

IMPACT OF BLOCKCHAIN TECHNOLOGY IN THE FINANCIAL SECTOR

Kartik Tharad¹, Akshat Gupta², Dr Anuradha Chug³

^[1] University School of Information, Communication and Technology ,GGSIPU, New Delhi, India ^[2] Netaji Subhas University of Technology, New Delhi, India ^[3] University School of Information, Communication and Technology ,GGSIPU, New Delhi, India

Abstract: *As a result of recent trends in digitalization, many businesses and traditional methods of conducting business have either been wholly transformed or rendered entirely obsolete. Blockchain technology is the current innovation that has the potential to completely transform and disrupt many different industries, particularly those that are dependent on trust, such as the financial industry. The explosive growth of Bitcoin and other cryptocurrencies is principally responsible for the advent of blockchain technology and its accompanying rise in popularity. Nevertheless, the potential of this technology based on distributed ledgers considerably transcends those of cryptocurrencies. It is anticipated that the new technology would usher in a period of revolutionary change within the financial services industry. According to the projected trends, there is a comparison profile of the prospective advantages and constraints that blockchain technology may*

offer in the financial sector. However, several legal, technological, and ethical issues remain unresolved before the widespread adoption of blockchain technology. This literature analysis examines how Blockchain influences the financial industry. This paper accepts that blockchain technology can promote transparency, improve efficiency, reduce transaction risks, and cut financial industry transaction costs. Smart contracts are among the more ambitious blockchain applications among many other financial applications. An evolutionary leap in financial services may be feasible with the help of these conclusions and recommendations, which outline the necessary conditions for the successful use of blockchain technology.

Keywords: Blockchain Technology, Banking, Financial Sector, Smart Contracts

1. Introduction

Technological advancements have dramatically altered industry and business processes. On the other hand, the Internet has ushered in many new business models and even spawned entirely new industries. Airbnb, Spotify, and Skype all became possible because of the Internet. New and more efficient means of collaboration are being created for businesses and individuals alike due to advances in information technology. The technology to watch right now is Blockchain. In conjunction with the Internet, this relatively new technology will make it possible to do business in simpler, more affordable, more effective, and more secure ways.

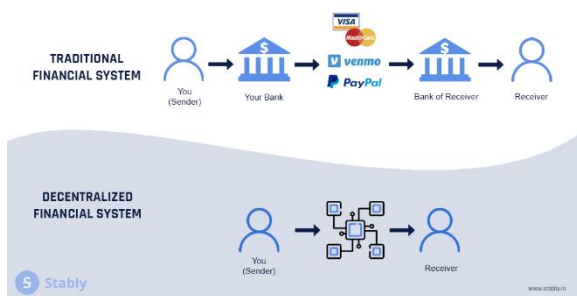


Figure 1: Comparison between the traditional financial system and the current Blockchain Technology.[22]

Blockchain technology in finance is sometimes compared to the impact of the Internet and social networks on communication [1,2]. The Blockchain is well recognized as the technology that

underpins the virtual currency known as bitcoin; nevertheless, this project aims to investigate other possible applications for the Blockchain. This hypothesis will provide a concise explanation of Bitcoin and its capability to transform the financial industry. It is necessary because practically all of the data contained in blockchains today are bitcoins. Despite this, this paper highlights that the technology is not limited to just this one application. Bitcoin has received a significant amount of criticism, and some people believe that its use of this technology is fairly restricted.

According to Jamali et al. [3], it is crucial to distinguish between the particular technology that underpins the virtual currency bitcoin and the overarching concept of blockchains to avoid any confusion. On the other hand, Buterin [4] draws attention to the distinction between public and private blockchains. According to Sakiz and Gencer [5], no third-party financial intermediaries are needed with Blockchain because it is a decentralized virtual network technology. Properties and contracts can be registered, confirmed, and transferred using Blockchain's decentralized ledger technology [6]. Technology has emerged as a critical facilitator of numerous innovations in the

distributed transaction and ledger systems because it provides alternative paths across the digital platform and services. Overall, blockchain technology has the potential to impact a wide range of industries around the world. According to Gasteiger and Lausanne [7], the primary benefit of the innovation is a reduction in processing time and an increase in data security. Blockchain technology is transforming how corporations conduct business and decision-making processes within organizations. All members can access the public Blockchain. Additionally, blockchains cannot be tampered with undetected, making them a trust ledger that allows for the transformation of information without intermediaries. Trust, being the main leverage of blockchain technology, can disrupt or impact the operations financial industry, with banks relying on these new technologies to transform their ways of doing business.

