Blockchain Technology in Banking and Finance

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***Abstract*— Blockchain Technology has proven to be or will prove to be a very essential Technology in the coming future, as it secures and safeguards the information- or here referred to as a transaction. This Technology enables in the elimination of the third-party involvement, which is needed for the level of trust in the exchange of data- transaction. This is one of the root causes of this Technology to impact the business models throughout the industries, it will affect the working of the industries and these industries will have to substantially change their business models and structure to actually grow with the growing Technology.**

Keywords*— *Blockchain technology, Banking and finance, applications, future, regulation, opportunities and implementation

I. INTRODUCTION

Blockchain is a public electronic ledger which is built around a system that can be openly shared among the users to create an unchangeable record of transactions. Theses transactions are posted on the public ledger and is verified by the different parties to the transaction. Every time a new set of transactions is added, that data become another block in the chain hence further initiating this process. Once the data is entered into the chain it can never be erased. Blockchain can only be updated by the consensus between the participants in the system and once this data is entered it can never be erased. It is a write-once and add many technologies, making it a safe and verifiable record pf each transaction that is being recorded in the blocks of the chain.

A. Working of Blockchain

To explain the working of Blockchain, lets consider 5 participants in our Blockchain, A, B, C, D and E, who are on a decentralized and distributed network. This example of Blockchain will help us understand the Blockchain Technology in the bitcoin system.

A wants to send 100 bitcoins to B.

The transaction of A sending 100 bitcoins to B will represent online as a block.

This block is then broadcasted to each and every participant in the network (C, D and E). In this example, C, D and E acts as validators in the network. Which will approve for the transaction validity.

The block containing the information or the transaction of 100 bitcoins is added to the Blockchain.

The 100 bitcoins are then transferred from A to B.

In step 3, C, D and E, the validators, execute the cryptographic algorithms and hold an evaluation and verify the history of the individual Blockchain under consideration. If the evaluation further proves that the history and hash values are valid, then the transaction is accepted. This process of acceptance by validators is known as distributed consensus.

If supposing, in this C, D and E for some reason cannot validate the information in the Blockchain, then the data is rejected and entry for the block is denied and the block is not added to the Blockchain.

A Blockchain is said to be valid if:

- All the blocks that are present in the Blockchain are valid.
- All the transactions in the blocks are valid.
- And the Blockchain starts with a genesis block (genesis block is the first block and is different from the other blocks, meaning that it doesn't contain or carry any hash value of some other block or the previous block, as every block in the Blockchain carries a hash value of the previous block).

B. Benefits of Blockchain Technology in different sectors

Benefits of Blockchain in Real Estate

Blockchain has brought a new fresh outlook on how the real estate sector operates. It offers multiple benefits, including the following.

- Tokenization: With blockchain, it will become possible to tokenize actions. This means that properties can be rented out for a certain period using pre-defined code.
- Proper tenant and investor identity: Digital identities can help both investor and tenant to create digital identities that are easy to verify and work with.
- Property sale: Property sale can be automated with smart contracts. It enables legal agreements that are traceable and executable if a certain condition is met.
- Real-time accounting: With blockchain, it is possible to do real-time accounting

Benefits of Blockchain in Government

Many governments around the world are not in favour of the cryptocurrency, but they do understand the importance of blockchain and what it has to offer. The government can utilize blockchain in many ways, and the benefits include the following

- Proper identity management**:** The government can use identity management for every citizen. This way, they can manage the transactions, credentials, and also do data management.
- Do elections: They can also utilize the blockchain to do transparent elections where there is no chance of frauds
- Finance management: Engage in a better way to do finance management. They can also allocate budget with transparency, efficiency, and effectiveness.

Benefits of blockchain in Healthcare

Healthcare also requires a complete change if they want to be more effective in providing service to their patients. Blockchain brings a lot of benefits to the table. Let's go through them below.

