

Review Paper on Blockchain and its Applications in the Banking Sector Globally

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Abstract

Blockchain technology has the potential to transform the banking sector by boosting transparency, lowering transaction costs, and strengthening security. This review paper investigates the present level of blockchain adoption in the banking industry as well as its future applications. The review begins by discussing the basics of blockchain technology and its characteristics, including decentralization, immutability, and security. The paper then explores the various ways in which blockchain technology is being utilized in the banking industry globally, including cross-border payments, trade finance, and identity verification. Finally, the paper discusses the challenges and opportunities that the adoption of blockchain technology presents for the banking sector and identifies areas for future research. Overall, this review paper concludes that blockchain technology has the potential to significantly transform the banking industry globally, but its success will depend on the ability of stakeholders to overcome challenges and fully leverage its benefits.

Keywords: Blockchain, Distributed Ledger, Banking Sector, CryptoCurrency, Bitcoin, Ethereum.

INTRODUCTION

The purpose of writing a review paper on blockchain and its global application in the banking sector is to provide an overview of the current state of research and development in the field of blockchain technology and its potential impact on the banking industry. The paper would likely cover topics such as the technical aspects of blockchain technology, the ways in which it can be used in the banking sector, and the challenges and opportunities that the technology presents. Additionally, the paper would likely examine the current global trends in the use of blockchain in the banking sector and any regulatory issues or challenges that need to be addressed. Overall, the main goal of the review paper would be to provide a comprehensive understanding of the current state of blockchain technology and its potential impact on the banking sector globally [1].

Furthermore, the review paper could also explore the use cases of blockchain in banking such as cross-border payments, digital identity, supply chain finance, trade finance, and more. It could also examine the current projects, pilots, and production deployments of blockchain in the banking sector by various stakeholders such as central banks, commercial banks, fintech companies, etc. [2].

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Additionally, the review paper could also compare the different blockchain platforms and protocols used in the banking sector and their respective advantages and disadvantages. It could also look at how blockchain can enable new business models and revenue streams for the banking sector [3].

What is Blockchain

Blockchain is a peer-to-peer decentralised distributed ledger system that works without the use

of a middleman third party, making the records of any digital asset visible and immutable. It is a cutting-edge, revolutionary technology that is grabbing the public's attention for its scalable capacity to eliminate hazards and fraud Figure 1.

Blockchain is a Distributed ledger that consists of an emerging list of Records called Blocks which are connected to each other using Cryptography Figure 2.

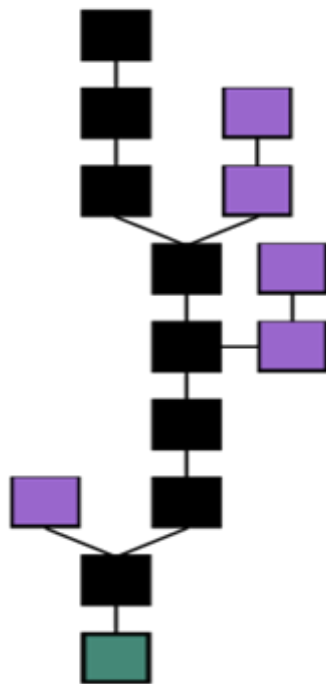


Figure 1. Blockchain Network.

Green Block is the genesis block and it connects to the main line which is the black boxes, the purple blocks represent Orphan Blocks that exist outside of the mainline.

