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BLOCK CHAIN FOR FINANCIAL TECHNOLOGY IN INDIA- GATEWAY TO OPPORTUNITIES OR AN IMPENDING DOOM?

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Abstract: Blockchain technology can be used to benefit a large section of the society in developing economies. As the access to internet increases among the population due to the increasing affordability and usability of smartphones, blockchain strengthens its potential to fill up the gap in effective formal institutions in many developing economies, including India in terms of their rules, laws, regulations, and their enforcement. Using the support of FinTech in creating positive changes in business models, blockchain is garnering great interest across different industries in India. This paper tries to understand how blockchain can support the FinTech landscape in India and traces out the opportunities present in its implementation. Some of the challenges in this direction have also been highlighted to provide a comprehensive overview of the current research topic. The paper follows a descriptive approach and brings to light that India will be immensely benefitted from the adoption of blockchain in the sector of financial technology. If certain concerns in implementation are dealt with prudently, opportunities for India in blockchain finance can be immensely beneficial for the entire economy.

Index Terms: Blockchain; Challenges; FinTech; India; Opportunities.

I. INTRODUCTION

Any individual in touch with the current trends in economy, must have heard of cryptocurrencies or one of its most famous variants- Bitcoin. Both the concepts have garnered much attention in the dynamic world of financial technology, but more important to know is the technology which creates the foundation for their operation. That technology is blockchain.

Wheels, printing press, electricity, telephones, computer, internet and numerous such inventions have had the capacity to revolutionize human life and indeed have lived up the expectations. Blockchain may very well be the next big invention of this generation. Still in its infancy stage of life and implementation, the technological impact of blockchain is evolving every passing day and thus, its total impact on the modern world cannot be articulated with accuracy. As newer applications of this wonder technology are being discovered, new doorways of changing the world that we live in are being sought. In the last few years, blockchain has emerged to be one of the fastest-growing trends, especially in the financial domain (Crosby et al. 2016, 71). It has brought along magnificent opportunities for the globalization of finance through facilitating financial technology-based applications (Imansiah 2018, 40).

As a country, India has several niche societal characteristics that makes the blockchain confrontation much more unique than the other countries exposed to this technology. One of the most promising emerging economies, India, is also riding up the blockchain hype by making itself open to its opportunities and challenges alike. There is no denying the fact that blockchain is a global trend that is here to stay. Thus, being one of the world's fastest-growing economies, India should embrace the opportunities it ushers in while being vigilant against its relevant challenges.

- **Fintech: A Brief Understanding**

The earliest evidence of financial technology (henceforth also referred to as FinTech) can be traced back to the 1950s when early credit cards were paving the elimination of carrying physical currency. Over the years the concept has evolved to include bank mainframes and online stock trading services. One of the pioneers amongst FinTech companies to operate mainly on the internet was PayPal in the year 1998. It was considered a breakthrough during those times.

The US Chamber of Commerce has briefly described financial technology as "any technology that delivers financial services through software, such as online banking, mobile payment apps or even cryptocurrency." It is broad in scope and covers many different technologies from simple

mobile payment applications to complex blockchain networks involving encrypted transactions. The primary objective is to simplify access to finances and compete with traditional financial services.

A "fintech company" is any business that uses technology to enhance, modify or automate financial services for businesses or consumers such as peer-to-peer payment services like Venmo, automated portfolio managers like Wealthfront or trading platforms such as Robinhood.

Over the years, fintech has only grown and changed in response to newer developments within the wider technology sector. Such growth is only expected to accelerate in the present context as defined by several prevailing trends, mainly, blockchain technology that allows for decentralized transactions without a government entity or other third-party organization being involved.

- **Block Chain: Simplified**

IBM, one of the world's leading multinational technology corporations, defines blockchain to be "a shared, immutable ledger that facilitates the process of recording transactions and tracking assets in a business network." Here, the asset in question could be either tangible in form such as cash, land or a house, or intangibles such as patents and copyrights. Anything of value can be tracked and traded on a blockchain network, thereby reducing the risk element and bringing forward cost cutting for all involved.

