

BLOCKCHAIN TECHNOLOGY AND ITS ACCEPTABILITY IN BANKING INDUSTRY IN INDIA

Dr. Payal Garg*
Gaurang Sharma**

ABSTRACT

Our world is becoming smart and more interconnected, as evidenced by technological trends such as smart banking, smart health services, supply chain and logistics, smart city, and also the smart nation. Security and safety are the two major considerations in these smart technologies and applications used today. For this every new day some security & privacy application software is developed and implemented. The latest technologies that is widely used and implemented in many sectors is blockchain-based security. This blockchain technology is used in a number of industries like- Banking and financial services, media, entertainment, manufacturing, healthcare, insurance and many more. Out of major technology applied today, Blockchain has become the demanding applications out of various industry-based applications. According to a latest statistic out of all sectors banking sector contributes about 30% in application of Blockchain technology. In this paper, we have presented a structured review of existing Blockchain technology, blockchain-based solutions, particularly for banking-based applications. We have highlighted the facts and drawbacks of various state-of-the-art approaches. This paper also states the challenges and future of the blockchain with the future scope and applicability of the technology so that this gives a clear understanding to the other researchers and professionals.

Keywords: Banking, Blockchain, Internet Banking, Banking Transactions, IBIC.

Introduction

The journey of blockchain technology began from finance applications like decentralized digital money (Bitcoin). When technological advancement is happening on a very fast pace, the enactment of blockchain is also rising in various segments, and also blockchain application is revolutionizing many business operations because of its exciting benefits like decentralization, trustworthiness, no or minimal exchange transaction fees by removal of intermediaries in distributed applications, and a highly secure data storage system. In a better way, blockchain is a distributed ledger (DL) network in which nodes communicate and connect with one another for trading the data and transactions too. Unique concepts of blockchain are decentralization, immutable, and transparency. It has become a latest technology used in different industries for privacy and security too. Banks are also using the modern technology of Blockchain.

Objectives of the Study

This paper aims at understanding the concept of blockchain and its acceptability in the banking industry of India. The objectives of the study are:

- To give an insight on various aspects of Blockchain technology
- To understand the need and utility of blockchain applications
- To study the acceptability of blockchain technique in Indian banking sector.
- To analyse the future benefits of blockchain technology.

Data Collection

This is a descriptive study. The research is based on secondary data which is collected through books, journals, articles, magazines and internet.

* Associate Professor, Raja Balwant Singh Management Technical Campus, Agra, U.P., India.
** Research Scholar, Raja Balwant Singh Management Technical Campus, Agra, U.P., India.

Blockchain: Introduction

Blockchain is a chain made up of blocks which contain specific information, but in a very secure and genuine way. This database is grouped together in a network (peer-to-peer). In other words, blockchain is a set of computers interconnected and interrelated to each other (decentralised) instead of a centralized server, such that the whole network is totally decentralized.

Blockchain has a scope to be used in a number of industries since this technology provides transparency, trust, data security, and transactional accuracy. Thus, the application of Blockchain in banking, finance healthcare, energy management supply chains is vivid. Many other areas of real estate, politics, education, charity and donations, and so on can also benefit from this technological revolution.

Features of Blockchain Technology

- **Decentralization**

Transaction systems process used to be in a centralized manner, traditionally, where a centralized entity (the main or central bank) allows to perform transactions and also centralized unit charges some additional transaction charges for the execution of the dealings between the parties. But with the use of blockchain, no such centralized unit is required for transaction but in the blockchain to maintain data reliability in the distributed network, all units perform on consensus algorithms.