Transaction records and blocks are the primary building elements of a blockchain system [8]. Data is saved in a blockchain database as a transaction, while blocks record and verify the order in which transactions occurred. There are transaction ledgers in the case of bitcoin that are formed whenever a user transfers money from one

account to another. Every time a person sends a cryptocurrency to another person, a transaction is made in the system [9]. On the other hand, users often called "miners" create the blocks. Miners build blocks using specialized software. Decentralized systems allow users to develop and validate transaction blocks by utilizing a specialized program to generate a hash of each block's contents, stored at the end of the Blockchain for all other users to see. The prior block's hash is also essential. Data modification is prevented by the hash of the previous block's data. For example, changing a transaction in a block changes its hash, invalidating subsequent hashes and corrupting the transaction record.

Blockchain distributed database has many benefits that make it ideal for business applications. For example, the design enables every node connected to the network to detect whether a given transaction exists or not precisely. The mechanism ensures that contradictory transactions are never included in the validated data set. Satoshi Nakamoto, a little-known Japanese scientist, first conceptualized a blockchain in 2008 [10]. In 2009, the technology was utilized as the public ledger for the cryptocurrency Bitcoin. Bitcoin was the first digital

currency, and its invention sparked a variety of related uses. In 2014, the term blockchain was coined from the original Blockchain to apply to all new distributed blockchain applications [10]. According to several experts, research into Blockchain's encryption and distributed ledger in decision-making has been sparked by its security and simplicity. A non-hierarchical, decentralized management style can be made more effective by using decentralized blockchain technology, which has the potential to upend traditional business decision-making processes. Traditional top-down decision-making procedures are being outsourced and delegated due to the rising use of blockchain technology. This research examines Blockchain's impact on business operations, focusing on the financial sector.

2. Research Questions

The fundamental subject that will be investigated in this research is: How has Blockchain influenced business operations in the financial industry? The other essential research questions include:

i. What impact, if any, are blockchains and cryptocurrencies having on the decision-making processes of modern businesses?

ii. What kind of an impact or disruption does the technology of Blockchain have on the existing business practices and decision-making processes in the banking sector?

iii. Where does Blockchain technology find its most promising future applications?

3. Methodology

To investigate how blockchain technology affects business operations and decision-making processes, this study conducted a systematic evaluation of various sources, including articles, journals, books, and databases. The research focused on the financial sector, particularly those published within the last seven years, with a bias towards recent publications. The study entailed seeking solutions to the research questions by reviewing the different findings of past research after careful analysis of the selected sources.

4. Literature Review

The introduction of significant improvements to the financial industry due to blockchain technology has had a significant influence. As new possibilities for developing trust-free sharing services emerge, it is now possible to reimagine most financial transactions using this

technology. Thanks to blockchain technology, it is now possible to conduct a wide range of financial transactions without requiring a third-party arbiter. It is possible to improve the global financial system and the efficiency of financial asset transfers by using this strategy. The banking sector is benefiting from the continued adoption of blockchain technology since it has also become more accessible for banks to transfer funds between parties without financial intermediaries. As a result, the technology helps to reduce fraud and identity theft situations [11]. Financial institutions' adoption of blockchain technology has increased their efficiency by reducing transaction costs and asset transfers [12]. A decentralized ledger and automated blockchain technology in the financial sector have made this necessary. Researchers have found that the reliable method that blockchain technology provides to regulate the global circulation of capital is critical for better financial risk control [12]. Borrowers and lenders can conduct peer-to-peer transactions using the technology's multicentered feature, which reduces the requirement for credit guarantees in the banking sector. Thus, credit risk resulting from knowledge asymmetry is reduced, and fund

management efficiency increases. Innovators in data storage and transmission will most likely revolutionize the current banking and FinTech business as blockchain technology gains traction. As a result, companies in the financial sector adopting blockchain technology have been interested in making international payments. Multinational financial institutions have invested in blockchain technology, as depicted in Figure 2.