- Universal patient profile: The use of a decentralized ledger means a unified patient profile. Patients do not have to carry their papers anymore as everything can be stored and shared through a secure ledger.
- Drug traceability: Drug traceability will also improve with blockchain. As everything is tracked in real-time and in a decentralized network, there are next to impossible chances for it to get hampered.
- Better clinical trials: Patient's data is secured and stored in a decentralized network.
- Electronic Health Records (EHRs): With blockchain, health organizations can easily manage electronic records.

II. LITERATURE REVIEW

- Tejal Shah (2018, July). Applications of Blockchain Technology in Banking & Finance: The application of Blockchain in the banking and financial industry and how it can be implemented. It concluded that, regulators should engage and shape the innovation. Blockchain Technology is becoming a crucial factor around the world and is generating significant interest across the industries
- Soonduck Yoo (2017, December). Blockchain based financial case analysis and its implications: The financial market is going through a lot of changes and is moving towards more adaptation to change. The author after examining the case and the situation in the banking industry and what all are the possible application of Blockchain Technology in the financial markets, suggested various methods and ways Blockchain Technology can be applied.
- Denny Nack (2018, September). Blockchain technology and the financial services market: This paper talked about the benefits that blockchain could provide and benefit the financial sector at a large scale. It talks about the removal of third parties, decrease in costs and increase in profits for various industries. It also talked about the different blockchains and the way it can be used in different situations and industries.
- Magnus Vitso (2017, June). A study on blockchain technology as a resource for competitive advantage: Blockchain technology is still its nascent stage and has the potential to eliminate the third parties or the mediators. It was found that the link between application areas and entrepreneurial opportunities were superficially covered for blockchain technology.
- Stefan k. Johansen (2016, November). A comprehensive literature review on the Blockchain as a technological enabler for innovation: Decentralization and digital innovation was the main talked about concepts in the paper, as blockchain is the combination of these two components. Researchers have found various applications of blockchain technology but there is still is a long road ahead in actually implementing the blockchain technology in the industries
- Thomas Kitsantas (2019, July). A review of Blockchain Technology and its application in the business environment: This paper focussed on the different application of Blockchain in different industries or sectors. The author mentions that there is much more beyond cryptocurrencies which a Blockchain offers. It talks about the benefits and opportunities that Blockchain would provide to different industries and help them grow.
- Stefan Seebacher and Ronny Schuritz (2017, April). Blockchain technology as an enabler of services systems: a structured literature review: Blockchain technology creates a trustable environment. The technology according to the authors have a very extensive impact on the current and situations and will have a huge contribution in the services sector and will totally disrupt the whole sector.
- Dr. Gareth R.T. White (2016, October). Future Applications of Blockchain: Toward A Value Based Society: A blockchain could be constructed that comprised records of other forms of activity, such as instances of voluntariness or exchange and barter between individuals or groups. Such acts may be recorded within a blockchain and form an approach by which individuals accrue recognition of their acts that are beneficial to their society.
- Michael Crosby (2015, October). Blockchain technology beyond Bitcoin: Blockchain technology beyond bitcoin, as people assume blockchain technology to be applicable only till bitcoin but it is clearly far beyond bitcoin and will definitely impact the whole market.
- Lawrence J. Trautman (2017, May). Is Disruptive Blockchain Technology the Future of Financial Services: Some of the disruptive changes that are likely to occur in financial services due to rapid technological advances. In addition, virtual currencies and the genesis of Bitcoin are examined, along with an explanation of blockchain technology