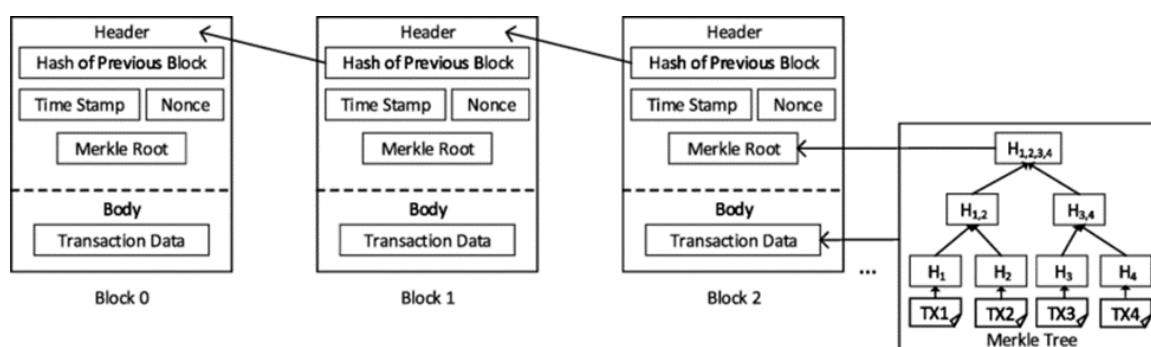


Figure 2. Structure of Blockchain.

The structure of the Blockchain consists of the following integral parts which are mentioned below:

- Header
- Hash of previous block
- Timestamp
- Nonce
- Merkle root.
- Version

- The block header is periodically hashed by miners by changing the nonce value as part of routine mining activity. The header is used to identify a specific block on the blockchain [4].
- Hash of the previous block is the reference of the previous node since Blockchain is a collection of various nodes which are interconnected.
- Because it has no preceding block hash, the first block on the blockchain is referred to as the Genesis Block [5].
- The timestamp is used to verify that the block has been used at a specific time mentioned and is used to maintain authenticity in the Blockchain network [6].
- Nonce (Number only used once) is a 32-bit number that Blockchain miners are finding to mine a block.
- Merkle Root is used to check the authenticity of the data and to make sure it is not hacked or manipulated in any way with the help of certain Mathematical Formulas [7].
- Version indicates which of the three sorts of Blockchain versions a certain Block is using.
- BlockchainVersion1.0(Cryptocurrency)
- Blockchain Version 2.0(Smart Contract)
- Blockchain Version3.0(DAPPS) [8]
- Blockchain Version4.0(Blockchain for Industry)

Types of Blockchain

Public blockchain

These Blockchain networks are truly decentralized as they do not have a central authority and can be accessed by an individual from the public.

They have comparatively no restrictions and can be accessed with the help of using a basic computer with an internet connection [10].

Advantages

1. Trustable
2. Secure
3. Anonymous Nature
4. Decentralized

Disadvantages

1. Processing
2. Energy Consumption
3. Acceptance

Examples: Bitcoin, Ethereum.

Private Blockchain

These Blockchain networks are not decentralized as compared to the Public Blockchain; only specific selected nodes can take part in the process which makes this very secure.

They only allow access to specific authorised users and are closed to the general public.

Advantages

1. Speed
2. Scalability
3. Privacy
4. Balanced

Disadvantages

1. Security
2. Centralized
3. Count

Examples: Hyperledger, Corda.

Hybrid Blockchain

This is a combination of public and private blockchains where certain parts are controlled by an organization or an individual and the other parts are public. They are permissionless and also permission based [9].

Advantages

1. Ecosystem
2. Cost
3. Architecture
4. Operations

Disadvantages

1. Efficiency
2. Transparency
3. Ecosystem

Example: Ripple network and XRP token.

Consortium Blockchain

This is a Blockchain network that belongs to an organization also called a Federated blockchain. It validates, initiates, and receives transactions. While part of it is public, around half of it is private.

Advantages

1. Speed
2. Authority
3. Privacy
4. Flexible

Disadvantages

1. Approval
2. Transparency
3. Vulnerability

Example: Tendermint and Multichain.

Characteristics of Blockchain**Data immutability**

This helps to make sure there is no data corruption. In Blockchain every block consists of a ledger that cannot be edited unless all blocks agree to edit the ledger, this makes it very transparent and secure.

