

IMPLEMENTATION OF BLOCKCHAIN TECHNOLOGY IN INDIAN FINANCIAL SECTOR

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Abstract : Technological innovations witnessed by the financial sector during the recent past have changed the way business needs to be conducted. IT has introduced new business paradigms and is increasingly playing a significant role in improving the services in the financial sector. One such technological change is the blockchain technology which is though in the initial stage of implementation, yet is gaining lot of popularity. Technology is changing time and again and the reason for this technology to emerge is to overcome the problems that have been encountered by the existing technologies. In this article a case study has been used to conduct the research and understand what the future of blockchain technology can be in India. The paper aims to explore and understand how the implementation of blockchain technology in the financial industry will bring in a change in the financial sector. A blockchain is a digitized, decentralized, public ledger of all cryptocurrency [transactions](#). Constantly growing as 'completed' [blocks](#) (the most recent transactions) are recorded and added to it in chronological order; it allows market participants to keep track of digital currency transactions without central recordkeeping. Each node (a computer connected to the network) gets a copy of the blockchain, which is downloaded automatically. It is more cost effective, efficient and faster than the existing technologies being used. In India ICICI Bank is the first bank to use this particular technology. In this article few examples from other countries using blockchain in used apart from India's ICICI Bank. The conclusion suggests that it will take around 5 years for blockchain technology to completely replace the existing technologies in financial sectors.

Keywords: Block chain Technology, digital Ledger, Finance Sector, Banking.

I. INTRODUCTION

In Indian financial system there is wide scope of automation since the legendary act of demonetization by our Prime Minister Shri. Narendra Modi. One of the reasons for not saving the money in banks or investing in other financial institutions is the trust factor of people on the technology being implemented in them. This problem can be overcome if blockchain technology is being implemented. The reason is that blockchain technology eliminates the intermediaries and makes the transaction process more transparent, simple and also quick. The unnecessary intermediaries in the transaction process not only make the process complex but also contribute towards increasing the cycle time and cost. All these problems can be overcome with the introduction of blockchain technology.

Futuristic Alternative - Block chain Technology

Block chain technology is an end to end software technology that protects the integrity of a digital piece of information using different forms of math and algorithm. It can also be defined as a shared ledger which gives access to any individual in the business network. In this system, the facts can be verified with great ease and the records stay confidential. In blockchain technology there is no human intervention to verify a particular transaction. There are only nodes, i.e. computers and an open algorithm. It is also believed that in the near future blockchain technology will replace the existing method of transactions available in the Indian banking and financial sector due to the reduction in cost and the increase in efficiency that can be brought about by it.

Capabilities of Blockchain Technology

Blockchain technology has the potential to bring about a huge change in much business process specially the financial sector. The traditional method of recording the transaction and processing it will now be completely replaced by directly processing the transaction without human intervention. A concern that arises is that this technology may reduce the employment opportunities available, leading to bigger economical problems. This concern is however ignored as the positive side to the implementation is higher than the negatives.

Applications of Blockchain Technology

Blockchain technology is an effective replacement framework for several revenue generating business processes such as trade financing, vendor financing, cross border payments, adhering to KYC norms and organisation of syndicated loans. The concept of smart contract execution is instrumental towards conducting this business process using Blockchain Technology. Blockchain technology is critical to certain success factors which can help the banks and financial institutions adopting this technology, to become the preferred financial institutions for the next generation.

Literature Review

Guy Zyskind, Oz Nathan & Alex Sandy Pentland, Decentralizing Privacy: Using Blockchain to Protect Personal Data. (2015). This study proposes a decentralized personal data management system that ensures that users own and control their data. The need for this system arises because of the increasing volumes of data and increase in incidents of data leaks and security breaches which has resulted in a breach of user's privacy. This article is extremely helpful for our project as it shows how blockchain technology can be used to safeguard data and prevent hacking, phishing or any other form of data leaks.

Ayushi Gupta, Jyotirmay Patel, Mansi Gupta & Harshit Gupta, Issues and Effectiveness of Blockchain Technology on Digital Voting. (2017). This study focuses on the impact of using Blockchain Technology in the voting system in India. The authors recommend a digital voting system that is powered by Blockchain Technology and digital verification system. This article is used in our research to find out the possible impact of Blockchain Technology for voting in Annual General Meetings and other meetings of a Company.

