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Blockchain Brilliance: Exploring Blockchain's Promise and Perils for Banking Managers in Operational Optimization and Sustainable Progress

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A B S T R A C T

Global banking institutions have recently created a considerable amount of advancements in the process of business schools that are digitalization-driven, which include mobile banking. Nonetheless, most of the efforts have yet to be considered when they relate to the operation of blockchain technology in banking. The reluctance that has been exhibited by most of the banks stands in stark opposite of all the enthusiasm based on what other industries are displaying for blockchain technology. Now, this research paper will examine the benefits and challenges of using Blockchain technology for managers in the banking sector to optimize operations and improve sustainability.

1. INTRODUCTION

The rapid evolution of digital technologies has significantly influenced the global banking sector, driving innovation in operations and service delivery. Amid these advancements, blockchain technology emerges as a transformative force, offering decentralized, secure, and transparent solutions for various banking processes [1]. Despite the enthusiasm for blockchain in other industries, banking institutions demonstrate a cautious approach toward its adoption. This research article explores the dual dimensions of blockchain's potential in optimizing banking operations and promoting sustainability [2-6]. By examining the benefits and challenges from the perspective of banking managers, the study aims to shed light on blockchain's role in enhancing operational efficiency, reducing intermediaries, and fostering financial inclusion [7-11]. Additionally, it addresses the technological and regulatory hurdles impeding blockchain integration, offering insights into sustainable development within the banking ecosystem. This work provides a comprehensive analysis grounded in both primary and secondary data, contributing to the ongoing discourse on blockchain's viability and strategic impact in the banking industry [12-15].

The research highlights the strategic implications of blockchain technology in reshaping traditional banking frameworks. By leveraging its decentralized ledger system, blockchain introduces unprecedented transparency and security, which are critical for fostering trust in financial transactions. The study also underscores blockchain's potential to reduce operational costs by minimizing reliance on intermediaries and automating processes such as cross-border payments, loan approvals, and compliance checks [16-19]. Moreover, blockchain's alignment with sustainability goals, such as green financing and carbon emission tracking, positions it as a pivotal tool in promoting environmentally conscious

banking practices [20-25]. By presenting case studies and examples from global and UAE banking sectors, the research provides practical insights into successful implementations and outlines pathways for addressing scalability, energy efficiency, and regulatory challenges. Through this dual focus on operational optimization and sustainability, the study offers valuable recommendations for banking managers seeking to harness blockchain's transformative potential effectively.

2. LITERATURE REVIEW

2.1 Strategic technology trends

Blockchain technology influences the banking industry in quite a few directions. In doing so, transactions are quicker and cheaper due to the absence of intermediaries. This enables efficiency in addition to transparency towards its operations of banking activities [26-29]. Traditional financial systems have one point of failure, making Blockchain more secure because it is distributed and encrypted. This reduces the chances of vulnerabilities such as cyber-attacks and data breaches. Blockchain Technology has applicability in the banking sector for the management of risks, security enhancement, and authentication [30-34]. Blockchain is an advanced technology with such features as a decentralized distributed ledger of secure and reliable record-keeping for transactions 35-39]. It promotes immutability, transparency, and reduced needs of intermediaries in financial transactions. Blockchain technology has increased over the last few years in the financial industry. Convert sentences from AI written to human written. Several studies highlighted its potential benefits, such as the reduction of operating costs, easier transactions, and better security arrangements [40-44]. Several studies point to some possible uses of Blockchain in banking, like supply chain financing, trade finance, identity verification and cross-border payment. The given illustrations show how blockchain technology can be helpful in improving customer care and performance. The book by Don Tapscott titled "Block Chain Revolution" explores how such technology can transform banking [45-49]. However, he discusses the use of blockchain technology in enhancing security, reducing fraud and banking process simplification in the sector. Alexander Lipton has published research articles on blockchain technology and its utilization in finance[50]. His work typically revolves around digital assets, financial contracts, and total revolution in financial operations.