Decentralized

Blockchain is decentralized in nature, which states that there's no central authority that manages the technology, but rather a bunch of nodes that manage or control the transaction.

Transparency

With blockchain, every transaction can be tracked from beginning to end.

Consensus algorithm

Consensus is a type of validation where members of the blockchain decide which transaction shall be processed, based on which those blocks will be added to the blockchain. Blockchain uses a number of different consensus methods, including Proof-of-Stake (PoS), Proof-of-Work (PoW), Delegated PoS, and Proof-of-Authority (PoA), among others.

Security

The Blockchain is more secure as it is immutable, and uses various hashing algorithms to encrypt data like SHA-256, etc.

Anonymous

Despite the fact that the transactions are transparent, the parties involved are not identified.

Applications of Blockchain

- Money transfers and processing payments
- Monitoring supply chains
- Retail loyalty rewards programs
- Digital Identification
- Data sharing
- Copyright and royalty protection
- Digital voting
- Real estate and land transfers
- Food safety
- Immutable data backup

Blockchain technology in the banking sector

Payments

Payments become faster in Blockchain Technology with the use of decentralized ledger which also makes it cost efficient.

Clearance and Settlement Systems

Reduction in operational costs which makes real time transactions easier between different financial establishments.

Fundraising

Use of Initial Coin Offerings (ICOs) in exchange for funds provided by the investor makes the fundraising process more simplified. ICOs are valued based on the success of the company offering them.

Securities

Blockchain network is decentralized and hence gets rid of any sort of middleman which results in less scams, reduces unnecessary costs.

Loans and Credit

By getting rid of middlemen in this industry the Loan and Credit industry becomes much more secure and reduces interest rates.

Trade Finance

Blockchain gets rid of processes which include a heavy paper trail in the Trading industry in finance and helps in making the whole process more transparent, secure and trustworthy globally.

Fraud Prevention and Customer KYC

Blockchain stores Customer data on blocks that are decentralized which makes it more secure and convenient to share information among different financial organizations.

Smart Contracts

They are agreements where the terms between the buyer and seller are written explicitly in code.. They are self-executing which means when the condition of the agreements is fulfilled the codes will execute the agreement. They are stored in a distributed, decentralized blockchain network. They are easily trackable and immutable.

Crypto currency

It is a digital currency which is secured using cryptography and uses blockchain technology which is distributed in nature hence it has no central authority. Example Bitcoin, Ethereum.

Challenges adoption of blockchain presents in the banking sector

- **Budget:** In order to adopt blockchain into the banking sector the main challenge is the cost. Since Blockchain is comparatively newer the cost to include blockchain services is not yet known. The banking industry is not willing to include blockchain as long as the costs are not clear. Solution to this problem would be to create a plan or a business case before any installation of blockchain services and focus on how the implementation of blockchain will reduce revenue and also the investment Tables 1 and 2.
- **Regulation and Compliance:** Banking industry is known to have strict laws in order to prevent criminal activity. Since Blockchain is decentralized it is difficult for the companies to regulate any sort of criminal activity as there is no solid framework.
- **Corporate culture and bureaucracy:** The banking sector works on a traditional centralized process which is the complete opposite of Blockchain technologies which are decentralized in nature which makes the implementation of Blockchain more difficult and unprofitable.
- **Security and Privacy:** Blockchain has transactions which offer anonymity and are considered far more secure but there are different threats to the blockchain network as well like Double spending, Private key attacks Tables3-5.
- **Suboptimal Infrastructure:** Most banking systems use traditional infrastructure when it comes to technology which is not compatible with blockchain therefore the existing systems will need to scale up which will incur more costs.
- **Energy consumption:** Blockchain uses a large amount of network resources which results in a large amount of energy consumption Tables 6-8.