Steve Fromhart & Lincy Therattil, Making blockchain real for customer loyalty programs. (2017). This research paper mainly emphasis on how blockchain can help banks and financial centers in providing customer loyalty programs to their faithful customers. According to the authors, by using the smart contract feature of blockchain it would be easier to implement loyalty programs by banks for their customers. The paper introduces a system of loyalty token which would facilitate in implementing in crediting loyalty points to the customers Digital wallet by interacting with the Bank and it is based on the set of protocols and algorithms as set up in the Smart Contract. Through this paper we are able to understand how blockchain can be used by banks to provide add on services to its customers, thus helping in improving the performance of banks and changing the entire dynamics of banking globally.

Steve Huckle, Rituparna Bhattacharya, Martin White & Natalia Beloff, Internet of Things, Blockchain and Shared Economy Applications. (2016). This research paper primarily talks about how Internet of Things coupled with blockchain technology can be instrumental in developing shared economy applications. The main area of focus is how blockchain technology can be exploited effectively which allows people to monetize, securely, their things to create more wealth. Leftover Foreign Currency (LFC) – cross border payments concept coupled with smart contract exchange that predominantly uses blockchain technology. This paper is relevant to our project as it focuses on smart contract execution with the help of blockchain technology.

Jason Killmeyer & Mark White, Will Blockchain transform the public sector? (2017). This article primarily discusses blockchain as a technology can be used by Government and the Public Sector to improve its own functioning and bringing about improved efficiency in the functioning of the public sector. The authors introduce us to the current status of implementation of Blockchain in the public sector around with major improvements taking place in Europe and United States of America. This article has given us insight that blockchain technology can make certain existing processes in the Finance sector such as voting at board meetings and KYC much more efficient, if implemented effectively.

Research Design Statement of the Problem

The main objective of this research is to understand the impact of implementing blockchain technology to overcome these inefficiencies. Many foreign countries like United Kingdom and Australia are in advanced stage of implementing blockchain technology. However, India is still in the initial stages of implementation and it has a long way to go.

Objectives

1. To understand blockchain technology and its relevance in the Finance Industry.
2. To assess the impact of implementation of blockchain the financial sector.
3. To evaluate probable challenges that will be faced while implementing blockchain technology in the Finance sector.
4. To analyse the prospects of blockchain technology in India.

Research Methodology and Sources of Data

In this project a descriptive and diagnostic method of research is used to analyze the situation in the financial sector of India and to predict its impact in the future. Case study type descriptive research has been used here since there is a lack of availability of primary data, cases have been taken into consideration where blockchain technology is being implemented in foreign countries, the cases have been studied and the results have been analyzed and the findings have been used to understand how blockchain technology would have an impact on the Indian financial sector. An analysis of the pilot transaction between ICICI bank and Emirates NBD, and the R3 Consortium has been done to cover the banking sector. A study of the Australian Stock Exchange (ASX), NASDAQ, Japan Exchange Group (JPX), Moscow Exchange (MOEX) and the Korean Exchange has been done in order to understand how blockchain technology can be used in the capital markets. Bitcoin, Rupee Blockchain, INR Falcon and Laxmi Coin are the cryptocurrencies covered in this project.

Limitations of the Study

The concept of blockchain technology is completely new, therefore now many people are aware of its wide scope. This lack of awareness has become a major limitation to the project as it resulted in the non-availability of primary sources of data. In India specially it is a completely new concept and is just in the introduction stage. This has led to the difficulty in collecting quantitative data regarding its effect of implementation in India. The results that were achieved in foreign countries have been used to estimate the quantitative impact of the implementation of blockchain technology in India.

Blockchain technology and its relevance in the Finance Industry

One of the most prominent reasons for India to still follow the tradition cash transaction method is the lack of trust on the digital world. The conventional method of transaction is preferred over the digital transaction. Transactions are nothing but digital entries on a ledger, and since data is relatively easy to create and modify there is a need for all the parties involved to verify the authenticity of the data that is being sent and being received. This is done to minimize the risk of wrong transactions.

