A Review on Blockchain- A Way Forward for Business

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Abstract:

Blockchain is a digital phenomenon that is expected to transform the complete meaning to the existence in the market in today's competitive era. The papers focuses on the journey of blockchain from inception to implementation with the review in different domains. The type of blockchain pertaining to the different sector application is emphasized here. Blockchain being the buzz word in the market is considered to be applicable in all the spheres of operation the papers emphasis the conditions that define the applicability of it. The study aims to bridge the gap by making an individual understand the concept with its application in different sectors in India as. The paper evokes the reader to understand the blockchain system and broader the thinking process in the potential areas. The findings will contribute too many more areas of research in Indian market with reference to Blockchain.

Keywords: Blockchain, Technology, Types, Fundamentals

Background

The history of blockchain technology started way in 1991 with the proposed content of blockchain by Stuart and W. Scott. The concept talked about the system that comprised of secured chain of blocks made by cryptography as well as digital timestraps which cannot be altered. Satoshi Nakamoto in the year 2008 applied the concepts and created Bitcoins- a cryptocurrency that will allow people to take up transaction where there is no need for any intermediary like bank to be part of the process. The idea also discussed about P2P (Peer-to-Peer) and decentralized system (Nakamoto, 2008). Blockchain application is built on decentralized application (dApps) (Raval, 2016). The technology is innovative and permits its members to transfer resources without the centralized third party on the Internet. The verification of blockchain is conducted through the algorithms and agreement amongst many computers, they are protected to any kind of influence, tinkering or scam. It is designed in such a manner that the network is not dominated by any individual or group of consumers. All the participants in the chain are almost unknown to others and are identified through a code with utmost security (John Plansky, Tim O'Donnell, and Kimberly Richards, 2016). Since the inception of Bitcoin the application of the concept was thought to be applied to the currency, but with the advancement it's been extended to areas beyond non currency.

The system offered great level of security and integrity in transaction. (Bahga & Madisetti, 2016; Swan, 2015) it had been discussed that this openness with the participants unknown in the network results to a move to a mistrustful environment. In this stage of digital transformation Blockchain technology application is considered as one of the most innovative disruptive force at global level. Digital technological innovations have transformed the process of buying and selling commodities in India. (Malik *et al.,* 2020).

In India the technology is getting attention from the producer irrespective of the magnitude of the business. The exquisiteness of Blockchain technology is that verification, trust and transfer of value does not require a central authority. The control and power transfer from outsized individuals leads to safe, faster and economical transaction in transparent way (Sandeep Jajodia President ASSOCHAM 2016). The level of perceived corruption in terms of trust system in India is low as per the corruption perception Index released by transparency international where India stands on 78 position out of 180 countries. According to Minister of State for Electronics and IT, Sanjay Dhotre stated that in India bockchain technology is the area of research with its application in various domain like banking, cybersecurity, governance and many more. The survey conducted by global consultancy firm PWC reveals that India with the accurate amount of industry and government involvement can be at the leadership position in the coming five years in blockchain technology. The countries that are in the advance stage of blockchain projects are USA, China and Australia capturing the 29%, 18% and 7%. According to the Cellular Operation Authority of India, Rajan Mattews Director General, Blockchain technology is in place, the people need to be educated regarding their preference and the steps to be followed in implementation like DnD (Do not disturb). He also stated that TATA Engineering and Locomotive Company (Telcos) with the development in the blockchain with AI in the telecommunications will be able to rectify all the flaws. India will be the largest market by 2020 in blockchain as per linkedin report. There are no. of project that have been given to India. Kerala is already working hard towards developing blockchain for its future prospects. If we look back in the recent past another industry that has grown in manifold is the Counterfeiting industry. Brand of tea and cigarette are also counterfeited. To face this problem the Tea Board of India has shown keen interest in application of blockchain from the starting to the end to incorporate transparency as well as traceability of the trade operations and products. The technology will maintain records regarding the supply chain from procurement to manufacturing and delivery. This will create records for the customer regarding the origin, plantation and adulteration. It is projected $430 million will be blockchain in agriculture, food and related industries by 2023. The implementation of Blockchain in India will improve the ease of living by transparency, decentralization and accountability for the citizens (Amitabh Kant CEO, NITI Aayog).