Table 1. Summary of Articles on Blockchain Technology in Banking Sector

S.N.	Article Name	Objectives	Findings	Recommendations
1	Understanding modern banking ledgers through blockchain technologies: Future of transaction processing and smart contracts on the internet of money	To provide an overview of the concept of blockchain technology and its potential to change the world of banking	It found that the blockchain technology has important features which give it high potential to be in financial applications.	Blockchain technology has positive and negative sides. The negative side of block chain needs to be carefully considered prior to development and using it in different applications.
2	Blockchain application and outlook in the banking industry	To show why banking industry requires urgent transformation and is seeking new growth avenues, Blockchain can be the solution.	Blockchains could revolutionize the underlying technology of the payment clearing and credit information systems in banks.	Regulation and actual implementation of a decentralized system are problems that remain to be resolved. Therefore, the authors propose some solutions.
3	Blockchain Technology: Transforming Libertarian Cryptocurrency Dreams to Finance and Banking Realities	The financial technology (FinTech) sector sees high potential value in cryptocurrency blockchain protocols, or distributed-ledger technology (DLT)	The author explores how blockchain research beyond Bitcoin is closing these gaps and some of the challenges that remain.	The requirements and guarantees of blockchains for cryptocurrencies do not match those of FinTech- from transaction throughput to security primitives and privacy.
4	Research of a possibility of using blockchain technology without	Discusses the use of Blockchain technology without tokens to	The article analyzes the protection mechanisms of distributed databases,	Gives recommendations on the introduction of Blockchain technology into modern banking

	tokens to protect banking transactions	protect information about banking transactions details	proposes a solution to the problem of maintaining the uniqueness of information in them based on Blockchain	systems. The authors propose that blockchain without mining and tokens will considerably simplify processes of maintenance of integrity and uniqueness
5	Exploration and practice of inter-bank application based on blockchain	Analyze the principle architecture and the technical characteristics of blockchain and introduces application scenarios of the blockchain.	Blockchain technology solves the consensus problem with cryptography. Even if without the participation of the central authority, there is also a way to ensure that financial behavior and transaction behavior are all stored in a common database.	If there is a perfect blockchain-based credit system, we can make a self-verification. Such a process is not only more transparent and efficient, but also reduces the cost of national regulation.
6	Multi-blockchain model for central bank digital currency	This paper attempts to use the blockchain as the fundamental technology of CBDC (Central Bank Digital Currency) model.	CBDC (Central Bank Digital Currency) model should take advantages of blockchain technology in the supervision, payment and consumption.	In order to use the blockchain as fundamental technology of CBDC (Central Bank Digital Currency), the challenges such as the protection for user's privacy, supervision and transaction speed should be solved.
7	Banking on blockchain: Costs savings thanks to the blockchain technology	This paper looks at the challenges and opportunities of implementing blockchain technology across banking.	The blockchain technology can optimize the global financial infrastructure, achieving sustainable development, using more efficient systems than at present.	Using blockchain technology in financial processes can be handled by overcoming the current disadvantages of blockchain which found in the "bitcoin". These disadvantages are the significant energy consumption and the high cost of hardware.
9	Inter-Bank Payment System on Enterprise Blockchain Platform	To introduce an end-to-end inter-bank payment systems (IBPS) prototype based on Hyperledger Fabric enterprise blockchain platform.	The prototype proves that enterprise blockchain platforms, represented by Hyperledger Fabric, can facilitate more efficient and secure payment services.	Positioning blockchain with existing financial technology is a promising research direction. Pioneer research projects have verified the feasibility and advantages of implementing Real-time gross settlement system (RTGS) on blockchain platforms.
10	Blockchain platform and future bank competition	The study proposes the systemic innovation model for analyzing and tracking the path of innovations. The model can be applied to any industry to understand the process of innovation	The analyses findings reveal the situation whereby most banks still compete to create their own Blockchain banking systems. The analyses, based on the systemic innovation	From the technology diffusion perspective, the future of Blockchain banking may need cross-chain interoperability to support a full spectrum of payments and value
11	Bis: A novel blockchain based bank-tax interaction system in smart city	To study the new bank-tax interaction model based on blockchain technology and completes the implementation and verification of the prototype system	Most commercial banks can obtain the enterprises tax information in an efficient and safe way through multi-channels technology of Blockchain.	In the same channel, different functions of intelligent contract can also be used to realize different types of data can be done using blockchain technology.
12	The advantages of blockchain technology in commercial bank operation and management	This paper discusses the advantages of blockchain technology for commercial banks from the following aspects: bill operation, cross-border payment operation and asset securitization business of commercial banks.	Blockchain technology can decrease transaction cost for both sides and increase operating efficiency of commercial banks in operation and management.	To start implementing blockchain technology for banks using ripple crypto currency.
13	Construction of elderly mutual aid	This paper combines the blockchain technology with the	The paper shows that If time banks use the blockchain	To start using blockchain in time banks.