- **Immutable**

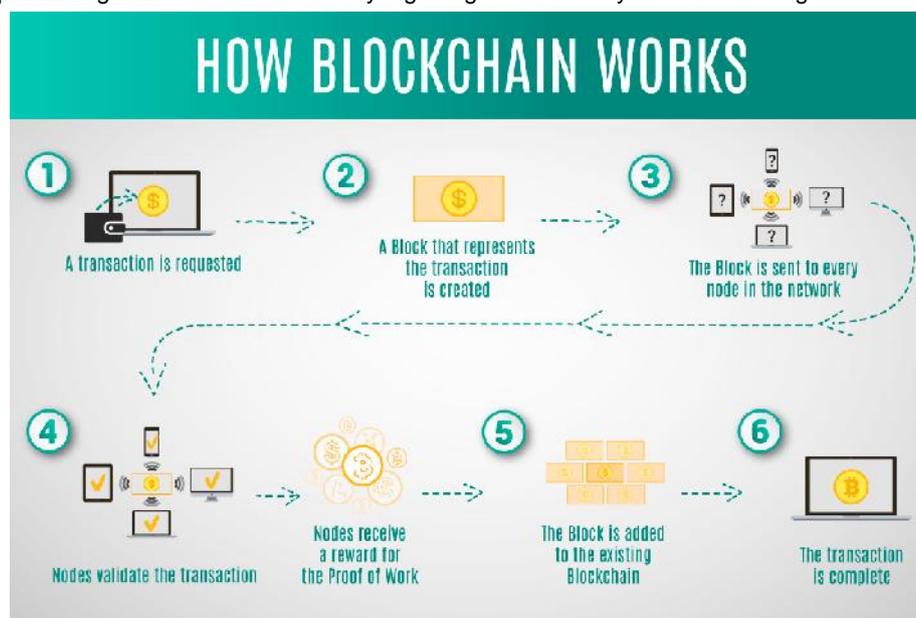
The security of the identity of the user is a primary concern, when two users transact with each other. In a blockchain application, the identity of the user is protected with the help of public-key cryptography. Every user identity is identified through the address, which is generated during the interaction of each other.

- **Transparency**

At present, in any network, mishandling of information is of prime concern. But in the case of the blockchain network, each block is made up of some information and this is provided with the hash address so that even a single change in the block reflects to everyone in the distributed network.

- **Working of Blockchain Technology**

Blockchains are a set of digitised blocks of information which are connected in a network. Every member in the entire network will get a shared copy of the full set of transactions stored in all blockchain. This way, even if any or many systems fail in the network, the original data and information stored in the interconnected system will always remain safe. Thus, the technology of blockchain is transparent, also helps in preventing data loss and has a very high degree of security in its functioning.



Source: mlsdev.com

It works on the basis of three important concepts: block, nodes, and miners.

- **Blocks**

Blockchain is formed by a combination of blocks and chain. Blockchain is the collection of multiple number of blocks, these blocks having the following elements:

A 32-bit whole number called a nonce (number only used once). The nonce is arbitrarily generated when a block is created, which then creates a block headers hash. This hash thus generated is a 256-bit number weeded to nonce. It should start with a large number of zeroes.

Nonce generates a cryptographic hash after the creation of the first block of the chain. The data in the block is assumed to be signed and endlessly tied to the nonce and hash until and unless it is mined.

- **Nodes**

Blockchain technology is a form of decentralized technology. Not a single computer and any single organization can own the chain. In its place, it is distributed ledger(DL)through the nodes linked to the chain. Any kind of electronic device can act as nodes which preserves replicas of the blockchain and keeps the network working and operating.

Each node has its own copy of the blockchain and the whole network must algorithmically support and agree to any newly mined block for the chain to be revised, updated, trusted, and verified. Since blockchains are transparent, so, every action that is happening in the ledger can be readily and easily checked and viewed. Every member is given an [exclusive alphanumeric identification number](#) that shows their transactions.

