, as international estimates indicate that approximately 91 percent of banks invested in the development and

use of blockchain technologies during 2018. The use of blockchain technology can also help global stock exchanges save between USD 50 and 60 billion annually in operating expenses and information systems. As for money transfer services, it contributes to increasing the volume of global remittances, which are estimated at approximately USD 500 billion annually using traditional remittance channels. In addition, there is the field of facilitating trade finance services through the automatic storage, securing, and exchange of contract details and financial terms, as well as coordinating trade logistics services and payments within a real-time and integrated network of transactions, which will help support trade finance operations, fill part of the trade finance gap, particularly in developing countries, and achieve estimated savings of approximately USD 30–40 billion annually.

4- Opportunities and Challenges of Using Blockchain in the Financial Sector: Blockchain technology has advantages that constitute opportunities for its use, but it also has challenges imposed by the reality of its use.

A- Opportunities for Using Blockchain Technology in the Financial and Banking Sector: The advantages of using blockchain technology in the financial and banking sector are represented as follows (Mohamed B., 2022, p. 74):

- The blockchain guarantees data integrity;
- It allows the decentralization of transactions and decision-making;
- Unlike traditional banking transactions, transactions conducted through this technology are characterized by high speed and effectiveness and reduced costs due to the absence of intermediaries;
- Through blockchain technology, personal data are secured within digital vaults, giving users the freedom to transfer their various goods and services.

B- Challenges of Blockchain Technology in the Financial and Banking Sector: Although blockchain technology has achieved considerable success in several fields, it faces many challenges that prevent the widespread use of this technology in the financial sector. The most important of these challenges can be mentioned as follows:

- The high cost of transactions resulting from the large number of computers with special specifications and their consumption of large quantities of energy, enabling them to carry out transactions and transfers;
- The anonymity of users may encourage illegal activities such as money laundering and terrorist financing;
- This technology faces challenges and uncertainties, as does any new technology, in terms of technology, speed, security, and scalability;
- Amending legal regulations, procedures, and policies does not happen overnight and requires considerable time and effort until the situation regarding this technology becomes established and it is accepted by the legislator;
- Protecting the blockchain network from various cyberattacks through algorithms;
- The lack of clarity regarding the technical and digital aspects results in a lack of clarity and stability in Shariah perspectives, such as the issue of digital currencies. Despite their acceptance by some groups of traders, questions still remain concerning their nature, monetary status, and the resulting economic and Shariah implications;

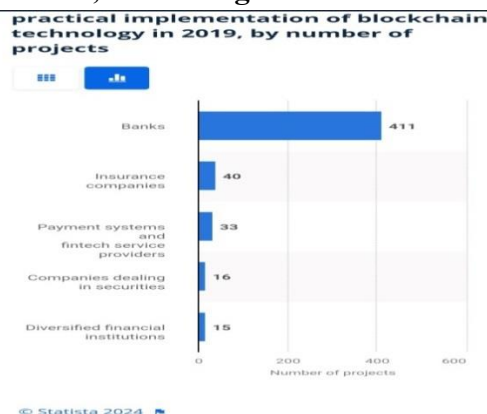
- The complete transition toward a decentralized network requires considerable efforts related to harmonization and the digitization of operations, which may be difficult for financial institutions.

5- An Analytical Study on the Development of Blockchain Technology Use in the Financial and Banking Sector: In order to conduct an analytical study on the development of blockchain technology use in the financial and banking sector, we will address both the distribution of the number of financial institutions using blockchain technology and the aspect of monitoring the development of blockchain technology use in the banking sector.

A- Financial Institutions Using Blockchain Technology: The following figure shows the distribution of leading financial institutions in the practical implementation of blockchain technology.

Figure No. (02): Distribution of Leading Financial Institutions in the Practical Implementation of Blockchain Technology

In 2019, According to the Number of Projects

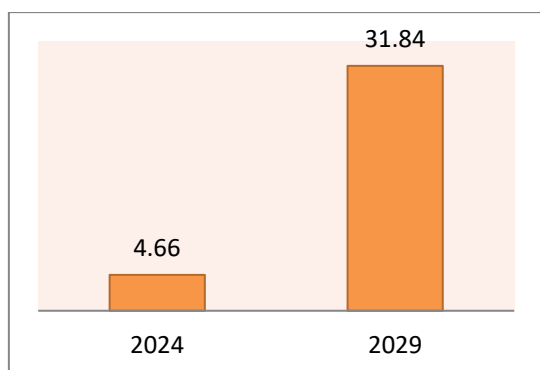


Source: <https://www.statista.com>

The above figure shows, according to the Statista website, that banks were at the forefront of financial institutions in implementing blockchain technology solutions in 2019, as they participated in 411 projects involving the practical implementation of blockchain technology. In contrast, the number of projects in which blockchain technology was used in the insurance sector reached 40 projects. As for the other financial institutions, they were as follows: payment systems and financial technology service providers with 33 projects; securities companies with 16 projects; and diversified financial institutions with 15 projects.

B- Development of the Use of Blockchain Technology in the Banking Sector: The following figure shows the development of the use of blockchain technology in the banking sector:

Figure No. (03): Blockchain Market for Financial Technology for the Period 2024–2029



Source: Prepared by the researcher based on data from the Mordor Intelligence website: <https://www.mordorintelligence.com>

Based on the preceding figure, and according to Mordor Intelligence, the blockchain technology market was valued at USD 4.66 billion in 2024 and is expected to reach USD 31.84 billion by 2029, at a compound annual growth rate of 46.92% during the forecast period 2024–2029. The blockchain-related financial technology industry is experiencing rapid growth due to various factors, such as the increase in the market capitalization of cryptocurrencies and initial coin offerings, the growing demand for distributed ledger technology, and the adoption of advanced solutions by financial institutions. Blockchain technology contributes to the digital transformation of the financial industry, in addition to the growth of financial technologies, as digital banking technologies and chatbots for customer service are witnessing increased demand.

Conclusion: In view of the significant developments in the field of information technology, and in parallel with the problems experienced by the financial and banking sector in recent years, institutions belonging to this sector have become obliged to seek successful and effective solutions to these problems in line with the Fourth Industrial Revolution and the technology being witnessed by the financial and banking sector within the framework of what is known as financial technology, of which blockchain technology is considered one of the most important manifestations. Through this study, we reached a set of findings:

- Blockchain technology contributes to changing the way banking transactions are recorded and documented through a distributed and secure ledger, thereby reducing reliance on human intermediaries;
- Blockchain technology has helped raise the level of trust between customers and financial and banking institutions through the decentralized and public nature of transactions;
- The reliance of blockchain technology on advanced encryption and shared data verification has made it difficult to manipulate information, thereby contributing to reducing financial forgery and fraud;
- Banks occupy the forefront of the financial and banking sector in terms of reliance on blockchain technology;
- The use of blockchain technology by financial and banking sector institutions as a whole is tending toward growth and increase, given what blockchain technology can contribute to the financial and banking sector in terms of significantly reducing the

costs of providing banking services and financial transfers, providing operational savings, supporting trade finance operations and transfer systems, and storage and insurance.

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