The term 'blockchain' gained popularity in the year 2008 when a research publication named 'Bitcoin: A Peer-to-Peer Electronic Cash System' authored by Satoshi Nakamoto was unveiled to the public. Blockchain was understood to be the backbone of Bitcoin operations, which in even simpler terms implied that 'Blockchain is to Bitcoin, what the internet is to email'.

Thus, blockchain is but a digital file consisting of blocks of data that are chained together (Harrast et al. 2021). Such blocks represent "an agreement between parties on a state of affairs and procession on the basis of that covenant" (Weber et al. 2020, 650).

Block chain technology has created a major revolution in FinTech and paved the way for advancements in the sector. The financial services industry has also been consequently benefitted by it. The successful removal of middlemen in financial transactions, which aides in removal of inefficiency and the costs associated with their services and the subsequent improvement in transparency have been a major advantage of this technology. Along with it, the instantaneousness of use, which speeds up transaction processes and allows the time saved to be allocated towards other facets has been a major boon.

Blockchain technology further helps upkeep the security of data in the face of probable natural calamities (Weber et al. 2020, 661). For example, if a financial services company is susceptible to losing data through water damage due to hurricanes, they can utilize blockchain as a preventive measure in such a scenario. The data would get stored across the decentralized ledger ensuring its safety in the event of such a natural disaster.

But as there are two sides to every coin, blockchain does not function without its fair share of brickbats. One of the most prominent flip-side of utilising blockchain is the amount of energy consumed in terms of the immense computing power involved in its functions. Environmental concerns and the high cost of production in operating blockchain technology successfully calls for cleaner and cost-effective energy methods along with a check on energy consumption to continue its operations in the future.

Overall, it is quite evident that the blockchain technology will keep reinventing itself and bringing forward newer dimensions of its usage to keep itself occupied in the financial services industry as well as various other industries and markets. Being in its initial years of infancy, there is no doubting the fact that it would need continuous fine tuning by institutions, governments and engineers for sustainable future usage and application.