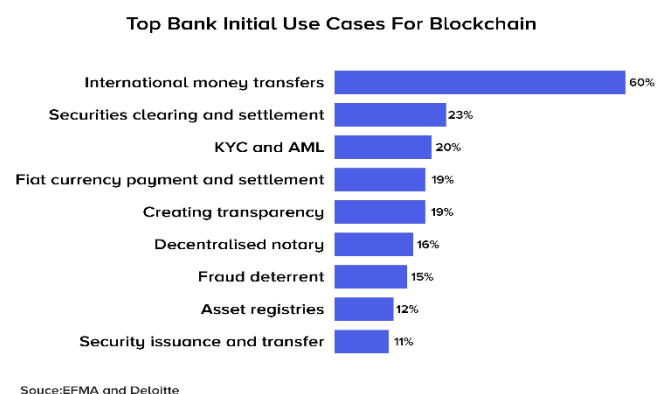


Figure 2: How Financial Companies are utilizing Blockchain Technology in their operations.[23]

The ability of a company to outperform its competitors in the marketplace and recruit, reward, and retain personnel, ideas, and capital is critical to its long-term survival. Since the advent of the Internet, new platforms have emerged to facilitate the

distribution of products and services faster and more efficiently. New digital media re-evaluated pre-existing value chains based on the underlying technological challenges in business models [13]. Digital platforms have created worldwide marketplaces where people, products, and services may meet more efficiently than ever before, thanks to online reputation and feedback systems. The new intermediaries benefited from the initial wave of digitalization by issuing curation and transaction security. As blockchain technology and related cryptocurrencies mature with emerging mainstream uses, a similar process is likely to occur. Intermediaries are expected to continue providing transactional value through this current wave of technological transformation, but the character of such intermediaries will be fundamentally altered [14]. However, as the blockchain technology industry grows, new or emerging players who bring fresh and entirely distinct value creation and capture are likely to replace incumbent competitors. Using a crypto-token like bitcoin or a blockchain reduces the overall cost of confirming and verifying transaction parameters and network costs. According to Lewis, McPartland, and Ranjan [15], transactional parties can employ

cryptocurrency to obtain a global agreement on resource allocation and ownership exchange. As a result, the scope and scale of what constitutes an online platform, or what such online platforms may achieve, will substantially shift. First, it's vital to understand how blockchain technology, specifically Bitcoin, is causing a change in the financial industry. Compared to traditional payment methods like credit cards and bank accounts, bitcoin has been tremendously successful in resolving issues that it was designed to do so. Using a digital currency like Bitcoin, a global network may securely link and exchange value and ownership without expensive intermediaries, as stated by Lewis, McPartland, and Ranjan [15]. Encryption and game theory helped the bitcoin network come to a consensus on the current status of its distributed ledger. Because of its computational and energy waste, Bitcoin has been criticized. However, the bitcoin ledger may be protected from attacks by using proof-of-work. When it comes to moving money around, the banking system's ability to do so quickly and securely is unmatched by Bitcoin's [15]. When it comes to transactions, bitcoin significantly reduced

the trust that parties had to have in each other.

5. Findings and Discussion

This study looked at how blockchain technology affects the financial services industry. The study's results showed that traditional financial system patterns had been replaced by blockchain technology, and there was less reliance on traditional

intermediaries. As a result, this technology has caused significant changes in how the banking process works. These alterations have made it easier for financial institutions to deal with information exchange, process traceability, and operational efficiency. Through "re-intermediation," this technology has re-aligned the global supply chain.