2.1.1 Hypothesis

H1: Blockchain will improve banking sector sustainability

H2: Blockchain will optimize banking operations

2.2 Technical profile

Blockchain technology depends on distributed ledger technology [52-55]. A distributed ledger system (DLT) on a computer network tracks transactions. The security, immutability and transparency of transaction records are assured for the continuation of trust in and securing these banks. "Smart agreements", also known as smart contracts, operate automatically upon fulfilment of specified circumstances. They can improve the banking industry's efficiency by computerizing some processes such as asset transfers, loan approval, and payment settlements [56-59]. Researchers give a thorough analysis of the use of blockchain technology in the banking industry from a managerial viewpoint in their book Blockchain Technology in Banking: A Managerial viewpoint. They explore the implications or benefits that may result from Blockchain and whether it will hinder management or not [60-64]. Managers are also enlightened on how to apply blockchain technology to enhance operations and realize organizational goals. To prove validity for each transaction on a blockchain, specific algorithms are used, e.g., consensus mechanisms including PoW or PoS etc [65-69]. Thus, the management should familiarize themselves with these mechanisms if they need to select the most suitable type of consensus algorithm that fits their specific case. Cryptography forms the basis of blockchain security. Public key cryptography, Hash functions, and digital signatures are tools for protecting user identities and transactions. Managers should know these ways of ensuring the security of blockchain technology in applications [70-74]. In the book Regulatory Frameworks and Blockchain Adoption in Banking, Garcia and Martinez focus on the regulatory aspects of the technology regarding adoption by the banks. The analyses they produce analyze the change in the regulatory situation and what it indicates for bank

directors. However, it explains issues of compliance and how managers must deal with this complex environment by aligning organizational goals with blockchain strategies [75-79].

2.3 Opportunities

The benefits that would stem from the banker's incorporation of blockchain technology will result in a total revolution if they ever occur in the banking sector. Blockchain technology is also beneficial to the financial industry. Blockchain can revolutionize the industry, introduce new services and facilitate financial inclusion, enhanced security, transparency, and operational efficiency. However, it is essential to recognize that these benefits must be planned carefully, including legislative changes and solving technology-related issues [80-84]. Blockchain technology can lower paperwork, automate processes, and remove intermediaries in banking activities. It leads to considerable cost-cutting measures. This is mainly due to blockchains' architecture, which is distributed, and their different encryption techniques [85-89]. It reduces the likelihood of fraud and unauthorized access to individuals' private financial information. The transparency and a trust between the parties involved in financial transactions that is made possible by the permanent record of blockchain technology. Banks provide their customers with live transaction information. A transaction process is faster and thus efficient due to blockchain technology. Cross-border payments, which can sometimes take days, may be completed within minutes or even seconds. By eliminating the need for intermediaries who usually increase operating costs such as paperwork and reconciliation, Blockchain reduces overheads significantly. Blockchain technology makes it possible for novel financial products, including tokenized assets, DeFi apps, as well as currencies like CBDCs [90-94].

The researchers further note that banks that implement this first are ahead in terms of innovation as well as customer-oriented financial services. Certain studies indicate that Blockchain has tremendous potential to transform the financial services market into a vibrant breeding ground for start-up companies, suppliers and collaborators [95-99].

2.4 Case Examples

The adoption and implications for employing blockchain technology in banking have to be analyzed primarily using secondary data sources like company reports, trade publications, transaction data and case studies. Blockchain has shown evidence of higher productivity, lower expenses, enhanced security, and modernized financial services and products, all of which are indicators that it is a game changer in the banking sector [100-104]. One of the largest international banks – JPMorgan Chase – introduced the JPM coin in 2019 as its own virtual currency. The Trezorcoin was built on quorum to serve as a high-speed cross-border payment coin for banks and treasuries. Other secondary data sources, such as financial reports or industry analyses, illuminate the acceptance of JPM Coin and its impact on interbank and possibly in cutting expenses [105-109].

For example, the huge-scale usage of R3's Corda blockchain platform by banks like HSBC, Standard Chartered and ING for alternate price range solutions. Using these safe and green alternate finance strategies, for instance, exchanging documents control and issuing letters of credit, is what Corda makes possible. Industry publications, case studies, and transaction facts show how Corda has impacted change finance to create quicker transaction times, better operation efficiencies, and lower expenses [110-114]. For example, a few central primary banks, such as the ECB and the PBoC, have investigated or trailed CDBC as a kind of government-backed electronic cash. These CBDCs are remodeling monetary coverage in addition to the method of payments. One also can look at studies, research, and white papers, in addition to courses from the central banks that create, compare, or are probable to impact on each the banking industry and the economy especially. Banks that have adopted blockchain era can expose facts concerning their investment plans regarding blockchain technology in their annual reviews, economic statements, and regulatory filing [115-119].