- Zibin Zheng (2017, June). An Overview of Blockchain Technology: Architecture, Consensus, and Future Trends: It discussed the typical consensus algorithms used in blockchain. It analyzed and compared these protocols in different respects. Furthermore, listed some challenges and problems that would hinder blockchain development and summarized some existing approaches for solving these problems.
- Kari Smolander (2016, October). Where Is Current Research on Blockchain Technology? -A Systematic Review: Blockchain is to provide anonymity, security, privacy, and transparency to all its users. However, these attributes set up a lot of technical challenges and limitations that need to be addressed. To understand where the current research on Blockchain technology positions itself, we decided to map all relevant research by using the systematic mapping study process.
- Stephan Lieble (2019. November). A Review on Blockchain Technology and Blockchain Projects Fostering Open Science: This paper contains an analysis about how the Blockchain technology can foster open science, a review of the state-of-the-art, and an evaluation of relevant research potentials and challenges for that subject.
- Min Xu and Gang Kou (2019, July). A systematic review of Blockchain: Blockchain influences corporate and market efficiency and is crucial for privacy protection and security issues.. This paper also discussed as to how deeply integrate blockchain technology and fintech.
- Chanson (2019). Blockchain for the IoT: Privacy-Preserving Protection of Sensor Data: A constantly growing pool of smart, connected Internet of Things (IoT) devices poses completely new challenges for business regarding security and privacy. In fact, the widespread adoption of smart products might depend on the ability of organizations to offer systems that ensure adequate sensor data integrity while guaranteeing sufficient user privacy.
- Juho Lindman (2018). Novel Uses, Opportunities and Challenges of Blockchain for Digital Services: "Blockchain could dramatically reduce the cost of transactions"1 by replacing private trust services with an open mode. There are examples of use of blockchain for identity management, maintenance of shipping records in cross-border shipping, and even for tracking copies digital art to name a few.
- Bin Cao (2019, March). When Internet of Things Meets Blockchain: Challenges in Distributed Consensus: Compare the main characteristics of PoW, PoS, and DAG. It present visible simulation results to show the impact of transaction arrival rate on the consensus process in DAG based blockchain, and reveal its low bound limitation. Challenges for the DAG based consensus mechanism when it is used in the IoT system.
- Jason Lin (2018). Comparative Analysis of Blockchain-based Smart Contracts for Solar Electricity Exchanges: due to changes in offer prices as well as market demand/supply, percentages of households cleared may vary greatly. Different mechanisms may be applied and combined to maximize economic efficiency.
- Kim S. Hald (2019, March). How the blockchain enables and constrains supply chain performance: The study highlights how BCT should be understood to have a multifaceted and diverse impact on SCM and supply chain performance. Specifically, the study develops a set of propositions, each of which highlights a different path of how these impacts might manifest.
- Bhupendra Pratap Singh (2019, March). Secured decentralized archiving healthcare data using blockchain with IoT: Overall it shows that Blockchain offers numerous opportunities for usage in the healthcare sector, e.g. in public health management, user-oriented medical research based on personal patient data as well as drug counterfeiting.
- Dr. Anita Venaik (2019, October). Information Security Parameters Used By Aadhar, Uidai And It's Impact: The study of this topic was to analyse the use of Aadhar cards issued by governments and its impact. The reliability and the reasons of reliability are highlighted through this study. The key security parameters used in aadhar are tested and evaluated. The research highlights various benefits among which the reduced data breaches, the portability, easy to use are few features of aadhar. According to the study the availability and the confidentiality is the biggest drawback in the aadhar system. To ensure proper verification so that no loopholes are their various verifications are done such as face authentication, KYC, virtual ID.
- Dr. Anita Venaik (2019, May). Moving from Cash to Cashless Economy: - A Study of Consumer Perception Towards Digital Transactions: There is a long way for India to become a cashless economy. People still lack trust and confidence while using digital payment methods. A lot of development in the field of infrastructure is required to make the dream of Digital India a reality. There are many people who are still not aware about the cashless economy not only in India but outside of India. Government has faced a lot of criticism in the past from the public for the various plans implemented on the public. There are a lot of challenges in fulfilling the dream of digital India but in the long run cashless economy will help in growth and will bring a lot of benefits and opportunities with it.
- Dr. Anita Venaik. Blockchain technology and its utilization in tracking milk process: This paper suggested a model related to blockchain technology for supply chain and gave an insight to reimagine supply chain as "virtual supply chain". The block chain/DLT do have functionality that can be useful in enabling the global food security. These technologies can facilitate distributed and secure digital identities and so as part of an information architecture is concerned, it incorporates the secure smart devices on packaging, logistics operations,

detectors etc. The applications of permissioned distributed ledger technology could contribute towards enabling the global food security. It will help eradicate the middle man and help the process to be smooth & integral.