	time bank based on blockchain	time bank to build a blockchain time bank, and solve problems faced by current time banks. Time bank as per Investopedia is: "a system of bartering various services for one another using labor-time as a unit of account".	technology, the pensions funds system will be more complete and wealthier.	
14	Blockchain, bank credit and SME financing	This paper sets up a theoretical model to analyze a new credit pattern that allows small and medium-sized enterprises (SMEs) assessing bank loans through the blockchain technology	Theoretical analysis demonstrates that the blockchain technology enables the decentralized consensus recording of success of debt repayment or debt default rendered by verifying and validating certain lending and borrowing activities in distributed ledgers.	In the newly proposed blockchain embedded credit system, SMEs with low-risk and high-quality could display their credibility and risk class through information distribution.
15	Blockchain investment decision making in central banks: A status quo bias theory perspective	This research draws on the status quo bias theory to investigate Distributed Ledger Technology (DLT) investment decisions to explore the feasibility of DLT in central banking.	The paper found evidence of different types of status quo bias in affecting two of the most influential central banks' Distributed Ledger Technology (DLT) investment decision-making.	To start using the blockchain technology in the investment banks.
16	An automatic pattern recognition value system with listed banks based on blockchain	It proposes an automatic pattern recognition value system based on blockchain, which allows investors to reasonably estimate the stock value of listed banks automatically by using blockchain technology.	The new automated value system based on blockchain technology includes three layers: a. Production of value; b. Record of value; (c) assessment of value.	The new value system can correctly guide investors in making a rational investment, which will increase investment returns and ultimately realize the rational allocation of social resources.
17	Improving the Process of Lending, Monitoring and Evaluating Through Blockchain Technologies	This paper describes a proposal for a process of lending, monitoring and evaluating development projects in the Brazilian Development Bank using blockchain technology.	The proposals increase transparency of public money allocation, simplify manual activities, reduce operational costs and produce data to support aggregate analysis of the benefits arising from the bank's loans.	After highlighting the difficulties to implement the mentioned proposal, this paper also discusses what can be done as a transition process using blockchain technology and outlines what has already been done.
18	Blockchain standards in international banking: Understanding standards deviation	Discusses how blockchain standards need to be integrated into the other standards of international banking to facilitate the effective use of the blockchain technology in the banking industry.	The article describes the role that blockchain can perform in international banking and why standards are needed for this transformation.	The standards which developed for implementing blockchain technology and the existing standards applied in international finance are not aligned. These differences in the standards can create a lot of conflicts in the future, so it should not be ignored.
19	Banking on Blockchain: An Evaluation of Innovation Decision Making	Blockchain technology was examined as technology innovation in the financial services industry.	Based on 12 financial services providers, the authors found that financial service organizations tend to view blockchain innovation as a lower priority due to the lack of a clear path of value.	As industries face new technology and innovation such as blockchain, they must consider efficient ways to explore and to determine whether they can capitalize on the innovation to be used or not.
20	Blockchain Innovation and Its	The main purpose of the paper is to show that blockchain technology	The new technologies like blockchain may be one of	It is recommended that managers should follow developments in this field in order to prepare for