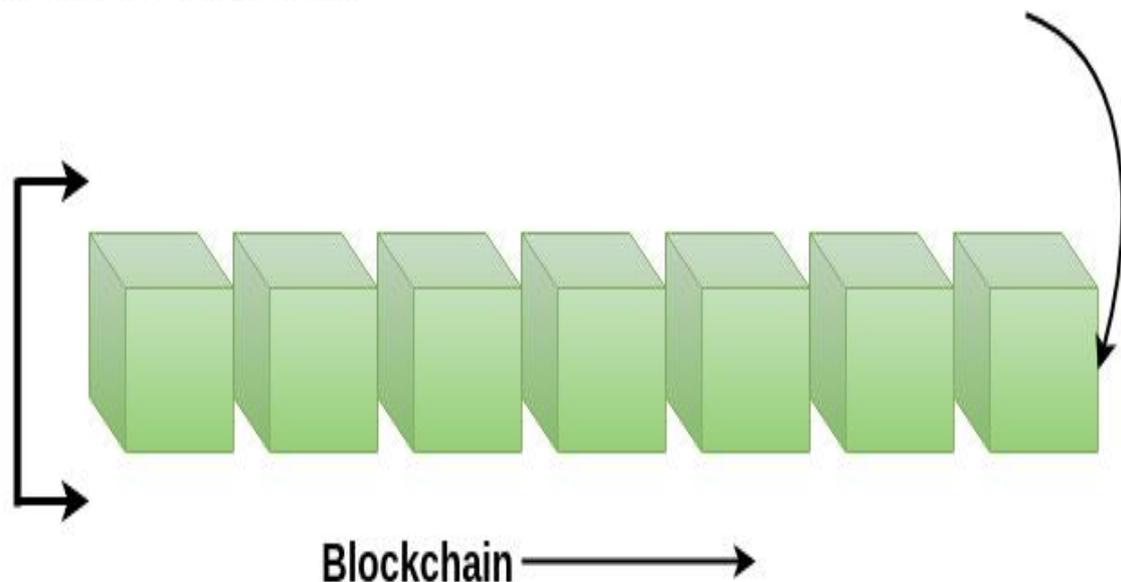
- **Miners**

Miners produce new block on the chain by a process called mining.

In blockchain application, every block has its own exclusive nonce(number only used once) and hash, but also the referenceof the hash of the preceding block in the chain, so mining a block isn't easy and is very difficult, especially on the chains which are very large.

Miners use some special software to resolve the incredibly compound math problem of finding a nonce(number only used once) that produces an accepted hash. Because the nonce is only 32 bits and the hash is 256 bits, there are about four billion probable nonce-hash combinations that must be mined before the accurate one is found. When that happens, miners are supposed to have found the "golden nonce" and then their block is added to the existing chain.

Information Flow in Blockchain



Information in a Blockchain flows from block to the nodes which then creates a new block of information. This block is added to the chain of blocks having data and information.

For example, if a Blockchain is used in money transfer, the flow of information will be:

When the individual makes a call to transfer money, it creates a request for the transaction. Then the following things will take place:

- This request for the transaction first represents online to the block itself.
- Once this information is received by the block then the block sends it again to various parties of the users.
- As this request is received by the parties (nodes) it is then analyzed and approved by all the various parties.
- The new block created can now be officially added to the existing block chain, after getting the approval of request
- After the addition of this block, the money is transferred to the other person.

Need of Blockchain

Blockchain has become popular because of the following requirements of the industry:

- **Time reduction:** Blockchain allow the quick settlement of trades in financial industry. It does not take the lengthy process for verification, payment, and clearance. Thus, saving a lot of time.
- **Unalterable Transaction:** Records are registered in chronological order in blockchain and once the block is added in the chain of the ledger it cannot be removed.
- **Reliability:** Blockchain is considered reliable. It endorses and verifies the identity of each party. This eradicates double records, decreases the rate of forgery, and accelerate the speed of transaction.
- **Security:** Blockchain security uses an advance cryptography procedure. It uses Distributed Ledger Technology (DLT) where each party holds a copy of the original chain, so the structure remains functioning and secure, even if a large number of other nodes fall.
- **Decentralized:** It is decentralized as there is no central authority supervising or being charge of anything. There are standards and guidelines on how every node interchange blockchain information. This method guarantees that all transactions are validated, and all valid transactions are added one by one and every party has access to it.