The UAE has demonstrated a willingness to embrace blockchain technology. The government has started projects and collaborations to investigate and apply blockchain-based technology in a number of industries, including finance. By 2021, the plan seeks to use the technology of blockchain to move 50% of government transactions onto the blockchain platform [120-

124]. The UAE government aims to preserve Blockchain Technology Applications in the UAE Banking Industry by implementing this innovation. 11 billion AED worth of transactions and paperwork are regularly handled; 398 million printed materials are produced each year; and 77 million labour hours are completed. Global research has been done on blockchain technology being used in trade finance procedures to improve visibility and lower deception. Banks from several nations have joined finance for trade sites like we.trade and Marco Polo, offering a common and safe platform for business related transactions [125-129].

2.5 Implementation Steps

The use of Blockchain in banking poses many challenges, such as strategic planning, regulatory compliance, and stakeholder engagement. Take specific objectives and how a financial institution will deal with blockchain role in a situation. Explore the feasibility of using blockchain technology in finance. Evaluate whether blockchain technology is appropriate for identified use cases. Develop a team that includes representatives from multiple departments, including operations, acceptance, computer technology, compliance, and risk management. Make sure anyone who might be interested gets involved. Identify the regulatory requirements that need to be met in order to integrate blockchain technology into corporate finance. Contact regulators to ensure transparency and compliance. Choose a blockchain platform that serves the goals. Open-source blockchains like Ethereum, commercial or consensus blockchains like Hyperledger Fabric, and a combination of the two are some of the options. Start with a small proof of concept and determine if the tool is suitable for the chosen use case. This reduces risk at an early age and encourages literacy. Consider how scalable blockchain technology is. As usage increases, the platform should be able to handle additional tasks. Put strong security measures in place to protect against cyber-attacks and unauthorized access. Cryptographic methods and digital contracts should be carefully considered. Learn how to approve the blockchain network. There are many options, such as proof of service (PoS), proof of work (PoW), and more.

Don Tapscott and Alex's groundbreaking book "Blockchain Revolution" examines how the application of blockchain technology is upending a number of industries, offering cases of successful blockchain applications and their effects on the economy and society. Smart contracts are an essential aspect of blockchain implementation, as Szabo, Nick's book "Smart Contracts: The Blockchain Technology That Will Replace Lawyers" explains. The notion of autonomous agreements is described in this paper, along with some applications that might apply.

3. RESEARCH METHODOLOGY

The aid of the qualitative research design has been taken into consideration in order to gather first-hand information regarding the possible challenges and benefits of utilizing Blockchain technology for managers to improve sustainability and optimize operations in the banking sector. Five technological managers from the banking sector have been considered to gather the primary qualitative information from the individuals who have encountered the advantages and challenges of using the Blockchain technology. This research design has used the exploratory research design in order to fully exemplify the research topic. The reason behind utilizing the experimental research design indicates the fact that the number of information and secondary data (peer-reviewed journals and other varied journals) were taken from authenticate and valid sources, which contain statistical data that had to be extensively searched. The research findings were then interpreted concurrently.

Both the secondary and primary methods have been considered in order to gather the primary and secondary data. The research has managed to conduct in-depth interviews with the participants that have been chosen to offer enlightening information by eliciting their discernments, which the researcher has presented in our analysis section. Authenticate sources from websites and peer-reviewed journals have been gathered and examined as per the findings of the secondary data, and this process has also provided the answers to the objectives of the research project. The interview method proved to be really helpful as it explained and explored the subject opinions of the research, including the experiences, phenomena and behaviour. As interview questions are mainly filled with open-ended questions, it helps to collect

in-depth information from the interviewers. For the interview procedure, the researcher went to five separate banking sectors and interviewed five technological managers from each of those. The meetings have been scheduled as per the preferred timing of the interviewees. Here, for the sampling procedure, purposive sampling will be used in this study as the researcher will be gathering prefatory data from the technology of the banking sectors and getting their perspectives on the advantages that the researcher will be enlightened about the advantages and disadvantages of using blockchain technology in the banking sector. Here, in this study, the researcher will identify and investigate recurring themes from past literary works as we analyze the data using a thematic approach.