The term “ledger” has been used above; ledger is nothing but a record of all the data exchanges. Each exchange of data is called a “transaction”. After the data is verified it is added to the ledger and this verified data is called a “block”. A distributed system is used to verify each transaction. Once a data is signed and verified, it is added to the blockchain and this data can never be altered, it remains there forever. To start with, the concept of “keys” must be understood. These are also known as the cryptographic keys, that gives us a unique identity. There are two kinds of keys the “private key” and “public key”. These keys together are used to give a digital signature. Public key is how others are able to identify the person and the private key allows one to digitally sign and authorize different actions on behalf of this digital identity when used with public key.



The above figure explains the transaction process that takes place in the blockchain technology. This type of transaction helps to keep the information secure and transactions safe.

Impact of implementation of blockchain on banks, stock markets and cryptocurrencies

According to a PwC report, 24% of financial executives from all around the world are very familiar with blockchain technology, with North Americans significantly more familiar than those from other regions. Observing the wide-reaching implications of the technology, companies are constantly researching to find out the ways of applying blockchain in multiple sectors.

Talking specifically about the banking and finance sector, hundreds and thousands of funds are being regularly transferred from one region of the world to another within each day. This makes the global financial system one of the most popular sectors that could be benefited through the application of Blockchain. Operating on the basis of highly dependent manual networks, the banking and finance sector is prone to errors and frauds that could lead to a crippled money-management system. According to Global Fintech Report 2017, 77% of Fintech institutes expect to adopt blockchain as part of an in the production system or process by 2020.

Blockchain in banking

Accenture and, McLagan in 2017 published an article stating that about eight of the world's ten biggest investment banks have been forecasted to implement blockchain technology in banking. It is estimated that blockchain will retrench their costs by 30%. There is strict bureaucracy in competencies in most of the banking setups, and these problems are very common in the clearing and settlement domains of the banks. These gaps can be filled by use of blockchain technology.

ICICI Bank and Emirates NBD

ICICI Bank (India) and emirates NBD of Dubai collaborated with edge verve, which is a fully owned subsidiary of Infosys to pilot a blockchain framework designed especially for the banking sector. A blockchain framework was created by edge verve for this purpose which was distributed. Reduction of operating and finance cost without any compromise on data security was the main target. The blockchain experiment between ICICI bank and emirates nbd focused on areas such as open account trade finance and cross border remittances.

Open account trade finance

All manual, paper based processes are replaced by blockchain with digital assets where all the parties will be able to see where the goods are in the supply chain, this will help in quicker release of funds. The transaction that happened was the import of steel scrap by a Mumbai company from a Delhi supplier. All the parties to the transaction were allowed to view the data and shipment in real time. The parties could also track the trade document and authenticate ownership of assets digitally. A series of encryption and secure digital contracts took place to execute the transaction and there was no human intervention involved in this process. This shows that blockchain provided a secure environment for the online verification by all parties and the transfer of title and original trade documents.

Cross border payments

To test the feasibility of performing cross border payments over blockchain technology network, this transaction was carried out. It involved funds transfer from the emirates nbd branch in dubai to the icici bank branch of Mumbai. Due to the use of blockchain technology the need for exchanging messages/letters between the banks was eliminated. Hence there was a reduction in time and security was intact.

R3 Consortium

R3 is an enterprise software firm which uses the distributed ledger technology to provide various financial services. The company was formed in September 2015, as a result for frustration amongst different banks due to various inefficiencies and unnecessary costs that they were experiencing with the existing system. R3 is working with several banks, financial institutions and IT companies to provide financial services using distributed ledger technology.

R3 has introduced Corda, an open source distributed ledger technology platform which carries out complex transactions for various clients. It aims at reducing costs in the business transactions by eliminating middle men. It focuses on three main areas they are finance sector, including cross border payments, equity trades and asset re-hypothecation, supply chain management and trade financing.