Pros and Cons of using Blockchain Technology

Pros

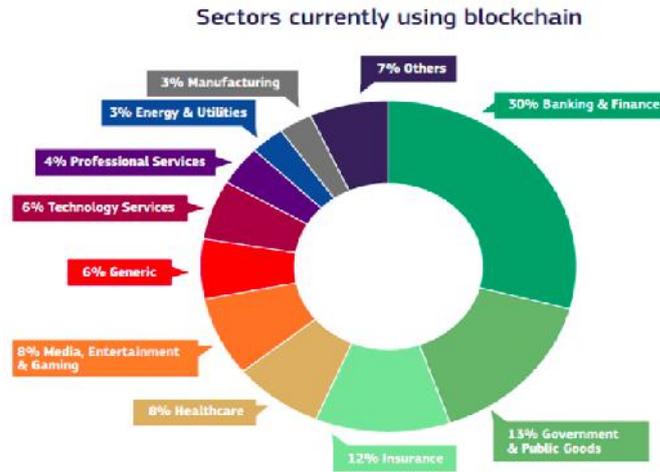
- Improve the accuracy by removing human participation in verification.
- Eliminating the third-party verification, results in reducing the cost.
- Decentralization makes it harder to temper.
- Transactions are efficient, very secure and thus private.
- It is a transparent technology, providing banking a good alternative and an effective way to secure personal information

Cons

- Significant technology costs.
- Low number of transactions per second.
- History may be used in some unlawful activities such as on the dark web.
- Regulation do remains uncertain sometimes and varies by jurisdiction.

Industries Using Blockchain

Blockchain is a revolutionary technology that has a huge potential and scope for the various areas of different industries. Different sectors that are using this revolutionary technology are health services, government organizations, transportation, banking, technology, manufacturing, finance, entertainment, games, and many more. Blockchain helps to perform many kinds of transaction like-transfer of data, possession right, currency, etc., the usage and spheres of application are unlimited.



Source: www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/global-blockchain/#.Wms8ZrPtytpo

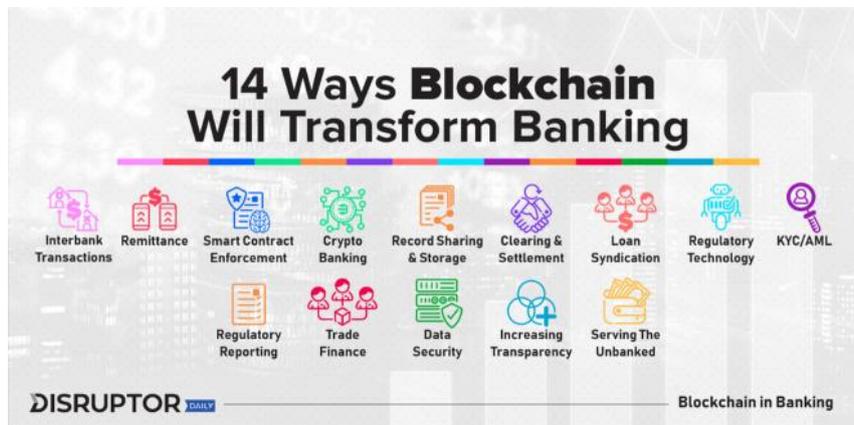
Blockchain application in Banking Industry in India

According to the apex bank, Reserve Bank of India (RBI), the banking sector in India is well-funded and well managed sector of the economy. The rapid changes in financial and economic environment in the country are much higher than in any other country in the world. Various risks are faced by the banking sector like debt risk, market and financial risk etc, Research suggests that Indian banks are generally more tough and better able to withstand global changes advancement and challenges.

The Indian banking industry has recently seen the introduction of fictitious banking types such as payments banks and small finance banks. New RBI measures could go a long way in restructuring the banking industry. One of the innovative moves is the approval of blockchain system in banking industry of India.

Various digital payment system in India have developed significantly among the 25 countries where India’s IMPS- Immediate Payment Service is the only five-level system in the index of Faster Payments Innovation Index (FPIL). Though digital payment systems are quick and efficient but they are not free from risks.

Block chain may be useful in about all the operations performed by a bank. In India it is now being used by few major banks to ensure privacy, security and to gain effectiveness in its working. Some of the major operations where it can be used are interbank transactions, crypto-banking, clearing and settlement, loan syndication, KYC, trade finance and many more.



Various risks associated with online banking facilities

- **Transaction Fees in Online Banking Facilities**

The cost of each transaction is the cost that businesses or customers pay to the service provider (banks) each time a customer payment is processed electronically. Payment for each transaction may change depending on the service provider (banks) but usually ranges from 0.5% and 5% with certain fixed payments.

- **Internet and Account Hacking**

Cash can be stolen from the bank account in a variety of ways. Sometimes fraudsters withdraw money from the bank. But they usually withdraw money using an ATM card or make purchases online or in-person with risky cards.