Types of Blockchain

The bifurcation of blocchain technology can be categorized on the basis of different technology choice. The main categorizes are Public Blockchain, Private Blockchain, Consortium and Hybrid Blockchain.

Public Blockchain

The word Public mean the community so public blockchain means where anyone who has an access to internet can sign into the blockchain and become an authorized node. They are then

considered to be part of network. It is a leger system that does not follow the permission distribution, the best examples are bitcoins, Litecoin and Ethereum. In this system the user has right to execute mining, see the current and the past records and verify transactions for an incoming block. It is completely a decentralized system with decision making though proof of work and stake. As the public blockchain is completely open so the chances of tampering of the data can happen. To overcome this the public blockhain has a reward for honest behaviour and punishment for bad acts. So application of this blockchain required high degree of vigilance.

Private Blockchain

This blockchain has a closed loop with not completely decentralized network with permitted players to be part of the closed network. It is opposite of Public blockchain with the ownership with an organization or individual. There is an authority that looks after the decision for mining, reading and access of information. Nodes that will get the transaction rights are also decided by the developer of the block chain. For example if the company creates a loyalty programme for its customer will be through Private blockchain.

Consortium Blockchain

This blockchain which is managed by more than one organization is a combination of public and private blockchain network. The right to authorize transaction is given to only few users on the basis of agreement. It is a semi decentralized blockchain administered not by an individual but a group. According to Vice President of Infosys Fianacle Rajashekara V. Maya, for blockchain Network for trade ICICI and other banks has partnered.

Hybrid Blockchain

It is a combination of Public and Private blockchain the users have right to control regarding who can be given the access to which data in the blockchain. Aergo is an example of Hybrid blockchain which has both the permissionless and permissioned architectures. Blocko had utilized and built the platform, it is South Korean blockchain supported by Samsung.

Fundamentals of Blockchain Resolutions

Blockchain is not the solution for all the problems that the organizations are facing related to transaction of data or assets it can be implemented keeping in mind the applicability as well as the solution to the problem. As per PWC there are prerequisites for blockchain to give an optimal solution and out of the five criteria for effective blockchain solution atleast three criteria must be met. Incase if it does not require three blockchain criteria mentioned below then blockchain is not the solution to transaction related problem.

1. Multiple parties update data: The data coming from the multiple parties need to recorded and updated as per the action by parties.
2. Condition for Verification: To build trust amongst parties it is essential to know that their action are being recorded lawful.
3. Complexity is added by Intermediaries: With presences of intermediary at multiple level in transaction the complexity increases of the transaction.

4. Time sensitive Interactions: For the benefit of business expedite transaction and reduce delay.
5. Interact Transactions: The transaction is generated by many participants' interaction and dependent on each other.

As per NITI Ayoag there are four potential areas for blockchain to bring in enhanced efficiency and to understand the likely hurdles in the implementation.

- Pharmaceutical Supply Chain of Drugs
- The disbursement of fertilizer subsidy from the claim verification to approval.
- University certificates Verification
- Land Records transfer

As per the survey by PWC blockchain survey 2018, the adoption barriers in blockchain for next 3 to 5 years will be Regulatory uncertainty, lack of trust among users, Ability to bring network together, separate blockchain not working together, Inability to scale, intellectual property concern, Audit/compliance concerns.

Objective of the study

- To enhance the understanding about Blockchain
- To understand the benefits of Blockchain.
- To find out the application of blockchain in different sector.

Research Methodology

The methodology applied is descriptive in nature. Data is collected using secondary resources. Various reports and studies have been referred in the present research. The sources from where the data has been collected for the present study is listed below –

- Research paper on related topic
- Web resources related to the topic
- All the other published material has been referred during the research

Literature Review

Blockchain is originate from a paper on Bitcoin which was published in 2008 by Satoshi Nakamoto. Bitcoin is a decentralized crypto currency and remains the most important blockchain application today. It is believed that the Bitcoin was created to offer an alternative to the central-bank controlled monetary system, which many people consider as a cause of the global economic crisis around 2008.