3.1 Data Gathering

3.1.1 Primary Data

The interview method has been used to gather the primary data. Here, five technological managers from the banking sector have been considered to enlighten the researcher regarding their viewpoints and thoughts based on the advantages and disadvantages of blockchain technology in the banking sector. Here, the technological experts of the local banking sector have been considered to provide opinions on the questions that are asked of them. They have been asked six questions, and based on those answers, the researchers have begun to interpret the data and derive a significant conclusion from the study. Here, the reason behind utilizing the interview method indicates the fact that the interviews have allowed the researchers to accumulate detailed information regarding the opinions and experiences of the participants based on the blockchain technology in their personal words and findings, offering a richer understanding of the topic based on the research than other methods of data collection.

3.1.2 Secondary Data

The citations from famous authors have been used in this study, and additionally, authenticated and validated articles and peer-reviewed journals from Google Scholar have been taken into consideration as part of the collection process of secondary data. These peer-reviewed sources have made sure that the quality of the citations, which include scholarly articles, is apt. In addition to the referring journals, particular websites have also been utilized to obtain relevant data that has improved the research's perceived intelligence for the target audiences. In addition, resources from the libraries will be acquired to facilitate further understanding of the subject and potentially contribute to our study project. Here, the themes of the secondary literature have been considered after going through the trends that have been constantly focused on online sources. Analyzing the qualitative secondary literature has helped in bridging the literature gap, too.

4. DATA ANALYSIS

4.1 Primary data

It has already been mentioned that five technological experts of the banking sector have been interviewed in order to get enlightening information regarding the challenges and benefits of utilizing Blockchain technology for the managers for enhancing sustainability and optimising operations. The questionnaire has been comprised of six open-ended questions, which is going to be analyzed in the below section:

The first question that has been asked to the technological managers is about the benefits of utilizing blockchain technology to optimize operations in the banking sector. Manager 1 has opined that blockchain technology has uses encryption and hashing in order to secure the data, depending greatly on the algorithm of SHA256. The address based on the sender, also known as a public key, the transaction, the receiver, and the private key are being transformed through the SHA256 algorithm. In the banking sector, the technology of banking revolutionizes the system by establishing a kind of decentralized data based on unique and digital assets. Additionally, he opined that blockchain technology authorizes the process of payment throughout the world and other kinds of transactions by utilizing the ledgers of encrypted distribution, which are dependent on real-time verification based on the transactions. Hence, as a result, there proves to be no longer any requirement for the intermediaries like correspondent banks or anything. Manager 2 has opined that in conventional banking systems, the process of transactions is typically based on centralized databases. technology, on the other hand, has the ability to record in the manner of the network that is partially decentralized where the trusted employees can host the nodes that are

validated. He further said that the distributed and decentralized nature of the technology of Blockchain makes sure that the accurate and transparent record is based on the transaction, establishing trust among the parties included in the financial transactions of the banking sector. There are several on the basis of how the technology of blockchain is being utilized to lessen the fraudulent activities in the industry of banking. Manager 3 has opined that one of the chief advantage of utilising blockchain technology is it reduces costs. Banks have recently learned that the facility of blockchain can enable them to lessen the infrastructure costs by more or less $20 in the year 2022 [130-134]. By executing things which include smart contacts inside the platform, banks can facilitate communications with intermediaries and counterparties. This aspect can reduce the cost of running and maintaining contracts. With the help of blockchain technology, banks can lessen the transaction costs from one bank to another bank transaction. Manager 4 stated that Blockchain in the banking sector has been providing faster transactions. Any transaction can be done in a few seconds and is done in a slightly quicker way than other conventional methods. Banks are now capable enough to avoid the middleman who can permit them to make sure that the consumers are able to complete the transaction process at a significantly quicker pace, which has resulted in the fact that banks and customers are capable of finishing the process of more transactions. Manager 5 has opined that blockchain technology has always helped in enhancing security. Shared ledgers have the ability to help the banks secure the transaction process in the banking sector. Initially, they are capable enough to finish the process of transactions and lessen the risk of diverting payments and capturing the transactions [135-139]. Two security keys are there for every transaction, and the public key is accessible for each and every utilizer while that key is shared amongst the parties of the offered transaction. The data of the process of marketing is said to be unchangeable when the method has been verified.