If cybercriminals hack into a bank account and can access a username, password and PIN they start shopping online and transfer money immediately. They try to pose a higher risk before the user can block the credit / debit card or may change banking details.

- **Financial Crises and Crashes**

There can be losses due to internet frauds and poor connections, especially in the country like India. Sending money to some 3rd party and then lost it somewhere due to internet frauds or connection error is a major risk.

Overcoming risks with the use of Blockchain technology in financial transactions

- **Decentralized System**

Imagine that a bank owns a server comprised of 20,000 computers use to maintain a database which is holding all of its client's personal account information. This bank owns a place that has all of the computers under one roof. It has full control of each of these computers and all the data and information contained within these computers. This, however, provides a failure from single point. What occurs if the electricity at that bank goes out? Or may be its internet connection is broken? What if someone deletes everything with only one keystroke? In any of the above cases, the data is lost, missed or corrupted.

The function of the blockchain technique is to allow the data held in that database to be distributed and shared among several network nodes at various sites. This not only generates redundancy, but also maintains the trustworthiness of the data stored therein: if anyone tries to change a record at one system which has the database, the other nodes would not be altered and so would prevent a someone from doing so.

- **Less Time Consuming**

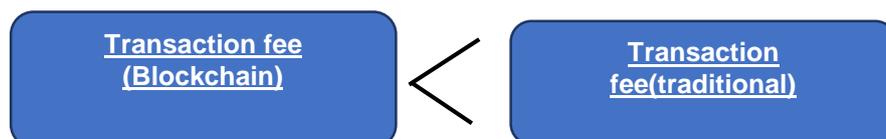
By installing the application of blockchain into banks, consumers(clients) can see their transactions getting processed in just a few minutes say, 10 minutes. Basically, it is only the time it takes to add a block to the blockchain, regardless of holidays or the time of day. With blockchain application, banks also have the opportunity to exchange funds between institutions more quickly and securely. Details of all transactions on the blockchain are open and robust available to all.

- **Verification**

This crucial process normally requires many steps and takes a long time, multiple duplications among financial institutions and banks. Blockchain is designed as such that it helps creating a decentralized, easily reachable, fast verifiable, and secure database of digital identities with privacy. Cambridge Blockchain and Trade Blockchain, Cloud Banking are fintech startups that uses Blockchain to improve and make effective various operation's in banks with the help of a customer verification system.

Low and no Transaction Fees: system

Usually, zero transaction fee is there when blockchain application is used, but certain variants do implement certain minimal transaction fees. This fee is usually lesser than traditional banking operations which do not use the concept of blockchain.



Present and future of Blockchain in Banking industry in India

In India 15 banks (4 public sector banks 10 private sector banks, and 1 foreign bank) have joined hands to start a new company, Indian Banks' Blockchain Infrastructure Co. Pvt Ltd. (IBBIC) which will help in using blockchain technology for processing inland letters of credit (LCs). It will also help in processing the GST invoices, and e-way bills easily and securely.

Currently, the process of issuing an LC is relatively slow and requires human intervention to prevent frauds, authenticate transactions, and balance the ledger. Blockchain when used to issue LCs would resolve these issues to some extent. Even fraud like the issue of two LCs fraudulently, on one invoice, can be easily prohibited with the help of this blockchain technology.

The company Indian Banks' Blockchain Infrastructure Co. Pvt Ltd. (IBBIC), will have identical share-holding from all the 15 banks that are participating in the pool. These banks are RBL Bank, HDFC Bank, , IndusInd Bank, Axis Bank Yes Bank, South Indian Bank, Federal Bank, IDFC First Bank, State Bank of India (SBI), ICICI Bank, Bank of Baroda (BoB), Canara Bank, Kotak Mahindra Bank, Indian Bank, and Standard Chartered Bank. The fund invested by each bank is Rs. 5 crores, thus creating a capital pool of Rs. 75 crores. After the adoption and use of [blockchain](#), banks are becoming unified and, as the whole industry gets benefitted, each bank will have some benefit as well. The Reserve Bank of India (RBI) has also been kept in the process to watch on the developments and it has no objection in this new venture of these banks along with IBBIC. The Institute for Development and Research in Banking Technology (IDRBT), which is the technology and research centre of RBI, is also in the course of developing a model blockchain application for meeting out various banking need.