NASDAQ

NASDAQ had initiated the project "Linq", which is a blockchain technology based solution that empowers private companies to digitally represent share ownership. Linq allows businesses such as Nasdaq Private Market to address the existing limitation of liquidity in private securities by streamlining payment transactions between multiple parties. Nasdaq, Inc. has partnered with Citi

Bank in order to establish an automated payment processing system. Citi Treasury & Trade Solutions is a new integrated payment solution that processes all the payments and automates reconciliation by using a distributed ledger that record and transmits payment instructions.

Cryptocurrency Market Rupee Blockchain

Rupee has been dubbed as the first cryptocurrency for South Asia. Rupee was created in 2016 and it is an open source cryptocurrency based on the Litecoin source code. Rupee was initially launched in India by developer Adam Syed and it was made available on a few exchanges. Rupee is listed on various exchanges like Coin Exchange, CryptoAPI, YoBit, Coin gather and Trade Satoshi. Rupee crypto currency works on Proof of Work mining algorithm and requires energy and computing to be mined. Rupee aims to generate revenue by developing payment gateway applications to merchants who accept Rupee in their online transactions. Rupee team has sold 90% of the pre mine to early investors on exchanges for development funding. Currently there are around 23,012,632 RUP coins in circulation.

Rupee Blockchain is presently in its early days and it is hard to say whether the crypto currency will have an impact on the Indian economy and the people. However RBI and the Government have envisaged the idea of bringing crypto currencies in India and establishing an exchange that facilitates fair trade of crypto currencies.

Evaluating the Probable Challenges While Implementing Blockchain Technology

Blockchain has some challenges as well. Few of which are mentioned below. These challenges hurdle the implementation of blockchain technology in our country.

1) Blockchain has an environmental cost

To replace the existing technology into blockchain technology will require a lot of financing. Not only this, there is a lot of computing required to create the algorithm which is possible only by high end computers which are again expensive. Taking the example of bitcoin in the year 2016 it was claimed that the computing power required to keep the network running consumes as much energy as was used by 159 of the world's nations.

2) Lack of regulation creates a risky environment

Taking the example of bitcoin where there are no regulators to control the value of bitcoin making it a risky affair. In the case of banking sector the intermediaries are eliminated since there is a peer to peer transaction making the intermediaries unwanted and the environment risky.

Apart from this for any technology there will be hackers ready to tamper the situation and create new problems. Every new technology will have a security issue attached to it one way or the other making it risky to transact.

3) Its complexity means end users find it hard to appreciate the benefits

There is no doubt that the technology is revolutionary, yet it requires some time and effort for individuals to understand how the transactions are executed, its process and what is it that makes this technology so special. Once all these things are clear one can appreciate and start using this technology to the fullest.

4) Blockchains can be slow and cumbersome

Due to the complexity and encrypted, distributed nature, blockchain transactions can take some time to process, as compared to "traditional" payment systems such as cash or debit cards. The reason for the delay is the authorization and verification that is taking place at the background. In the case of banking the process appears to be faster but in case of bitcoin the transaction speed is slower.

Analyzing the Prospects of Blockchain Technology in India

- There is a lot of work is being conducted to implement blockchain technology in various sectors of the economy.
- ICICI Bank executed India's first international trade transaction using blockchain, since then many other banks joined like YES Bank, Kotak Mahindra Bank and Axis Bank.
- In September 2017, the Institute for Development and Research in Banking Technology (IDRBT), the research arm of RBI, released a paper on the 'Applications of Blockchain Technology to Banking and Financial Sector in India.' It also announced plans to launch a Blockchain platform. IDRBT also announced that India could use Blockchain to digitize rupee.
- Government of Andhra Pradesh is planning to use blockchain to record land titles and resolve disputes between the owners.
- According to audit and consultancy firm PwC., more than 32 blockchain start-ups were founded in India in 2016. They were established for the purpose of designing and creating end-to-end blockchain solutions in India that can be used by the banking sector.

Conclusion

- The blockchain technology is certain to overtake the Indian financial system very soon. It can happen within the next 5 years.
- The reason behind blockchain technology not having lot of popularity in India is because of lack of awareness among people regarding its application.
- It can bring in the benefit of automation which can lead to faster and efficient economic transformation of the country.
- Blockchain is generally associated with cryptocurrencies (eg:bitcoin) which makes people feel that it is secure or useful.

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