The second question that has been asked to the technological experts of the banking sector is the challenges that the employees have faced while using blockchain technology in operations in the banking sector. Manager 1 opined about scalability. Scalability is known to be one of the meaningful obstacles which blockchain technology should overcome. Conventional public blockchains, which include Ethereum and Bitcoin, can meaningfully come into contact with the performance concerns related to the number of enhanced transactions, and the whole process would lead to more extended processing and enhanced transaction fees. Manager 2 has opined about the deficiency of compatibility and standardization throughout the course of numerous blockchain networks and platforms, which is necessary for financial organizations to integrate Blockchain technologies, and these aspects are already being utilized in built-up infrastructure [140-144]. Various researchers have opined that banks must make sure that numerous blockchains can communicate with one another in a smooth way. Manager 3 has stated about the pseudonymous and decentralized nature of the blockchain technology, and this particular nature can make sure that it is really crucial for the bank to adhere to a few rules and regulations, especially those that are concerned with know-your customer or (KYC) or anti-money laundering also said to be (AML). Financial institutions possess an obligation to innovate the methods which allow them to properly satisfy the requirements while retaining the capability to harvest the advantages provided by blockchain technology. As per the views of Manager 4, it has been known that though the technology of Blockchain is very well known for possessing a strengthening security characteristic, a concern is still there based on data privacy and the protection based on sensitive data. Due to the distributed and open nature of blockchain technology, each and every participants are capable to visualize each and every transaction which are taking place in the network and this process raises concerns regarding the perceptibility of the sensitive data. Lastly, Manager 5 stated that to successfully execute the technology of Blockchain, an efficient upfront expenditure in research, expertise, and infrastructure is necessary. It is really very crucial for the financial to control the ROI or return on investment in order to justify the expenditures that are associated[145-149].

Now, the third question that has been asked to the technological managers is the benefits of utilizing blockchain technology to enhance sustainability in the banking sector. Manager 1 opined that blockchain technology always supports the

financial inclusion process. The process of financial inclusion has been emphasized as the prime enabler of various developmental goals in the SDG or Sustainable Development Goals for the year 2030; this process is specified to be the objective of eight goals that are related to the seventeen goals. Manager 2 opined in a similar way as Manager 1 did. He opined that the blockchain technology definitely supports the financial inclusion process. Pursuing the objectives of the 17 SDG goals necessarily requires more financial inclusion, which can be performed through fostering the accumulation of the process based on savings for investment and consumption, the two of which have the ability to spur growth. If blockchain technology can be effectively used for better financial inclusion, long-term prosperity can be guaranteed on numerous fronts. Manager 3 opined that a banking platform that has been enabled by Blockchain would definitely offer a digital backbone which is required to aid the information transparency for the development of sustainable infrastructure establishment while also authorizing the checks of automated compliance, data integration and data standardization with other numerous digital technologies such as deep analytics also called artificial intelligence and internet of things also called as remote sensors. Manager 4 stated that Blockchain technology has the potential for further establishment in green finance as it has allowed the banking securities to be marketed or traded in most of the smaller units. The establishment of tokenization has been proposed to enhance the requirement to trace where few of the funds are being allocated to improve the transparency in a few financial transactions. Manager 5 has opined that as blockchain technology is making it easier to issue green bonds, investors will be capable enough to increase their payments to green financing. Additionally, the level of detail of financial goods will be improved by blockchain technology, letting most be readily diversified across a vast range of investments and assets. This will assist investors in diversifying the types of portfolios they own. Blockchain also helps with the problems associated with cross-border data exchanges.