The formation of IBBIC is somewhat similar to that of the National Payments Corporation of India (NPCI), that handles critical real-time products like RuPay, UPI, and FASTag. It was established in 2008 and in the beginning had only ten banks as the stakeholders. The cooperative model like this has been widely appreciated as banks do not care for their individual benefits and got associated at an unparalleled scale.

Before the inception of IBBIC, a trade system 'India Trade Connect' was designed by Infosys Finacle in 2018. It is a blockchain-based trade system which was formed in partnership with various banks, namely, Axis Bank, Kotak Mahindra Bank, ICICI Bank, IndusInd Bank, South Indian Bank, RBL Bank and Yes Bank. The network thus created was used by the above associated banks to go through a successful pilot testing of Finacle Trade Connect enterprise. It is this blockchain technology-based solution which is presently adopted by IBBIC. The company IBBIC is the result of larger contribution of the positive result of effective pilots done by the Trade Connect enterprise.

Integration of various independent companies to run blockchain based platforms is not new. Principal global blockchain trade finance platforms such as We trade, Komgo and the Contour begin out as associations of banks and some other companies. All the three have drifted away from that basic model and now operate as separate legal units. This is done as essential requirement to maintain good governance and neutrality of the platform. Independent and autonomous units can ensure that all the members are sharing data with a neutral entity and none of the members take unjustified advantage of the data accessible on the platform. These newly incorporated companies are presently running proof of concepts with the prevailing partners and are adding on new partners at a swift rate. Komgo, which is known to be the world's initial blockchain-based platform for commodity trade network. It is backed by fifteen of the world's giant global banks, trading concerns and oil giants, like BNP Paribas, ING, Citi, MUFG. Komgo rein forced close to US\$ 1 billion financing collected by network members within a year of its public launch.

The blockchain network is designed to digitalise trade finance business operations, including authentication of the ownership, certification of various documents and making payments, on a well organised distributed, decentralised, trusted and shared network. This network will generate new business prospects for the banks that are participating, while eradicating the inadequacies in the current trade operations and empowering everyone involved in a transaction to have only source of the correct information. The network allows for immediate transfer of messages and also documents between the parties involved in a completely secure manner thus, reducing lifecycle reversal time. The pilot run showed significant decrease in cycle time for inland letter of credit (LC); a reduction of 75% from 8-9 days to 2-3 days. Also, the use of digitisation techniques decreased the cost in two major areas of operations. These are document dispatch (courier) expenses and the operation or transaction cost that are connected with intermediary messaging systems. As invoices and other related documents were exclusively recognized and kept on the blockchain, danger of replica financing reduced significantly.

Future of banking with the application of Blockchain technology

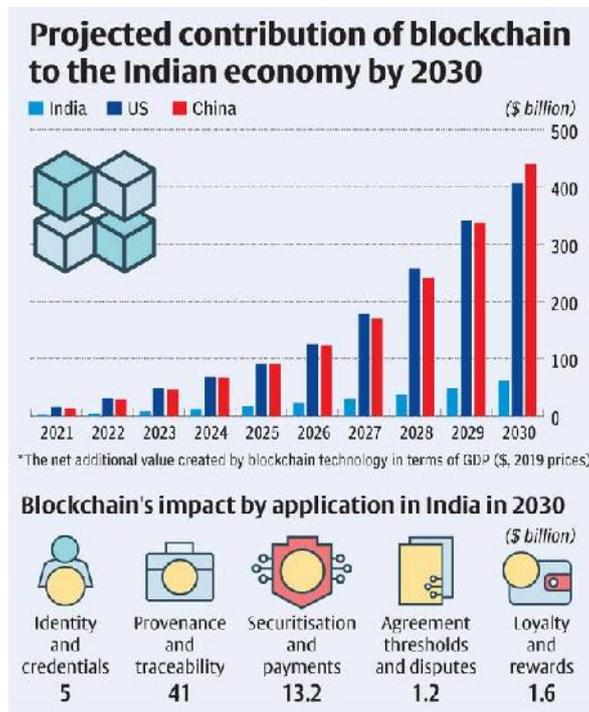
The banking system in India is now taking a new step forward in digitisation of business finance, which has traditionally been trapped down by older systems and paper-driven processes. The move to experimentation of blockchain in India, comes at a time when blockchain technology archetypes all over the world are fast-moving out. They have moved ahead from the first phase of experimentation to positioning and installation phase. The government is also set to introduce blockchain and cryptocurrency regulations in India.