Table 1: Analysis of the criteria, preconditions and resultant benefits of Blockchain Technology in Financial Sector

Criteria	Preconditions	Benefits
Trust	Many parties can alter the terms of the transaction. Fraud and falsification could occur.	Participant misconduct is prevented through smart contracts.
Middlemen	High Fees The involvement of intermediaries is due to the parties' lack of confidence in one another. Delays resulting from the involvement of intermediaries.	Reduced costs Eliminating or reducing the number and role of middlemen Accelerating processes
Transparency	The transaction involves more than two participants, and thus a lack of adequate transparency among the parties involved.	Blockchain records are immutable and prohibit manipulation and forgery.

Data	Multiple participants save identical data in various locations. Synchronization is a difficulty.	Using Blockchain to store data ensures data consistency and synchronization.
Data Processing	The methods need manual data processing Costs are quite high for the verification of the data's conformance.	Automation of processes eliminates or significantly decreases the need for human processing and provides a solution to the issue of data identity.
Paperwork	Paper documents are the most common. Time-consuming document handover	There is a significant reduction in the amount of documentation that is required.
Time	During transactions, the settlement and clearing are not completed in real-time or do not go through promptly.	The time it takes to settle a transaction is reduced or "near real-time."

Source: Interpreted according to the analysis of the selected sources.

Industries That Global Executives Think Are Most Advanced In Blockchain Development

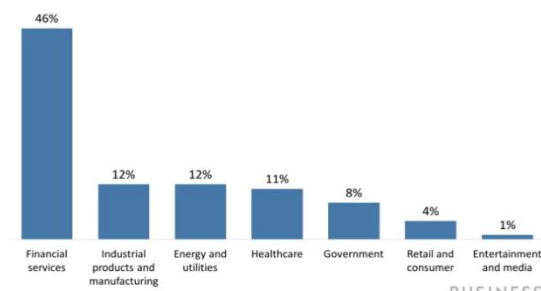


Figure 3: Blockchain in different industries[24]

It has done this by reorganizing the supply chain and bringing new financial service intermediates to the table. Some of the qualities of the technology, according to the findings, make it suitable for usage in a

digital economy. First, the technology has a decentralized system that makes it less likely that hackers will be able to break in and steal data. It also helps make sure that the technology can't be messed up. The second feature is that the Blockchain is immutable. This implies that transactions that have already been added to or stored in the chain cannot be changed [11]. It ensures that the information that is stored is real and safe. The other important thing about blockchain technology is that it is cost-effective. In this case, the chain takes the place of all middlemen who collect and

send data. In this way, the chain helps lower the transaction costs of doing business.

Blockchain technology has created new opportunities for established and developing enterprises in financial services. Blockchain's ability to issue a unique distributed ledger or database is used in banking and supply chains [16]. The blockchain concept has galvanized the global banking and supply chain business and is anticipated to generate disruption, with the logistics sector leading the blockchain spending. When it comes to financial services, Blockchain is being referred to as the "new internet," and it's reshaping the way businesses operate. It also has the potential to make financial transactions faster, cheaper, more secure, and more streamlined [16]. Here are a few instances of how Blockchain could transform the financial services industry.

Improving Compliance Procedures

It is possible to reduce the amount of time spent on tedious and error-prone tasks by using blockchain technology, which reduces the amount of work needed by several financial institutions. Financial institutions worldwide are required to disclose and comply with various local regulations. While laborious and mistake-

prone operations play an essential role, the process is time and resource-consuming. Participants need automated consumer identification technology and integration so that this system does not have to carry out its responsibilities. Blockchain technology can provide a single digital source of identifying and verifying financial information to promote the seamless interchange of information between banks and other linked external businesses [17]. There are possible outcomes for automated account creation, reduced resource and expense requirements, and privacy protection for legally gathered data. Besides that, trade finance tools like drafts and commercial papers are today characterized by lengthy procedures, intricate documentation, several parties involved, and the difficult transfer of documents between them. A tremendous amount of time and money could be saved if the deployment of Blockchain and smart contracts were made a reality. Increased operational efficiency and lower expenses can be achieved by eliminating the need for many correspondent banks [18].