The fourth question that has been asked to the interviewees is about the challenges that the employees have faced while utilizing blockchain technology to improve sustainability in the banking sector. Manager 1 and 5 has opined that one of the most essential challenge that most the organization have faced while the implementation of the block chain technology is the issue with energy consumption. The process based on the validating transactions on the network of Blockchain needs a massive amount of computing power, which definitely need a significant amount of energy. This process has led to the issue regarding the carbon emissions and the impact on the environment of the blockchain technology. There are few blockchain projects that have embraced the alternative based on consensus mechanisms, which include PoS that consume meaningfully less energy. Initiatives such as Ethereum 2,0 have aimed to lessen the energy consumption of the networks of Ethereum. While all these attempts are promising, it is pivotal for the community of Blockchain to continue exploring to lessen energy consumption. Manager 2 has opined that blockchain technology possessed a meaningful carbon footprint because of the energy-intensive approach of substantiating the transactions and establishing evolved blocks based on the Blockchain. This energy consumption of the technology of the Blockchain leads to emissions of greenhouse gases that contribute to the process of climate change. Now, Manager 3 has opined that the pollution generated by trading in digital currencies and the core problem of blockchain layout mistakes cannot be separated completely. Blockchain programmers' choices concerning design result in the expensive method of "mining" to confirm a cryptocurrency trade or carry out an NFT trade. Manager 4 stated that blockchain technology provides new possibilities to improve efforts by enhancing the process of verifying emissions and tracking. Its transparency, accountability and immutability make the whole aspect possible to focus on the carbon balances and other metrics of the environment and hold companies responsible for the claims of sustainability [151].

The next question that has been asked to the technological experts is the process through which blockchain technology can be enhanced in the banking sector. Managers 1 and 3 stated that, sharding has the ability to improve the performance and scalability of the Blockchain in numerous ways. It can do this by lessening the amount of information that every node has to

process and store. Sharding has the capability to enhance the speed and throughput of transactions and also lower the fees and latency and by giving out the data and workload throughout numerous shards, distributing the data and workload throughout multiple bits, sharding can improve the resilience and security of the network as it is really more challenging for most of the attackers to disrupt or compromise a considerable portion of the nodes. As per the views of Manager 2 and 5, the future of Blockchain in the sector of finance and is really promising. The cost based on the money transfer among various intermediaries is relatively high. The blockchain technology can diminish the requirement of these intermediaries and aid in lessening the cost meaningfull. It can offer the finance sector with a limpid ledger system. Manager 4 has opined that Blockchain is a powerful tool in aiding the efforts of sustainability. With every features include traceability, transparency and decentralization, Blockchain can improve the practices of sustainability and offer eco-friendly initiatives.

Furthermore, the researcher has asked about offering few examples of the UAE and the global cases and to compare them. Manager 1, 2, 4 has opined that the UAE banking sectors has incorporated the block chain technology in order to boost the green finance. Manager 1 opined that the Central Bank of UAE, the Emirates Institute of Finances, the Bank based on International Standards and the Cop 28 has set afloat the Cop28 UAE at the year's end. Manager 2 stated that the program has tried to motivate the global innovators from the private and the public sectors to utilize technologies like blockchain, Internet of Things, AI and other sensors in order to handle challenges in sustainable and green finance. It has been opined by Manager 4 that JPMorgan Chase has been initiated the JPM coin during the year 2019 to be their personal virtual currency. The coin named as Trezorcoin has been developed on quorum to consider the payment coin related to high-speed cross-border for treasures and banks. On the other hand, Manager 3 and 5 stated that the other parts of the country are not less than the UAE banking sectors. By diminishing the requirement for the intermediaries, the payment systems that are block-chain based has facilitated faster, more affordable and more secure. Manager 5 further stated that Ripple is known to be a global payment that are being built over the blockchain technology which has focuses on the financial institution to operate the payment systems in the correct time along with the negligible fees by offering an efficient alternative and cost-effective process to the conventional payment methods. Owing to blockchain technologies, it is possible to create new financial products that will enhance customer loyalty and satisfaction, such as smart contracts and digital currencies.