The main concept of blockchain is to decentralise and dispense (distribute) data that is stored, so that no single being owns, controls or changes data, thus providing a single and unique source of reality. The move is expected to eliminate the old aged and traditional paperwork, reducing transaction processing time, and also offer a secure and safe environment to the business. Disbursements on domestic LCs, which used to take four to five days traditionally, can be done in approximately four hours.

The company, Banks' Blockchain Infrastructure Co. Pvt Ltd. (IBBIC), is planning to launch the platform for blockchain and may become fully operational in less than a year. It will have an open type of structure, which will permit and open up opportunities for new banks to invest in it and contribute, thereby developing a strong network. Domestic LCs are just a single step or say just the 'tip of the iceberg'. The industry has been exploring and experimenting with more intricate cases such as collateralized disbursement of loan, in-depth credit rating, and even transaction or operations traceability. At the same time, smart contracts ensure frauds are minimal. While these case studies are still in a budding form, the future looks hopeful as the traditional organizations converge with visionary engineers and the cutting-edge of technology.

PwC's Time for trust, issued a report on blockchain which was released in October 2020, estimated that in 2030, blockchain could uplift the global GDP by US\$1.76 trillion.

The PwC report also detailed that blockchain results in decentralization and traceability thus help firms confirm the source of goods and also help in tracing their movement in supply chains. These industries will have the highest impact of about \$41 billion in India, in the year 2030. This is then followed by solutions for payments and securitisation at about \$13.2 billion and numerous applications that can protect one's identity, credentials documents and certificates stored online and stop identity theft (at about US\$5 billion).



Source: PwC

Contribution to Economy

Data from the report also showed that blockchain's overall contribution to the Indian economy is projected to flow to US\$62.2 billion in the year 2030. But the problem is this number is approximately less than one-sixth of what it will be in the countries like US and China.

Both the world leaders, China and US are researching and competing to innovate with the use of blockchain and at the moment it seems like China is taking the lead. For instance, China has a blockchain policy and has even developed a state-sanctioned blockchain infrastructure project known as Blockchain-Based Service Network (BSN). While, India currently lacks any such project or policy which will bring it to a cutting edge.

But the irony is industrial involvement is very low in India in crypto or blockchain technology, and regulatory policies by the government and their uncertainty is the biggest obstacle in that. The top Indian tech giants would need regulatory policies to be told in precision before participating in a budding industry like blockchain.

Conclusion

The blockchain application is exclusive and has made its way into various industries. Using blockchain in various industries will have a consequence in huge industrial revolution. This technology allows for fruitful collaborations which will create lasting impacts in these industries. Thus, its adoption and use in the banking will undoubtedly result to better banking transactions and operation. More so, it will create efficient and effective banking systems for better service delivery. Most blockchain companies leverage on its adaptability to provide services unique to the banking sector and also to the other sectors of the economy.

Today, blockchain is regarded as the heartbeat of the financial sector and many other sectors by the 'World Economic Forum'. This indicates that this technology will play significant roles in the financial sector. Hence, brings about a technological revolution which will transform the banking sector for good in the coming future.

This unique technology of blockchain offers the banking industry many unique and secured opportunities. But certain challenges must be overcome for noticeable impacts to occur in the banking sector. To install this technology in the Indian banking sector, it must conform and follow recent privacy laws. This is necessary to protect individual and organizational data and also the safety of such data.

More so, the need for regulatory functions and oversight needs to be addressed by relevant authorities. The financial sector is synonymous with huge data. Hence, data scalability must be sorted out prior to deploying blockchain in the financial sector.

In summary, blockchain can have a major impact and it may revolutionize the banking sector. The only thing needed is its right application and use and also at the right time.

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