- Dr. Anita Venaik & Dr. Vijit Chaturvedi (2019, December). Blockchain technology as an Innovative Tool For Agriculture sustenance: This paper propose a model for agriculture sustenance and talked about the Agriculture 4.0 and about the prediction accuracy technology for facilitating the agriculture using AI technology. Blockchain will serve as a necessary element in ensuring sustainability of most basic sector of our economy and will help in improving varied aspect of development indicators right from social transformation, security, innovative working, low risk, financial strength of farmers, selection based on correct and accurate information and above all independence in making decision.

- Dr. Anita Venaik & Nikhil Budhiraja (2018, August). Cryptocurrency – Could it be a menace to the society: People use various international banks to send and receive money across the world, which generally takes time and leads to higher transaction fees, thus ending paying huge amount of their hard-earned money, but with the cryptocurrency there is no issue of transacting the huge amount of money, because it's a peer to peer form of transaction, thus there is no middle-men required and there are no conversion charges dealt with it.

III. RESEARCH METHODOLOGY

A. *Research Objectives*

- To study the possible applications of Blockchain technology in Banking and Finance.
- To analyse the challenges in implementation of Blockchain technology in Banking and Finance.
- To identify the opportunities and challenges of Blockchain technology for future prospects in India.

B. *Research type and data collection*

Secondary research or desk research is used. It is a research method that involves using already existing data. Existing data is summarized and collated to increase the overall effectiveness of research.

The data collected in this study is secondary data through research papers, articles, publications, newspapers, magazines, includes research material published in research reports and similar documents. Secondary data is used for the purpose of the study.

IV. CONTENT ANALYSIS

A. *Blockchain Technology in Banking and Finance*

Blockchain Technology holds the power to drastically transform the whole banking and finance sector, though there are a lot of roadblocks but they are continuously worked upon to bring this Technology effective in the industry with full potential. Blockchain Technology will be very useful for the baking industry, as it will reduce the cost and increase the efficiency. The companies are constantly looking for the ways to apply Blockchain Technology in the banking and finance industry and various other industries or sectors as well. Every region of the world is giving their bit developing this Technology and are constantly working upon it to make it successful.

Financial institutions and banks are showing their interest in this disruptive technology, big names like JP Morgan Chase have shown their faith and trust in the future of blockchain technology. It has started a new division named as Quorum division which is specifically assigned for research and implementation of the Blockchain technology. This division is a distributed ledger and smart contract platform for the businesses that supports fast transactions and addresses the challenges in the financial industry and banks.

B. *Possible Applications of Blockchain Technology in Banking and Financial Services*

Following are the areas where blockchain technology holds the potential to bring about change and make them more efficient:

- Trade finance: Blockchain aims to disrupt the old -fashioned paper -based business and systems. The focus is on reducing the cost and boosting the speed and obviously increasing the transparency of the international trade with digital accounts in the digital distributed ledger. The point here is, that, cross- border payments and financing are based on the inefficient model, which has changed a little in these decades. The adoption of digital trade finance can be used to settle the payments or the letter of credit in only a few hours as compared with ten days in the old system. The delays in the updating and transferring of the bill of lading to confirm the ownership, the consignments siting in the ports leads to heavy penalties. But, blockchain will make the sellers get the payments faster and the frauds will be reduced hugely, and the back-office work for drafting documents will witness a huge reduction in overheads.
- Payments: The blockchain technology -based payments platform will enable low processing cost, minimal manual work, speedy transaction and will save time. The cost of sending the payments will decrease with banks using the blockchain technology drastically. This will also eliminate the verification of the third parties relating to the bank transfers. Therefore, Blockchain can be used to make payments in real-time globally, with real time execution with complete transparency and fraud analysis and prevention and also reduced costs.
- Know Your Customer (KYC): The blockchain databases have an inbuilt system, which makes the data stored in them more trustworthy and secure. If the financial services sector, implements blockchain for the KYC verification, they will be able to verify quickly from a reliable source. With the adoption of the Blockchain enabled KYC verification process, will store the verification

information of the client done by any bank or institution will be accessible for all other trustworthy organisation or banks for their verification process. This will at a large scale reduce cost, time and increase efficiency. And the duplication of efforts will be eliminated and the verification could be made in real time.