4.2 Secondary Data

Now, after analyzing the primary data, the secondary data will be exemplified which has been gathered from various peer-reviewed journals and articles that are extracted from valid and authenticate sources. From the above discussion of the literature review, it has been found that blockchain technology lessens the likelihood based on weaknesses like data breaches and cyberattacks. Blockchain technologies has the power to develop new financial products like digital currencies and smart contracts that has improved customer satisfaction and loyalty. Blockchain technology can be utilized in the banking industry to enhance security, manage risks, and authenticate transactions. Blockchain is said to be an upgraded technology with features like decentralized ledger of reliable and secured record-keeping process of transactions. The whole process contributes to transparency, immutability and lessen the requirement of intermediaries in the transaction process. In the past few years, blockchain technology has developed in the financial sector. The written sentences based on transform Artificial Intelligence into human-written ones. Various studies has emphasized the possible benefits, involving lower operating costs, significantly simpler transactions, and enhanced security setups. There are many studies that have suggested that blockchain technology may have the ability to find application in the banking industry in areas such as trade finance, supply chain financing, identity verification, and international payments. Hence, blockchain technology can be really supportive in enhancing the customer care and performance. Blockchain technology basically relies on the technology of distributed ledger. The system of distributed ledger or DLT on the network transactions of computer, the transparency, immutability and security of the transactions

records has been made sure for the process of trust securing the banks. Intelligent contracts or Smart agreements can be operated on the fulfilment of the particular circumstances. These processes can enhance the efficiency of banking industry by computerizing few processes which include payment settles, loan approval and asset transfers. Researcher has offered a thorough analysis of the utilization of the blockchain technology in the banking industry from the viewpoint of the managers. This is primarily because of the distributed architecture of blockchains and the various encryption methods they use. It lessens the possibility of fraud and illegal access to people's personal financial data. Further, the researchers also have focused on the banks that adopt the process of blockchain technology first and are more innovative and provide financial services that are focused on the requirements of their consumers. According to some research, Blockchain has the enormous opportunities to turn the financial services industry into a thriving incubator for suppliers, partners, and start-up businesses.

5. RECOMMENDATIONS

Blockchain technology aids in the process of traceability and verification of multistep transactions that require traceability and verification. It can offer lessening compliance costs, secure transactions and speed up the information transfer processing. Blockchain technology can be improved if the sharding technology will be incorporated into the operations. Sharding can enhance the performance and scalability. Sharding enables a secure sharing process based on the storage for data needs, which additionally lessens the cost of deployments and optimizes the operations node. They enable solution layers to administer the lower prices for transactions while utilizing Ethereum's security features. Sharding can aid to divide the process of network and connectivity into fewer partitions and module and this can boost the transfer rate per second of the network. Sharding can appear like a straightforward procedure, but it actually involves a number of substantial components and characteristics. Having the capacity to scale the process of distributed ledger is the primary advantage that comes from utilizing the sharding. With the approach of sharding, the distributed ledger can usually store the more significant data and has the ability to communicate more nodes, all without dramatically lessening the processing time of transactions.

From the primary and the secondary qualitative sources, it has been found that as the adoption of the blockchain has enhanced, it is more likely to lead to the shift in the landscape of the global payments by empowering the business to transact the process in a seamless manner. Hence, the proposed hypothesis has been proven here as block chain will enhance the sector’s sustainability (H1). As it has already proved that the block chain technology has positively impacting the green finances which have been definitely promote sustainability of the banking sectors. Furthermore, Blockchain has also optimized the operations of the banking. According to various researchers, it has been understood that blockchain technology can lessen the paperwork, automate procedures, and eliminate intermediaries in banking activities. It prompts meaningful cost-cutting actions which will definitely optimize the operations.

6. CONCLUSIONS

The technology of Blockchain in the the process of banking has consistently revolutionized the operations by establishing the decentralized database related to the unique and digital assets. Through the process of distributed ledger, it has became relatively much more accessible to transact the purchases through numerous token which has represented the advantage of off-chain. The beneficial factors related to Blockchain in the work of banking have worked around the development of the tokenized security which are carrying the opportunities of cutting the intermediaries together and lessening the exchange fees of the assets.

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Appendix
Transcripts

1. How block chain technology is helpful in optimizing operation in the banking sector?
Manager 1: Blockchain technology has utilizes the encryption and hashing in order to secure the data, depending greatly on the algorithm of SHA256
Manager 2: This technology has the ability to record in the manner of network that are partially decentralized where the trusted employees can host the nodes that are validated.
Manager 3: Banks have recently learned that the facility of block chain can enable to lessen the infrastructure costs by more or less $20 in the year 2022. Executing things which include smart contacts inside the platform, banks can facilitate the communications witth the intermediaries and counterparties.
Manager 4: Through using the blockchain technology banks now are capable enough to avoid the middleman who can permit them to make sure that the consumers are able to complete the transaction process at a significantly quicker pace which has resulted in the fact that banks and customers are capable to finish the process of more transactions
Manager 5: Blockchain technology has always helped in enhancing security. Shared ledgers has the ability to help the banks to secure the transaction process in the banking sector.