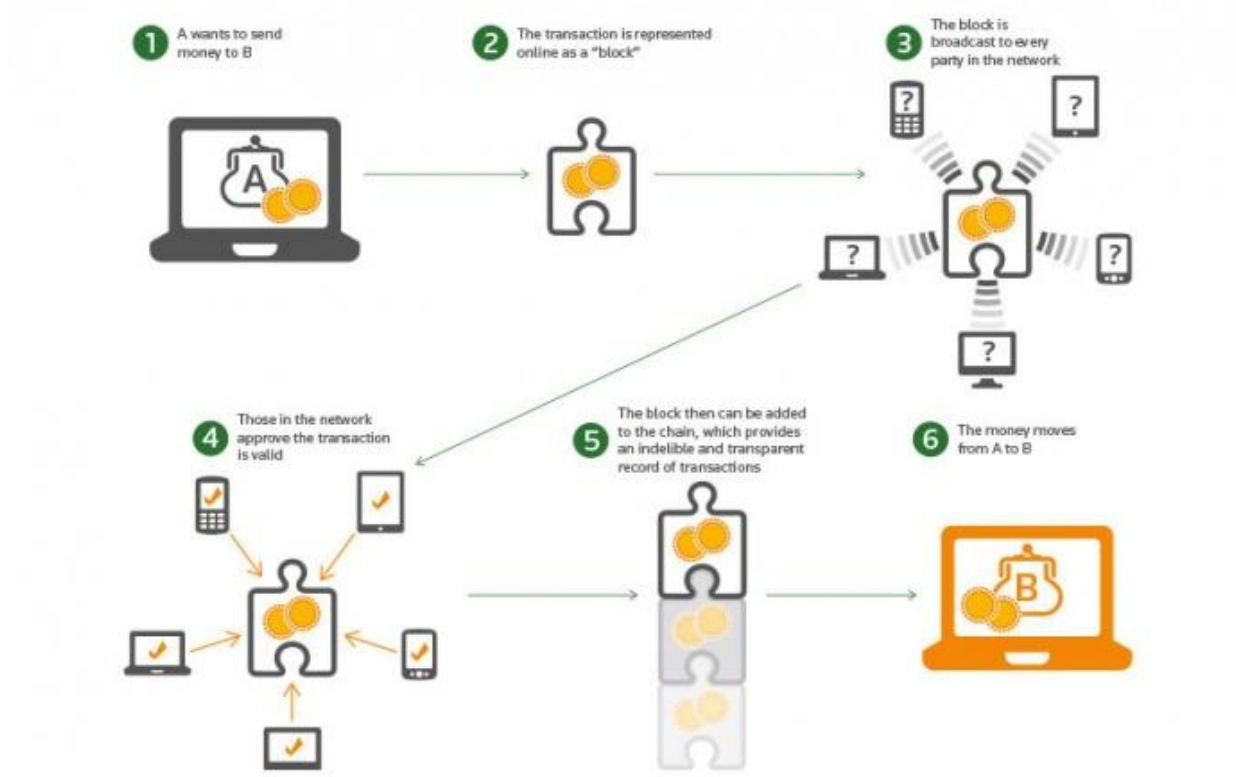

Figure 1: The functioning of Blockchain Technology (Source: internet)

II. REVIEW OF LITERATURE

Blockchain is a type of distributed ledger technology and is attracting a lot of attention globally. By leveraging cryptography, this technology aids "digital ownership and the transaction of ownership on a decentralized network" (Nakamoto, 2008). A lot of research attention is being given to the emergence of blockchain technology, especially in the area of financial services. Such increased research interest pinnacles the growing expectations from this emerging technology. The technology of blockchain gives a much-needed thrust to cryptocurrencies to achieve a complete decentralized network, which can simultaneously maintain consensus as well (Nakamoto, 2008). This can be achieved by securing and time-stamping the series of transactions, having a protocol that helps to define how consensus is to be reached and provision of a transaction language that can change the ledger state (Paul, 2018).

Some researchers may consider blockchain technology as a potential trigger, although its ability to "facilitate the process of tracking assets effectively while providing a shared, cryptographic and distributed ledger with a verified, reliable and permanent content" cannot be argued about (Gupta, 2018). In today's current context, the most common application of blockchain technology lies in cryptocurrencies, although blockchain may be equally utilised in the fields of voting systems, health data management and identity verification (Swan, 2015). One of the most prominent implications of this technology is that third parties are not needed to verify a transaction and transactions do not need to be stored in a centralized ledger system. Instead, all participating users in the distributed network hold an exact copy of the database (Swan, 2015). This creates a pathway to track ownership of assets since the ledger provides a unified transaction history (Gupta, 2018). Blockchain, quite similar to the internet, also holds the capability of coordinating human activity on a level that was previously unthought of.

III. METHODOLOGY AND RESEARCH OBJECTIVES

The current study is descriptive in nature. Accordingly, the appropriate methodology implemented and data collected has been based on secondary data sources such as academic journals, pertinent paper presentations and newspaper articles corresponding to the topic under research. The primary objective of the paper is to present a conceptual understanding on how blockchain technology is being used to better the FinTech space in India. The subsidiary objectives developed further are to understand the opportunities present and challenges imposed in implementing blockchain technology in India.

IV. DATA ANALYSIS AND FINDINGS

- **Block Chain for Financial Technology: The Indian Context**

Before getting into the advantages or disadvantages of blockchain usage for FinTech in India, it is pertinent to get a brief idea regarding the relevant Indian context. As the world around changes and incorporates the dynamism of newly evolving technologies, the work culture and work space in India has also undergone a positive makeover (Ahluwalia et al. 2020, 151). India seems to have understood that in order to survive the tumultuous period of technological transformation, it needs to update its markets with time. Bitcoin's popularity ushered in the awareness of blockchain technology in the Indian landscape.