- Smart Contracts: Smart contracts provide a whole lot of benefits. The first one being, speed and accuracy, the smart contracts are digital and automated, so you need not spend time in the processing of paperwork and correcting the errors that are often made in the documents. The second one being, trust, smart contracts automatically executes the contracts on the acceptance of the predefined set of rules and conditions, so it eliminates the chances of altering of information for personal benefits. The third benefit being, security, blockchain transactions records are encrypted and this makes it very difficult to hack and the information can neither be deleted or revised which makes it secure. The last one being, savings, smart contracts remove the need of intermediaries which saves time and money.
- Consortium Lending: With the involvement of the blockchain based system for consortium lending, it will ease the process and benefit the parties to the contract to easily facilitate the process. Blockchain technology holds the power to solve these current pains by providing solution. Since the original consortium lending or banking is a very time-consuming process, blockchain can provide faster syndicate formation, by automated formation through smart contracts. The intermediary fees will be eliminated by technology integration that can automatically analysis of information for loan underwriting. The digitisation of the documents will be done, hence saving the time and simplifying the process. The problem of delayed settlement cycles will be solved by providing real-time settlement and loan funding through smart contracts.
- Regulatory Compliance: With the advent of blockchain, AML processes will be eliminated, as the regulators could track everything on the blockchain. Blockchain can also help to solve the KYC problems in identity verification. Blockchain could enable instant identity verification. Blockchain technologies can improve private regulatory compliance, because blockchain lends itself for the improvement of regulatory compliance. The agencies can maintain real time access too secure compliance related data on the blockchains of regulated financial institutions. This will enable regulators to stay ahead and analyse the information. The effective application of blockchain will provide reduction in cost, time and efforts that financial institutions spend on regulatory reporting while improving quality and accuracy of the process.

C. Concern related to the Implementation of Blockchain Technology

With all the advantages and solutions that blockchain provides, and the promising future it comes with still has a lot of challenges that need to be faced in its implementation. Various institutes are planning ways to implement the blockchain technology in the best possible way. The various road backs and challenges in implementation need to be addressed.

- Security: Private and permission blockchain and strong encryption exists in the system, but still cyber security concerns need to be addressed before the blockchain technology becomes accessible to the general public and their data is added to the blockchain system.
- Scalability: Blockchain technology has become the centre of attraction for everyone. But in the banking sector. The number of transactions is huge and blockchain doesn't hold that much of capacity to validate so much transactions and hence can lead to delayed transaction and increased costs. Researcher are doing research to bring solution and cater to this problem of blockchain technology.
- Culture adoption: Blockchain technology is completely a new and non- traditional concept for the industry. It is a totally new experience and a complete shift to a decentralized network. Anybody is prone to have a cultural shock and difficulty in adaption when introduced to a totally new world. It is not easy to adapt even for the institutions so it seems very difficult for the people to adapt such disruptive technology.
- Regulation and Governance: There are set of rules and regulations which a government follows and it may vary from country to country. The blockchain regulation status may remain unsettled because blockchain doesn't have a set of rules and regulations to operate.
- Initial cost and Efficiency: Blockchain offers huge savings in transaction costs and time but it has a high initial capital investment which might become a major concern for banks. And it might also have high maintenance cost due to scalability as mentioned earlier.

D. SWOT Analysis

- Strengths: Elimination of intermediaries; Automation; Fraud protection; Transparency; Fast and low-cost payments; Worldwide access; Secure encryption and tamper proof data storage; No repudiation; Platform for data analytics; Operational Efficiency; Elimination of central authority who has the full access.

- Weaknesses: Difficult concept for new comers to adopt to; In conflict to various regulatory compliance already present; Business rules changes frequently but blockchain doesn't; Old encryption models cannot be replaced easily; Reduction in user's privacy; No intermediary to contact with, in case of loss of credentials; Volatility
- Opportunities: Competitive advantage (can prove to be a competitive advantage for various industries and specifically for banking and finance as discussed in this paper); Possibility of addressing new markets; Availability of a huge data to perform big data and analytic research; Gives control to the user; The whole world is becoming digital, and soon blockchain will be used in daily lives.
- Threats: Hype and fast changing environment; Low adoption by external parties meaning lack of information; Not suitable for all existing processes; Customers still rely on personal contact or interaction; Unwanted centralization because of mining pools; The future computers (Quantum computers) might be able to decrypt the data; Scalability issues due to too many transactions.