	Impact on Business Banking Operations	may disrupt the existing business models and to explore how this may occur.	the drivers of business model innovation.	possible disruptions in their industries.
21	FinTech and Sustainability: A Mini- Review	To survey and examine the role of FinTech as a speedier innovation and focus on sustainable performance of FinTech.	FinTech Plays important role for development in financial businesses and speedier innovation. Also, it has a significant and positive impact in supporting sustainable corporate performance.	More research is required to help understand the relationship amongst Fintech and sustainability.
22	Sustainability Practices and Sustainable Financial Growth	To identify, analyze, and categorize the possible steps to develop the financial sustainability of a company and study the possible risks.	The development and effective functioning of risk management and financial growth will expand with applying sustainability practices.	The overall performance of The enterprise, financial stability and the possibility of further development are known to depend on numerous aspects. a systematic indicator can be used to ensure the effectiveness of the financial mechanism.
23	The Role of Financial Management in Promoting Sustainable Business Practices and Development	To explore the role of financial management in promoting sustainable business practices and development.	Allocating capital budgeting for sustainable issues enhances the competitive advantage of the business.	The study concludes that Financial management plays a vital role in promoting sustainable business practices and development.
24	How Sustainability Contributes to Shared Value Creation and Firms' Value	To show how Sustainability Contributes to Shared Value Creation	Sustainability practices in the firm improve the financial growth and decision making in respect of the cost of capital, capital budgeting, investment returns and working capital management.	Risk mitigation and risk management tools and its execution can decrease the risks in business. Also, the bankruptcy can be decreased through proper implementation of low-risk sustainability financing models.
25	Corporate Sustainability Reporting and Corporate Financial Growth	This study is a detailed synthesis of sustainable practices within the financial systems and how corporate disclosure is fundamental with regard to sustainable financial growth.	Shows the value added to specific firms and industries through sustainable approaches as well as the occurrence of more optimal decisions by managers through sustainable policy	The report provides an outlook on the risks associated with the sustainability initiative and how such risks can be managed for seamless integration of sustainability aspects within the financial systems.

METHODOLOGY

This review paper is about Blockchain and its applications in the banking sector globally, it starts by explaining the basics of blockchain, the different types of blockchain networks, and the various advantages and disadvantages of blockchain. It further explains the applications of Blockchain in various departments along with its various applications in the Banking sector.

Research Design

The study uses a combination of quantitative research design which deals with numbers, statistics, and qualitative research design which uses non-numeric data like literature reviews, books, websites, etc.

Data Collection

Data has been collected from various types of sources including previously published research papers, books journals, magazines, and websites.

Data Analysis

Data collected from different sources including previously published research papers, books journals, magazines, and websites helps in understanding what exactly is blockchain and its applications, effects on the banking sector, etc.

Below mentioned are the various research papers which have been collected and studied carefully to create this review paper.

Table 6. Journal and Publisher Distribution 1.

S.N.	Article Name	Author(s)	Journal	Publisher	Year	Scopus IF
1	Understanding modern banking ledgers through blockchain technologies: Future of transaction processing and smart contracts on the internet of money	Peters, G.W., Panayi, E.	New Economic Windows pp. 239-278	Springer- Verlag s.r.l.	2016	25.19
2	Blockchain outlook in industry application and the banking	Guo, Liang, C.	Financial Innovation 2(1),24	SpringerOpen	2016	9.51
3	Blockchain Technology: Transforming Libertarian Cryptocurrency Dreams to Finance and Banking Realities	Eyal, I.	Computer 50(9),8048646, pp. 38-49	MDPI AG	2017	8.64
4	Research of a possibility of using blockchain technology without tokens to protect banking transactions	Popova, N.A., Butakova, N.G.	Proceedings of the 2019 IEEE	Institute of Electrical and Electronics Engineers Inc.	2019	6.52
5	Exploration and practice of inter-bank application based on blockchain	Wu, T., Liang, X.	ICCSE 2017 - 12th International Conference on Computer Science and Education 8085492, pp. 219-224	Institute of Electrical and Electronics Engineers Inc.	2017	6.23
7	Banking on blockchain: Costs savings thanks to the blockchain technology	Cocco, L., Pinna, A., Marchesi, M.	Future Internet 9(3),25	MDPI AG	2017	4.33
8	Banking with blockchain-ed big data	Hassani, H., Huang, X., Silva, E.	Journal of Management Analytics 5(4), pp. 256-275	Taylor and Francis Ltd.	2018	3.22