2. What are the challenges that you have faced while utilizing the blockchain technology to optimize operations in the banking sector?
Manager 1: Scalability is known to be one of the meaningful obstacles which blockchain technology should overcome.
Manager 2: The deficiencies of compatibility and standardization throughout the course of numerous blockchain networks and platforms
Manager 3: Financial institutions possess an obligation to innovate the methods which allows them to properly satisfy with the requirements while retaining the capability to harvest the advantages provided by the blockchain technology.
Manager 4: Due to the distributed and open nature of the blockchain technology, each and every participants are capable to visualize each and every transaction which are taking place in the network and this process raises concerns regarding the perceptibility of the sensitive data.
Manager 5: It is really very crucial for the financial to control the ROI or return on investment in order to justify the expenditures that are associated.

3. What according to you are the benefits of utilizing block chain technology to enhance sustainability in the banking sector?
Manager 1: Blockchain technology always support the financial inclusion process and the process of financial inclusion has been emphasized as the prime enabler of various developmental goals in the SDG or Sustainable Development Goals for the year 2030
Manager 2: Blockchain technology can effectively used for better financial inclusion, long-term prosperity can be guaranteed on numerous fronts
Manager 3: Blockchain offers a digital backbone which is required to aid the information transparency for the development of sustainable infrastructure establishment while also authorizing the checks of automated compliance.
Manager 4: Blockchain technology has the potential for further establishment in the green finance as it has allowed the banking securities to be marketed or trading in most of the smaller units.
Manager 5: Blockchain technology is making it easier to issue the green bonds, investors will be capable enough to increase their payments to green financing.

4. What are the challenges that you have faced while utilizing the blockchain technology to improve sustainability in the banking sector?
Manager 1: One of the most essential challenge that most of the organization have faced while the

implementation of the block chain technology is the issue with energy consumption.
Manager 2: Blockchain technology possessed a meaningful carbon footprint because of the energy-intensive approach of substantiating the transactions and establishing evolved blocks based on the Blockchain.
Manager 3: Blockchain programmers' choices concerning design result in the expensive method of "mining" to confirm a cryptocurrency trade or carry out an NFT trade.
Manager 4: Blockchain technology provides new possibilities to improve the efforts by enhancing the process of verifying emissioms and tracking.
Manager 5: This process has led to the issue regarding the carbon emissions and the impact on environment of the blockchain technology.

5. How the process of blockchain technology can be improved in the banking sector?
Manager 1: Sharding has the ability to enhance the performance and scalability of the Blockchain in numerous ways.
Manager 2: The future of Blockchain in the sector of finance and is really promising. The cost based on the money transfer among various intermediaries is relatively high.
Manager 3: Sharding has the capability to enhance the speed and throughput of transactions and also lower the fees and latency and by giving out the data and workload throughout numerous shards
Manager 4: With every features include traceability, transparency and decentralization, Blockchain can improve the practices of sustainability and offer eco-friendly initiatives.
Manager 5: The blockchain technology can diminish the requirement of these intermediaries and aid in lessening the cost meaningful.

6. Can you provide few examples of the UAE and the Global cases and compare them?
Manager 1: The Central Bank of UAE, the Emirates Institute of Finances, the Bank based on International Standards and the Cop 28 has set afloat the Cop28 UAE at the year's end.
Manager 2: The program has tried to motivate the global innovators from the private and the public sectors to utilize technologies like blockchain, Internet of Things, AI and other sensors in order to handle challenges in sustainable and green finance.
Manager 3: The other parts of the country are not less than the UAE banking sectors. By diminishing the requirement for the intermediaries, the payment systems that are block-chain based has facilitated faster, more affordable and more secure.
Manager 4: JPMorgan Chase has been initiated the JPM coin during the year 2019 to be their personal virtual currency.
Manager 5: Ripple, a global payment that are being built over the blockchain technology which has focuses on the financial institution to operate the payment systems in the correct time along with the negligible fees by offering an efficient alternative and cost-effective process to the conventional payment methods.