V. FINDINGS AND RECOMMENDATIONS

A. *Findings*

The study was about blockchain technology and its application in banking and finance, the major findings as to the study are as follows:

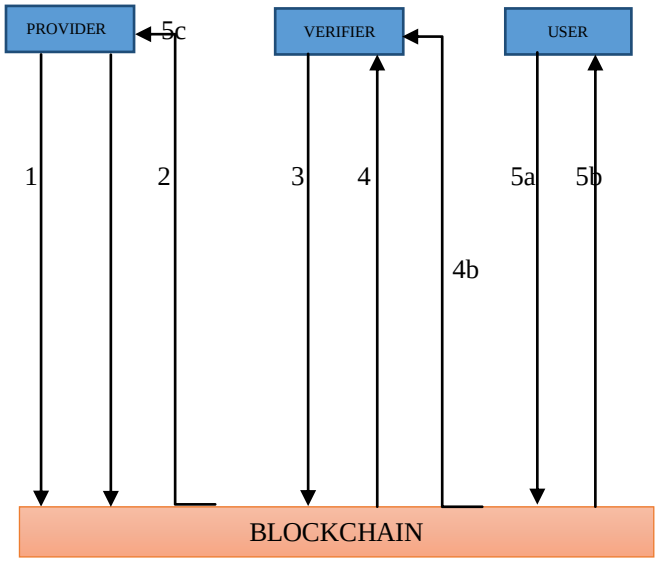
- Blockchain technology is a very disruptive technology which comes with a promising solution to the current pains in various industries. But specifically talking about the banking and finance industry, blockchain promises a very bright future with the features of decentralized network or database.
- Blockchain technology can be applied in various forms in the financial sector. Applications in smart contracts, capital markets, Know Your Customer, consortium lending and a regulatory app, these were the major applications of blockchain technology that were discussed in the study.
- With the promising advantages there are various challenges that blockchain has to face in its implementation like security issues, scalability, culture adaption, cost and efficiency and regulatory status, as mentioned in the study.
- Blockchain technology offers various benefits like security, reduced cost, transparency, safeguarding of transactions, privacy of data through strong cryptography keys and a platform to analyse the best possible solution.
- Blockchain technology opens up various opportunities like for the big data analytics it provides huge data, competitive advantage and opens up to new markets.
- With the strengths and opportunities blockchain technology also suffers and has challenges that is yet to be addressed.
- With all the aspects being considered, blockchain technology is the upcoming future of the banking industry and will soon be used in the daily lives of people. It will leave no stone unturned to get into the market and disrupt the marketplace.
- Blockchain technology for sure is the biggest innovation, as the saying says, that what internet has done to media, blockchain will do to banking.
- Awareness regarding blockchain technology is less and organisations are not able to implement and adopt the technology because less awareness and the problems in implementing the technology.
- Blockchain has shown a way towards better efficiency and transparency to various sectors including healthcare, real estate, government, supply chain, agriculture and various other service sectors as well.

B. *Recommendations*

Following are the suggestions and recommendations that can be adopted so as to have the best potential and a better application of blockchain technology.

- There should be a set of rules and guidelines so as to have some kind of authority to regulate the blockchain technology and so that it can be implemented in the industries.
- The security factor of data and transactions should be worked upon so as to have the best out of the proposed models.
- Scalability came out to be one of the biggest challenges of blockchain, hence solution like having a block that can hold more transactions should be adapted or in other words the capacity of recording transactions should be improved.
- Development of standards in the industries is yet another problem that this technology is facing, hence industries need to work with the government for the sake of regulation.
- Ideally, the market should be the one with the involvement of middlemen. Hence it will give better security as there will be some kind of authority in case of loss of any credentials, there will be someone you can report to.
- The technology should be first implemented on a small scale, to see its efficiency and the way it is accepted by people and later on it might be tested upon a large scale.