Table 7. Journal and Publisher Distribution 2.

9	Inter-Bank Payment System on Enterprise Blockchain Platform	Wang, X., Xu, X., Feagan, L., (...), Jiao, L., Zhao, W.	IEEE International Conference on Cloud Computing, CLOUD 2018- July,8457854, pp. 614-621	IEEE Computer Society	2018	
10	Blockchain platform and future bank competition	Harris, W.L., Wonglimpiyar at, J.	Foresight 21(6), pp. 625-639	Emerald Group Publishing Ltd.	2019	
11	Bis: A novel blockchain based bank-tax interaction system in smart city	Lu, Z., Wan, X., Yang, J., (...), Hung, P.C.K., Huang, S.-C.	Proceedings - IEEE 17 th International Conference		2019	
12	The advantages of blockchain technology in commercial bank operation and management	Wu, B., Duan, T.	ACM International Conference Proceeding Series pp. 83-87	Association for Computing Machinery	2019	
13	Construction of elderly mutual aid time bank based on blockchain	Cui, L., Yuan, K., Zhao, X., Mou, L.Y.D.	Proceedings - IEEE International Conference	Institute of Electrical and Electronics Engineers Inc.	2019	
14	Blockchain, bank credit and SME financing	Wang, R., Lin, Z., Luo, H.	Quality and Quantity 53(3), pp. 1127-1140	Springer Netherlands	2019	
15	Blockchain investment decision making in central banks: A status quo bias theory perspective	Chatfield, A.T., Reddick, C.G.	25th Americas Conference on Information Systems, AMCIS 2019	Association for Information Systems	2019	
16	An automatic pattern recognition value system with listed banks based on blockchain	Liu, X., Yu, T.	Proceedings of 2018 IEEE 3 rd Advanced Information Technology	Institute of Electrical and Electronics Engineers Inc.	2018	

Table 8. Journal and Publisher Distribution 3.

17	Improving the Process of Lending, Monitoring and Evaluating Through Blockchain Technologies: An Application of Blockchain in the Brazilian Development Bank (BNDES)	Moises Arantes, G., Nogueira D'Almeida, J., Teruo Onodera, M., De Borba Maranhao Moreno, S.M., Da Rocha Santos Almeida, V.	Proceedings - IEEE 2018 International Congress on Cybermatics: 2018 IEEE Conferences 1181-1188	Institute of Electrical and Electronics Engineers Inc.	2018
18	Blockchain standards in international banking: Understanding standards deviation	Farrell, S.	Journal of ICT Standardization 7(3), pp. 209-224	River Publishers	2019
19	Banking on Blockchain: An Evaluation of Innovation Decision Making	Dozier, P.D., Montgomery, T.A.	IEEE Transactions on Engineering Management	Institute of Electrical and Electronics Engineers Inc.	2019
20	Blockchain Innovation and Its Impact on Business Banking Operations	Li, L., Sy, M., McMurray, A.	Advances in Parallel Computing 29, pp. 583-598	IOS Press BV	2018
21	FinTech and Sustainability: A Mini-Review	Al Hammadi, Tahani and Nobanee, Haitham	SSRN	SSRN	2019
22	Sustainability Practices and Sustainable Financial Growth	Al Hadhram, Ahmed and Nobanee, Haitham	SSRN	SSRN	2019
23	The Role of Financial Management in Promoting Sustainable Business Practices and Development	Al Breiki, Mariam and Nobanee, Haitham	SSRN	SSRN	2019
24	How Sustainability Contributes to Shared Value Creation and Firms' Value	Almansoori, Alia and Nobanee, Haitham	SSRN	SSRN	2019