India's growing fondness for Blockchain-based FinTech applications can be largely documented through the various proactive measures taken by the Reserve Bank of India (RBI) –India's central bank. Since early 2017, RBI has conducted numerous studies and facilitated high quality researches about Blockchain and its Distributed Ledger Technology's (DLT) implementation to help usher in a decentralized and cashless

financial system (Priyaranjan et al. 2020). Indian banks have also gotten involved in blockchain service and allied services with the due permission of the Supreme Court of India (Saha et al. 2021). Also, various state governments have been vocal about their enthusiasm in embracing the improved and updated technology of blockchain. The Government of Karnataka is working towards a blockchain based e-governance system and looks forward to hosting the country's Centre of Excellence (CoE) for Blockchain Technology (Choudhury et al. 2020). Also, as recently reported in most leading dailies, Telangana Government has decided to digitize land records and other governmental data through blockchain technology.

Certain areas of implementation of blockchain in FinTech in the Indian context can be illustrated with the following examples:

- Trade finance- In the year 2016, ICICI Bank became India's first bank to join hands with Emirates NBD, a leading bank based in Dubai for executing international trade finance and remittance transactions with the help of blockchain.
- Supply chain finance- In 2017, Indian tech giant Mahindra Technology entered into partnership with global technology giant IBM to initiate a cloud-based application with a view towards transforming "supplier-to-manufacturer trade finance transactions" with the help of a permissioned distributed ledger; Bajaj Electricals, in collaboration with Yes Bank, IBM and Cateina Technologies, wanted to reduce payment processing time of their respective financial transactions. This has been made possible through blockchain based "smart contracts for facilitating supplier finance."
- Electronic-KYC management- Since 2017, India's leading stock market, National Stock Exchange (NSE) uses blockchain technology for KYC documentation verification and management. This feat is achieved through efficient collaboration with some of the leading banks in India.
- Cross-border payments – To enable low-cost global money transfers through blockchain technology, Stellar India Consultants collaborates with top financial institutions to engage in cross-border payments to and from India, Europe, Kenya, Ghana and Nigeria; Most leading private banks in India, such as, Axis Bank (with Dubai-based RAK Bank), Yes Bank, Kotak Bank and IndusInd Bank, to name a few, are focusing on making cross-border remittance & trade settlements easier and more transparent through blockchain technology.
- Loyalty/Reward programs-A blockchain-based pilot project covering the management of customer rewards and recognition programs has been introduced by Deloitte India. Through this program they aim to minimise errors, maintain full transparency and enabling smoother monetisation of reward programs through e-wallets.

- **Opportunities In Implementation**

Of the many reasons that blockchain has become the preferred technology underlying FinTech operations in modern day India, the decentralization feature tops the list (Foroglou and Tsilidou, 2015). If implemented with necessary precautions, blockchain becomes a great platform for increasing the security and reliability of transactions through tracing the origin of a financial transactions. Further, blockchain has the capability of streamlining land records (Dixon et al. 2019, 120), auto records, national identity and traceability. This is helpful in curbing large scale corruption and bringing India's large informal sector into the formal economy. If used alongside other promising technologies such as data analytics, artificial intelligence and machine learning, to name a few, the efficiency of India's current trade finance system would improve manifold (Omohundro, 2014).

Development of employment opportunities is another blessing upon India that might arise from blockchain usage. Due to a current scenario of shortage of blockchain developers, many engineering students are preferring to specialise themselves in this technology. According to popular market analysts, many high paying jobs in this sector is being expected in the forthcoming years. Tech giants like IBM and Tech Mahindra are also conducting seminars and workshops to spread awareness on the understanding and implementation of blockchain. (Fanti et al. 2018, 30).

India is taking major steps towards using blockchain in its mainstream activities. As India is all geared up for a digital economy, fully embracing blockchain seems to be the next logical step. Apart from FinTech industries, other industries such as pharmaceutical, education, infrastructure, etc. would be greatly benefitted from it. Further, as India is progressing towards a sustainable democracy, voting might become a potential field where blockchain usage may create a revolutionary impact in ensuring greater transparency (Ayed 2017, 09). Though not feasible immediately, in the longer horizon India might utilize such technology in a move towards more accountable and secure voting.