- Following is a model suggested by me to have a clearer view to this technology and how it can be used for better adaption:



Explanation of the proposed model:

The following operations are executed in sequence in the main flow of the example scenario:

1. The data provider creates project information and its project attributes. Then he/she inserts created project information into project information pool.
2. The data provider grants access rights for the project information via project attributes.
3. The verification request is made to inform the verifiers.
4. a. The verifier checks whether project information is proper and verifies it. Verification result determines the value of the project information rating.

b. The verifier receives tokens when the verification process is completed.

5. a. The data user queries project information pool with respect to certain criteria to obtain the project information data set that he/she want to use. Project information that the data user has access rights is displayed.

b. The data user pays tokens for using project information.

c. Token payment is made to the owners of project information used by the data user.

Data Provider: The data provider can insert project information to project information pool and manages access controls of already inserted project information. Access controls are managed by associating data users (or user groups to be defined) with project attributes that the data provider wants to grant access to. By this way, project information sharing is enabled per allowed attribute. Only the data provider owning project information is authorized to manage access controls. The data provider receives tokens in return for project information used by the data user. If the data provider does not give access right to anyone, he/she cannot earn tokens. Yet the data provider can access and use his/her own private project information.

Verifier: When the data provider adds project information, a number of data providers who have similar project attributes are assigned as verifiers. Similarity decision can be made by using project attributes like project type such as embedded system and project size measures such as functional size. Verifiers are selected from data providers who have been granted access to project information.

Therefore, the verification cannot be done if the data provider does not give access to any other data provider. The reliability rating of inserted project information is determined according to the verification results. The value of rating which is verified by more verifiers will be higher. This value indicates the reliability of project information for data users. The verifier wins tokens after completing the verification process.

Data User: The data user makes queries in project information pool and uses project information that is granted access by data providers. Access to project information will be allowed on the project attribute basis. The data user pays tokens in exchange for using project information. The data user can evaluate the reliability of a project information according to its rating value. The project information which has higher rating value is more reliable because it is verified by more verifiers.

The scenario described above can be realized by developing a software application that will use the underlying blockchain technology. Smart contracts can be implemented for the data store and access control mechanism. This can overall improve efficiency and can increase transparency and authenticity.

This blockchain-based software project information sharing is to encourage stakeholders for sharing and using project information by defining an access control mechanism. In order to make stored project information more reliable, an incentive mechanism that benefits all roles is employed. The features of blockchain technology make the model more secure and reliable. This infrastructure will not be specific to project information, and it can be adapted for other kind of information sharing and storage problems. This work can be beneficial for companies that need to make estimations with software project data and for organizations, which want to make comparisons with software project information, like research centers, technology transfer offices etc.

The blockchain technology to be used for a system using this model is a critical decision. The basic requirement of the model, i.e., the restricted access control, implies that private blockchains with more features in this respect are more suitable than public blockchains

VI. CONCLUSION

Blockchain technology has evolved in the last twenty years from just a database to a full-fledged globally distributed cloud computing platform. Although blockchain was initiated to serve as an infrastructure for cryptocurrencies, it has invaluable potential uses in many industries like financial services, property registries, medical records, and government services.

Although the potential of Blockchain is widely claimed to be at par with early commercial Internet, banking firms needs to understand the key features of the technology and how it can solve the current business issues as on one hand, internet enabled exchange of data while on other, the Blockchain can involve exchange of value. Banks need to identify opportunities, determine feasibility and impact, and test proof of concepts. However, the questions around regulations will have to be resolved through focused discussions with competent regulatory authorities and incorporation of their thought-process.

Through this study, I would like to conclude that there are various possible applications of blockchain technology and these applications like payments, smart contracts etc which can be adopted and increase transparency, security and efficiency in transaction. The other part of the study discussed different challenges that the industry might face in implementing the technology and the concerns regarding it. Later the study moved towards the opportunities and challenges that blockchain has in its way and how it will disrupt the whole marketplace.

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