Karafiloski (2017), Blockchain is a technology that consist a universal online database which can be used anywhere and by anyone through internet connectivity. It does not support any fake information, transactions and other documents. Blockchain has generated thousands of clones across computer network. It is basically a spreadsheet a revolutionary picture. Blockchain removed middleman efforts as every node of network verify the other node in this. It is also

known as decentralized database which stores confidential data of customer and also manage it efficiently. If someone wants to do legal change then they will perform proper methodology that's known as proof of work, every node of network validates the node and get the copy of this node also then change will occur. In this technology tempering of data is not easy. Quality of the human capital in terms of employability needs to be improved rather than quantity of workforce or job opportunities Dhingra, M. (2017).

Yuan1 et al. (2016), Blockchain is a distributed database in which every block can get the copy of newly entered record which means that no one can change any of the record but information it keeps is truly publically accessible for everyone. Blockchain is a frequently submissive database and it contains the collective information. Each block has an enticement for processing and verifying the transactions which makes it wonderful to keep the records transparent and everyone can use it. In a blockchain there are several blocks and each block contains data, the hash of preceding block and the hash (address) of the block. Data section contained transaction, smart contracts and other confidential records. Hash itself is an identification of the block. When new block is formed in the chain hash of block is automatically developed. The competitive advantage is achieved with technological environment which indeed helps in providing best quality of services at a reasonable price Panwar, A., & Malhotra, A. K. (2017).

Ekblaw (2016), found that blockchain is very beneficial as it removes the middle man between two parties. Private signing is mandatory for transaction in blockchain. The process of transaction in data consists of logic, source, destination and rules as well as other validated information and transaction can happen in various ways like money, smart contracts etc.

Zibin et al.(2017), In blockchain peer to peer network concept is used where every node gets the copy of other node. In every network or every node of chain perform as a server or client and there is no central authority but each transaction must be authorized and validated.

(Pierro, 2017), describe the blockchain as "a table with three columns, where each row represents a distinct transaction, the first column stores the transaction's timestamp, the second column stores the transaction's details, and the third column stores a hash of the current transaction plus its details plus the hash of the previous transaction". This technology is not limited to currency only since each transaction in the ledger is just a string value, transactions can always be traced. In Chicago, Cook County is using this technology to track real estate titles as they change ownership. Basically it is a linked chain of blocks of data.

Every technology has its pros and cons. Yuan1 et al. (2016), studies that blockchain has immutable feature which leads to increase security in network. Immutable means when something is added and validated a block then this cannot be removed or tempered. Encryption and decryption is used to keep the data secure from unauthorized person/ user.

Guo (2016), examined that there is reversible transaction process in this technology and this step removes the fraud transaction but it is also considered as a disadvantage as if someone performs transaction accidently then it's based on the next block whether he can return back or not. Too much verification is also considered a disadvantage in different studies.

Ekblaw (2016), studies that in Blockchain anyone and everyone can access the data and can read it easily, so we can't store the data in such a way that it is accessible to only validated users. Many researcher has also proposed various solutions for this but still not sure whether it will work or not. The main aim of blockchain is security removing fraud, scam to manage data well.

Asaph Azaria (2016), found that the due to proof of work, validation or verification of transaction from all nodes of network the transactions get delayed sometimes which is a disadvantage of this technology.

Economic benefits of blockchain has been studied by various researcher. They suggested that to streamline settlement processes and transactions blockchain technology can be implemented which will reduce the costs associated with manual operations. For example, research data can be centralized using blockchain in the health care sector, reducing administrative overheads and avoiding prescription drug fraud. (Engelhardt 2017). Swan (2017) examined the economic value of blockchain through four typical applications, such as leapfrog technology, digital asset registries, payment channels, long-tail personalized economic services, and peer banking services.

Eyal (2017), found that banking and health sectors are using blockchain for maintain user accounts information and to keep the record of patient. Herbert (2015) Educators are also using this technology to provide material to students securely and efficiently. Due to decentralized network users can access data from anywhere.