- **Challenges In Implementation**

Despite its numerous advantages, many modifications need to be implemented before utilising blockchain technology to make the operations safe and secure. The promising outlook of this technology might become a pathway to vulnerability if certain questions are not answered.

Existing literature identifies a number of broad challenges in adopting blockchain technology in various operational sectors in India. Technological challenges include immaturity of the technology, high end power consumption and the lack of appropriate platforms. Social hindrances are namely use of multiple identities and privacy concerns. The ultimate nail in the coffin is lack of economic and public measures such as the lack of national regulations or large initial investment costs and maintenance costs which make the efficient implementation of blockchain technology delayed and vague. There is also no denying the fact that both intra-organizational and inter-organizational woes such as the lack of management commitment and technology readiness or the lack of participation by business partners in collaboration and information sharing add fuel to the fire (Saberi et al. 2019, 2180; Kosmarski 2020, 117; Grover et al., 2019; Dutta et al. 2020, 140; Sternberg et al. 2021, 76).

The readiness of the Indian society for adopting blockchain in financial transactions is often put under the radar as many people in India are still in darkness about the concepts and benefits of digitalization. The digital divide in India is a glowing reality, which unfortunately is often brushed under the carpet. Although job creation is a promising future through blockchain in FinTech but if sufficient training infrastructure is not provided in mainstream Indian education to master the implementation of the technology, the onboarding of the applied science may

become counterproductive. Thus, enabling proper regulations and reshaping the roles of financial institutions to help build necessary financial system infrastructure are some possible mitigation measures worth noting.

Several noted Indian corporations, commercial conglomerates and banks have already started using blockchain technology for their international trade finance, international payments, bills discounting, supply chain finance, etc. Some of the key challenges identified by them in such initiatives are the dearth of knowledge and know-how among the stakeholders, the pace of evolution of the technology and opposition faced due to difficulty in operational and cultural integration across organizations and stakeholder groups (Jaag and Bach 2016, 217).

Taking such challenges and difficulties into account, RBI had put a temporary ban on the immediate adoption of blockchain in financial services in India. This ban was subsequently lifted by the Indian Supreme Court in early 2020. However, RBI had issued a circular advising regulators, stakeholders and policymakers to be sufficiently ready for the challenges in implementing this technology before embarking on its full-fledged adoption.

V. CONCLUSION

India will very likely be immensely benefitted from the adoption of blockchain technology across different sectors, especially financial technology sectors which is growing by leaps and bounds. But the different institutions thinking of implementing blockchain need to update themselves into having an enriched understanding of its potential implications for finance and financial services (Chaudhary et al. 2021,170). Risks in outright implementation of such a robust technology without proper research on its challenges or ways to mitigate the same should be avoided.

Concerns with regard to the high energy consumption in utilising blockchain can be well tackled in the future as coming years introduce the global economy to more renewable energy methods. The dynamic pace of the world as well as the continued pace of the economy will lead towards pathways in cleaner, alternative energy sources.

Blockchain and its usage in Fintech will continue to change the world that we live in. In upcoming years, emerging economies like India will have no choice but to accept the adoption of this technology to keep up pace with the world around. Related industries need to accordingly prepare themselves for such change. Instead of focusing on the severity of the challenges in its adoption, the timely address of the same will be much more helpful in opening up opportunities for India in blockchain finance. Although blockchain usage for FinTech services in India is but in its rudimentary stages, the possibility for its implementation remains endless. Blockchain will continue to grow with time as innovation and competition pushes it to new heights. The growing demand for blockchain usage in FinTech for many emerging markets will continue to expand due to global demand for more efficient business practices.

In the field of financial services and FinTech in India, the opportunities of growth and acceleration which blockchain adoption will bring outweigh its challenges. It is high time in India that this technology is embraced with unequivocal necessity or the economy might become victim to outdated industry operations.

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