RESULTS AND DISCUSSIONS:

The application of blockchain technology in the banking sector has shown promising results. Blockchain technology has the ability to lower costs for banks while also enhancing the speed and security of financial transactions. Reducing the need for intermediaries in financial transactions is one of the most important advantages of blockchain in banking. Faster, less expensive, and more secure transactions may result from this. Additionally, blockchain's decentralized nature can provide added security against fraud and hacking.

The capability of blockchain in banking to ease international transactions is another advantage.

Blockchain technology can enable banks to conduct transactions with other banks in different countries without the need for intermediaries, which can save time and money.

In general, the use of blockchain technology in the banking industry has the potential to completely change how money is transferred. Before there can be a mass adoption, there are still a few issues that need to be resolved. The lack of standardisation among various blockchain platforms is one of the primary issues.

This can make it difficult for banks to choose which platform to use, and can also make it difficult for different banks to communicate with each other. The absence of a regulatory framework for blockchain in banking is another difficulty. This can make it difficult for banks to know how to comply with laws and regulations, and can also make it difficult for governments to monitor and prevent illegal activities such as money laundering. Despite these challenges, many banks and financial institutions around the world are exploring the use of blockchain technology, and we will likely see more widespread adoption in the future.

Companies using blockchain in the banking sector

- *BBVA*: BBVA and Red Electrica Corporation recently completed a syndicated loan using blockchain technology. The €150 million loan was approved by MUFG, BNP Paribas, and BBVA, and it was processed with a speedy record using BBVA's blockchain platform. Currently, the company is positive about using blockchain technology for future projects.
- *Banca Intesa Sanpaolo*: To verify trading data, an Italian banking firm is utilising blockchain technology.. Other companies like Deloitte, and Eternity Wall started testing blockchain technology recently. More specifically, they are utilising the Open Timestamps protocol, which runs the system on Bitcoin.
- Blockchain technology is being used by Barclays, the second-largest bank in the United Kingdom, to streamline fund transfers and KYC (Know-Your-Customer) procedures.
- *HSBC*: Will replace its antiquated paper-based records with a fully digital, decentralised Vault platform.
- Therefore, their investors can now track their funds in real time.

CONCLUSION

In conclusion, the application of blockchain technology in the banking sector has the potential to revolutionize the way financial transactions are conducted. The use of distributed ledgers and smart contracts can greatly increase the efficiency, security, and transparency of banking operations. However, the implementation of blockchain technology in the banking sector is still in its early stages, and several challenges need to be overcome, such as regulatory compliance and scalability. Nonetheless, the future looks promising for the integration of blockchain technology in the banking sector as more and more financial institutions are beginning to explore its potential benefits.

In addition, the use of blockchain technology in the banking sector can also provide new opportunities for financial inclusion, particularly in developing countries where access to traditional banking services is limited. Decentralised finance (DeFi) applications are one example of a new financial service or product that could be made possible by this technology. Furthermore, the use of blockchain technology can also enhance the security of financial transactions and reduce the risk of fraud, which is a major concern for banks.

In conclusion, it is evident that blockchain technology has the ability to significantly advance the banking industry. As the technology continues to mature and more practical use cases are developed, we will likely see an increasing number of financial institutions adopt blockchain-based solutions. Nevertheless, a thorough understanding of the technology, its potential benefits and limitations, and the regulatory environment is crucial for the successful implementation of blockchain in the banking sector.

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