Through blockchain a business can reduce transaction costs, streamline their core business, and make intellectual property payment and ownership more automated and transparent. Businesses can gain an advantage over their competitors (Felin and Lakhani 2018). Funding-related problems of businesses can also be solved through virtual currency and bitcoin supported by blockchain technology. For example, the companies who wants to implement non-cash payments, cryptocurrencies can support these companies The automation of electronic transaction management accounting improves the level of control of monetary business execution, both internally and externally (Zadorozhnyi et al. 2018).

As data is a valuable resource every enterprise. Blockchain provide a reliable storage and efficient use of data (Novikov et al. 2018). As a decentralized and secure ledger, blockchain can be used to manage digital asset for many kinds of companies (Dutra et al. 2018). Decentralized data storage means you do not give the data to a centralized agency but give it instead to people around the world because no one can tamper with the data on the blockchain. Businesses can use blockchain to store data, improve the transparency and security of the data, and prevent the data from being tampered with.

Supply chain management (SCM) can be significantly change through blockchain technology (Treiblmaier 2018). Recent adoptions of the blockchain technologies and Internet of Things support better supply-chain provenance (Kim and Laskowski 2018). Data can be recorded in the blockchain when the product goes from the manufacturer to the customer, Companies can trace raw materials and products to effectively monitor product quality.

Businesses can build smart contracts on blockchain, which is widely used to implement business collaborations in general and inter-organizational business processes in particular. Enterprises can automate transactions based on smart contracts on blockchains without manual confirmation. For instance, businesses can file taxes automatically under smart contracts (Vishnevsky and Chekina 2018).

Tranquillini writes about the potential of blockchain technology in the securities industry. He explores current issues with the stability and safety of European financial markets and government regulation. His article serves more as an outlet for his intellectual musings on the potential of the application of such technology to the securities industry as embedded within the socio-governmental regulations of European standards. As such, he avoids any certain conclusions and resolves that implementation of such technology would be difficult at best, and that it will not be happening anytime in the near future. (Tranquillini, 2016)

Smart cities refer to city planning involving three primary factors that would allow a city to thrive through social sharing of goods and services. Those three primary factors being the human element, improvements and implementations of technology and citywide organization to bring them all together (Sun, Yan, & Zhang, 2016). As worldwide human populations is growing day by day and more than 50% of the global population lives in urban areas, and an additional 2.5 billion people are predicted to move to cities by 2050" [Sun et all. citation here]. Due to which various problems will arise like pollution, traffic and waste that are only getting worse (Sun et al., 2016). Through blockchain we can atleast resolve our previous issues such as unskilled service providers and fraud, liability. (Sun et al., 2016). With increasing reward and less risk, the third primary factor, a city-backed blockchain platform based at tracking and organizing all of these interactions could be the guarantee that would allow such a smart city to develop.

Conclusion

In this paper we have discussed about blockchain, its types and its application in various sectors. Blockchain application is built on decentralized application. The technology is innovative and permits its members to transfer resources without the centralized third party on the Internet. Blockchain technology application is considered as one of the most innovative disruptive force at global level. Blockchain technology can improve tasks in current industries. Blockchain offers unique possibilities of addressing issues relating to improving governance. The countries that are in the advance stage of blockchain projects are USA, China and Australia capturing the 29%, 18% and 7%. In India the technology is getting attention from the producer irrespective of the magnitude of the business. It was found that the implementation of Blockchain in India will improve the ease of living by transparency, decentralization and accountability for the citizens. Worldwide different industries are using this technology to make the data secure and earn money by giving the permission of public access of data for research or analysis. Many industries around the world has already adopted this technology. It is playing an important role in managing data in banking, education and healthcare sectors. In India the adoption barriers in blockchain for next 3 to 5 years will be Regulatory uncertainty, lack of trust among users, Ability to bring network together, separate blockchain not working together, Inability to scale, intellectual property concern, Audit/compliance concerns. Further research can be done to find the productivity

change in industries those who have adopted blockchain. Research can also be done to find out the roadblocks in adopting the technology.

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