Reliable Payment Processes

All financial sector organizations and customers can benefit from Blockchain's

ability to improve payment transparency, effectiveness, confidence, and privacy while also reducing costs at the same time. Payments between banks can now be completed fast, thanks to improvements in the transfer process. Users will save a lot of money and time if the prices of goods and services are optimized through blockchain technology [16]. Blockchain reduces intermediaries and office workers' needs because payments are instantly settled. Thanks to blockchain technology, any participant in a transaction can see the entire history of the transaction and the roles of all parties involved. By exchanging unencrypted data and messages, current payment systems can achieve this at a greater cost. Currently, clearing procedures provided by third parties are used in interbank payments. Only a few examples of the processes that intermediaries must perform to clear and settle payments include data storage, coordination, validation, initiation, execution, and reporting. It is possible to drastically lower the operating costs of data interchange in a distributed ledger by eliminating administrative procedures and manual data processing. In addition, the encrypted identity of participants and the

impossibility of modifying data make the payment process more secure and speedier.

Enhancing Smart Reconciliation

Blockchain technology, such as the distributed ledger, can significantly reduce the time and manual work required to reconcile payments by providing all parties with complete remittance information. Financial institutions, including banks, insurance companies, and other traders, will also profit from the technology's ability to reduce errors through a simple reconciliation.

Reduced Counterparty Issues

The danger of a counterpart failing to meet their agreed-upon duty can be significantly reduced when transactions are settled immediately. Most financial institutions view failure to meet obligations as a severe cost [17]. Defaults by transacting parties have been considerably reduced due to the advent of blockchain technology that allows for peer-to-peer and real-time transactions.

Empowering Consumers using Smart Contracts

The usage of smart contracts is one of the most important aspects of blockchain

technology development and popularity. To handle self-operating computer protocols, smart contracts offer unique contractual services and goods that imitate the real-life or financial agreements utilized in the contemporary industry [20]. Smart contracts are made directly between a customer and a provider instead of relying on a third party like a broker to enforce and carry out traditional contracts. To ensure the participants in a transaction are protected, smart contracts are developed using blockchain technology and deployed and executed automatically [15]. When information can be shared transparently throughout a digitized and centralized process, customer trust grows because intermediaries relinquish power to the customer party participating in a transaction. This is how customer trust develops.

Improving Supply Chain Inefficiencies

Businesses that rely on supply chains are well aware of the numerous inefficiencies that come with such procedures as system complicity, slowness, and the propensity to include third parties worldwide in their daily operations. The elements of the supply chain that originate from other parties are typically distrusted [21]. It is

possible to reduce the paperwork involved in legal document transfers by using blockchain-based intelligent contracts to verify and enforce agreements. Consequently, the usual costs associated with intermediaries and third parties are significantly reduced [20]. Reduced supply chain stages and the Blockchain's inherent contractual transparency increase confidence.

Capital Optimization

Peer-to-peer transactions are made easier using blockchain technology since it eliminates the need for trusted intermediaries. With the advent of Blockchain technology, traditional financial intermediaries such as custodian banks, which transfer money between institutions, and cleaners, which certify the creditworthiness of counterparties, will become redundant. Following the huge reduction in operational costs for financial institutions, Blockchain offers a better choice for capital optimization.

6. Conclusion

Blockchain can bring about the necessary reforms in the financial services business. Certain sophisticated financial products necessitate a network of middlemen and

human document processing, which adds additional costs and inefficiency to transactions. According to findings from a functional parameter analysis, Blockchain and distributed ledgers have evolved from merely technology tools into concepts of survival and crucial parts of the financial industry's long-term growth plans. The nature of the predicted changes is framed by comparing the potentials and constraints of Blockchain in the financial sector. For the financial services industry to make an evolutionary leap forward, the industry must successfully overcome the impediments to applying this technology. This can be achieved through; deploying trial projects employing distributed ledger in real-world market situations in specified financial industry segments, creating the legal and regulatory framework to support the project, and working on a standardized rating system that automates the KYC procedure. The global supply chain will benefit significantly from implementing Blockchain. However, key stakeholders such as innovators, developers, regulators, and incumbents will need to work together more closely if the technology is to be used effectively.

References

- [1]. Perez, Y. (June 16, 2015). Santander: Blockchain Tech Can Save Banks \$20 Billion a Year, CoinDesk. [Online] Available at: <https://www.coindesk.com/business/2015/06/16/santander-blockchain-tech-can-save-banks-20-billion-a-year/>
- [2]. Swan, M. (2015). Blockchain Blueprint for a New Economy, O'Reilly Media Inc., CA, USA. [Online] Available at: [https://books.google.co.ke/books?hl=en&lr=&id=RHJmBgAAQBAJ&oi=fnd&pg=PR3&dq=Swan,+M.+\(2015\).+Blockchain+Blueprint+for+a+New+Economy,+O%20%80%99Reilly+Media+Inc.,+CA,+USA.&ots=XRvCJ4-Rg0&sig=0Ab9JP95idz1CCe32KhQWRxPSt0&redir_esc=y#v=onepage&q=Swan%20%20M.%20\(2015\).%20Blockchain%20Blueprint%20for%20a%20New%20Economy%20%20O%20%80%99Reilly%20Media%20Inc.%20CA%20USA.&f=false](https://books.google.co.ke/books?hl=en&lr=&id=RHJmBgAAQBAJ&oi=fnd&pg=PR3&dq=Swan,+M.+(2015).+Blockchain+Blueprint+for+a+New+Economy,+O%20%80%99Reilly+Media+Inc.,+CA,+USA.&ots=XRvCJ4-Rg0&sig=0Ab9JP95idz1CCe32KhQWRxPSt0&redir_esc=y#v=onepage&q=Swan%20%20M.%20(2015).%20Blockchain%20Blueprint%20for%20a%20New%20Economy%20%20O%20%80%99Reilly%20Media%20Inc.%20CA%20USA.&f=false)
- [3]. Jamali, R. Li, S. and Pantoja, R. (n.d.). Cryptocurrency | digital asset class of the future – Bitcoin vs Ethereum? The Economist. [Online] Available at: https://www.economist.com/sites/default/files/economist_case_comp_ivey.pdf

- [4]. Buterin, V. (7 August 2015). Vitalik Buterin: On Public and Private Blockchains, CoinDesk. [Online] Available at: <https://www.coindesk.com/markets/2015/08/07/vitalik-buterin-on-public-and-private-blockchains/>
- [5]. Sakız, B. and Gencer, A.H. (2019). Blockchain Technology and its Impact on the Global Economy. In International Conference on Eurasian Economies (Vol. 10, p. c11). [Online] Available at: <https://www.avekon.org/papers/2258.pdf>
- [6]. Gomber, P., Kauffman, R.J., Parker, C. and Weber, B.W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. Journal of Management Information Systems, 35(1), pp.220-265. [Online] Available at: <https://doi.org/10.1080/07421222.2018.1440766>
- [7]. Gasteiger, D., Lausanne, T. (2016). Blockchain Demystified. Youtube video. [Online] Available at <https://www.youtube.com/watch?v=40ikEV6xGg4>
- [8]. Natarajan, H., Krause, S., Gradstein, H. (2017). Distributed Ledger Technology (DLT) and Blockchain. FinTech note, no. 1. Washington, D.C., World Bank Group. [Online] Available at: <https://olc.worldbank.org/system/files/122140-WP-PUBLIC-Distributed-Ledger-Technology-and-Blockchain-Fintech-Notes.pdf>
- [9]. Petrasic, K., Bomfreund, M. (2016). Beyond Bitcoin: The Blockchain Revolution in Financial Services, White & Case, N.Y. [Online] Available at: <https://www.whitecase.com/publications/insight/beyond-bitcoin-blockchain-revolution-financial-services>
- [10]. History of Blockchain (2022). [Online] Available at: <https://www.icaew.com/technical/technology/blockchain-and-cryptoassets/blockchain-articles/what-is-blockchain/history>
- [11]. Tönnissen, S. and Teuteberg, F. (2020). Analyzing the impact of blockchain-technology for operations and supply chain management: An explanatory model drawn from multiple case studies. International Journal of Information Management, 52, p.101953. [Online] Available at: <https://doi.org/10.1016/j.ijinfomgt.2019.05.009>
- [12]. Chang, V., Baudier, P., Zhang, H., Xu, Q., Zhang, J. and Arami, M., 2020. How Blockchain can impact financial services–

The overview, challenges and recommendations from expert interviewees. Technological forecasting and social change, 158, p.120166. [Online] Available at:

<https://doi.org/10.1016/j.techfore.2020.120166>

[13]. Nguyen, Q.K., (November 2016). Blockchain-a financial technology for future sustainable development. In 2016 3rd International conference on green technology and sustainable development (GTSD) (pp. 51-54). IEEE. [Online] Available at:

https://ieeexplore.ieee.org/abstract/document/7796617?casa_token=7dfmYoPER8IAAAAA:uyA-2fuqRQgIosREL0XVD0Diw8n94_6bcnZ3JGHcoiXrTDx9ZA0fLL4_t626re4N6q_zt1lEPm8ASuc

[15]. Lewis, R., McPartland, J. and Ranjan, R., (2019). Blockchain and financial market innovation. Economic Perspectives, 41(7), pp.1-17. [Online] Available at: <http://www.jpmmc-gcard.com/wp-content/uploads/2019/03/GCARD-Summer-2019-Chicago-Fed.pdf>

[16]. Longo, F., Nicoletti, L., Padovano, A., d'Atri, G. and Forte, M. (2019). Blockchain-enabled supply chain: An experimental study. Computers &

Industrial Engineering, 136, pp.57-69.

[Online] Available at:

<https://doi.org/10.1016/j.cie.2019.07.026>

[17]. Castillo, M. (2018). IBM-Maersk blockchain platform adds 92 clients as part of global launch. Forbes Mag. [Online] Available at:

<https://www.forbes.com/sites/michaeldelcastillo/2018/08/09/ibm-maersk-blockchain-platform-adds-92-clients-as-part-of-global-launch-1/?sh=342742cf68a4>

[18]. Rizzo, P. (26 May 2016). Goldman Sachs: Blockchain Tech Could Save Capital Markets \$6 Billion a Year. Coin Desk. [Online] Available at: <https://www.coindesk.com/markets/2016/05/25/goldman-sachs-blockchain-tech-could-save-capital-markets-6-billion-a-year/>

[19]. Guo, Y., Liang, C. (2016). Blockchain Application and Outlook in the Banking Industry, Financial Innovations, 2:24, p. 6. [Online] Available at: <https://jfin-swufe.springeropen.com/track/pdf/10.1186/s40854-016-0034-9.pdf>

[20]. Herweijer, C., Waughray, D. and Warren, S. (2018). Building block (chain) s for a better planet. In World Economic Forum. [Online] Available at: https://www3.weforum.org/docs/WEF_Building-Blockchains.pdf

- [21]. Sakız, B. and Gencer, A.H. (2019). Blockchain Technology and its Impact on the Global Economy. In International Conference on Eurasian Economies (Vol. 10, p. c11). [Online] Available at: <https://www.avekon.org/papers/2258.pdf>
- [22]Image1:<https://www.deltecbank.com/2021/02/12/what-is-defi-and-yield-farming/?locale=en>
- [23]Image2:<https://appinventiv.com/blog/blockchain-in-banking/>
- [24]Image3:<https://research.aimultiple.com/blockchain-applications/>

Dr Anuradha Chug is a Assistant Professor at University School of Information, Communication and Technology , GGSIPU New Delhi.Her area of specialization includes Software Engineering, Algorithm Design, Data Structure, Computer Networks and Data Mining. She has earned her doctorate degree in Software Engineering from the Delhi Technological University, Delhi, India. She has achieved top rank in her MTech (IT) degree and conferred the University Gold Medal in 2006 from GGSIPU.

Biographies:

Kartik Tharad is a 3rd year student of B. Tech in Information Technology at University School of Information, Communication and Technology , GGSIPU New Delhi. His area of interests includes Cloud Computing, Blockchain Technology and Data Science.

Akshat Gupta is a student pursuing his B. Tech in Mathematics and Computing at the Netaji Subhas University of Technology, New Delhi. His area of interest includes Mathematics, Finance, Blockchain, and Data Science.